CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS
(NOTES omitted)

INSTRUMENTS

G06 COMPUTING; CALCULATING; COUNTING
(NOTES omitted)

G06F ELECTRIC DIGITAL DATA PROCESSING (computer systems based on specific computational models G06N)

NOTE
In this subclass, the following terms or expressions are used with the meaning indicated:
• "handling" includes processing or transporting of data;
• "data processing equipment" means an association of an electric digital data processor classifiable under group G06F 7/00, with one or more arrangements classifiable under groups G06F 1/00 - G06F 5/00 and G06F 9/00 - G06F 13/00.

WARNINGS
1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - G06F 3/18 covered by G06F 3/00, G06K 11/00
   - G06F 7/04 covered by G06F 7/02
   - G06F 9/302 - G06F 9/318 covered by G06F 9/30
2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 Details not covered by groups G06F 3/00 - G06F 13/00 and G06F 21/00 (architectures of general purpose stored program computers G06F 15/76)

1/02 Digital function generators { (evaluating functions by calculating only G06F 7/544, G06F 7/60; generating sawtooth or staircase waveforms H03K 4/00) }

1/022 . . . [Waveform generators, i.e. devices for generating periodical functions of time, e.g. direct digital synthesizers (G06F 1/025, G06F 1/03 take precedence)]

1/025 . . . for functions having two-valued amplitude, e.g. Walsh functions { (generation of pulse trains in general H03K 3/00) }

1/0255 . . . [Walsh or analogous functions]

1/03 . . . working, at least partly, by table look-up (G06F 1/025 takes precedence)

NOTE
In order to be classified in this group, the table must contain function values of the desired or an intermediate function, not merely coefficients.

1/0307 . . . [Logarithmic or exponential functions (G06F 1/0314, G06F 1/035 take precedence)]

1/0314 . . . [the table being stored on a peripheral device, e.g. papertape, drum]

1/0321 . . . [Waveform generators, i.e. devices for generating periodical functions of time, e.g. direct digital synthesizers (G06F 1/0314, G06F 1/035 take precedence)]

1/0328 . . . . . . [in which the phase increment is adjustable, e.g. by using an adder-accumulator]

1/0335 . . . . . . [the phase increment itself being a composed function of two or more variables, e.g. frequency and phase]

1/0342 . . . . . . [for generating simultaneously two or more related waveforms, e.g. with different phase angles only]

1/035 . . . Reduction of table size { (G06F 1/0314 takes precedence) }

1/0353 . . . . . . [by using symmetrical properties of the function, e.g. using most significant bits for quadrant control]

1/0356 . . . . . . [by using two or more smaller tables, e.g. addressed by parts of the argument]

1/04 . . . . Generating or distributing clock signals or signals derived directly therefrom

1/06 . . . . Clock generators producing several clock signals { (G06F 1/08 - G06F 1/14 take precedence) }

1/08 . . . . Clock generators with changeable or programmable clock frequency

1/10 . . . . Distribution of clock signals, e.g. skew

1/105 . . . . [in which the distribution is at least partially optical]

1/12 . . . . Synchronisation of different clock signals [provided by a plurality of clock generators]

1/14 . . . . Time supervision arrangements, e.g. real time clock

1/16 . . . . Constructional details or arrangements
G06F

I/1601 . . . {Constructional details related to the housing of computer displays, e.g. of CRT monitors, of flat displays (constructional details related to flat displays integrated in a portable computer, e.g. laptop, handheld computer G06F 1/1637; constructional details related to television receivers H04N 5/64)}

I/1603 . . . . {Arrangements to protect the display from incident light, e.g. hoods}

I/1605 . . . . {Multimedia displays, e.g. with integrated or attached speakers, cameras, microphones}

I/1607 . . . . {Arrangements to support accessories mechanically attached to the display housing (G06F 1/1603, G06F 1/1605 take precedence)}

I/1609 . . . . {to support filters or lenses}

I/1611 . . . . {to support document holders}

I/1613 . . . . {for portable computers (cooling arrangements therefor G06F 1/203; constructional details or arrangements for pocket calculators, electronic agendas or books G06F 15/0216; constructional details of portable telephone sets: with several bodies H04M 1/0202)}

I/1615 . . . . {with several enclosures having relative motions, each enclosure supporting at least one I/O or computing function (constructional details of portable telephones comprising a plurality of mechanically joined movable body parts H04M 1/0206)}

I/1616 . . . . {with folding flat displays, e.g. laptop computers or notebooks having a clamshell configuration, with body parts pivoting to an open position around an axis parallel to the plane they define in closed position}

I/1618 . . . . {the display being foldable up to the back of the other housing with a single degree of freedom, e.g. by 360° rotation over the axis defined by the rear edge of the base enclosure}

I/162 . . . . {changing, e.g. reversing, the face orientation of the screen with a two degrees of freedom mechanism, e.g. for folding into tablet PC like position or orienting towards the direction opposite to the user to show to a second user}

I/1622 . . . . {with enclosures rotating around an axis perpendicular to the plane they define or with ball-joint coupling, e.g. PDA with display enclosure orientation changeable between portrait and landscape by rotation with respect to a coplanar body enclosure}

I/1624 . . . . {with sliding enclosures, e.g. sliding keyboard or display}

I/1626 . . . . {with a single-body enclosure integrating a flat display, e.g. Personal Digital Assistants [PDAs]}

I/1628 . . . {Carrying enclosures containing additional elements, e.g. case for a laptop and a printer}

I/163 . . . . {Wearable computers, e.g. on a belt}

I/1632 . . . . {External expansion units, e.g. docking stations}

I/1633 . . . . {Constructional details or arrangements of portable computers not specific to the type of enclosures covered by groups G06F 1/1615 - G06F 1/1626}

I/1635 . . . . {Details related to the integration of battery packs and other power supplies such as fuel cells or integrated AC adapter (details of mounting batteries in general H01M 2/1023)}

I/1637 . . . . {Details related to the display arrangement, including those related to the mounting of the display in the housing (constructional details related to the housing of computer displays in general G06F 1/1601)}

I/1639 . . . . {the display being based on projection}

I/1641 . . . . {the display being formed by a plurality of foldable display components (G06F 1/1647 takes precedence)}

I/1643 . . . . {the display being associated to a digitizer, e.g. laptops that can be used as pempads (touchpads integrated in a laptop or similar computer G06F 1/169; secondary touch screen G06F 1/1692; details related to the relative motion of the display enclosure with respect to the body enclosure, e.g. to move between laptop and tablet PC configuration G06F 1/1615)}

I/1645 . . . . {the display being suitable to be used in combination with an external overhead projector}

I/1647 . . . . {including at least an additional display (G06F 1/1692 takes precedence)}

I/1649 . . . . {the additional display being independently orientable, e.g. for presenting information to a second user}

I/165 . . . . . {the additional display being small, e.g. for presenting status information}

I/1652 . . . . {the display being flexible, e.g. mimicking a sheet of paper, or rollable}

I/1654 . . . . {the display being detachable, e.g. for remote use}

I/1656 . . . . {Details related to functional adaptations of the enclosure, e.g. to provide protection against EMI, shock, water, or to host detachable peripherals like a mouse or removable expansions units like PCMCIA cards, or to provide access to internal components for maintenance or to removable storage supports like CDs or DVDs, or to mechanically mount accessories (mounting of accessories to a computer display G06F 1/1607; display hoods G06F 1/1603; cooling arrangements for portable computers G06F 1/203)}

I/1658 . . . . {related to the mounting of internal components, e.g. disc drive or any other functional module}

I/166 . . . . {related to integrated arrangements for adjusting the position of the main body with respect to the supporting surface, e.g. legs for adjusting the tilt angle}

I/1662 . . . . {Details related to the integrated keyboard}

I/1664 . . . . {Arrangements for ergonomically adjusting the disposition of keys of the integrated keyboard}
1/1666 . . . . . (Arrangements for reducing the size of the integrated keyboard for transport, e.g. foldable keyboards, keyboards with collapsible keys (G06F 1/1664 takes precedence))

1/1667 . . . . . (Arrangements for adjusting the tilt angle of the integrated keyboard independently from the main body (adjusting the tilt angle integrally with the main body G06F 1/1666))

1/1669 . . . . . (Detachable keyboards)

1/1671 . . . . . (Special purpose buttons or auxiliary keyboards, e.g. retractable mini keypads, keypads or buttons that remain accessible at closed laptop (G06F 1/1666 takes precedence))

1/1673 . . . . . (Arrangements for projecting a virtual keyboard)

1/1675 . . . . . (Miscellaneous details related to the relative movement between the different enclosures or enclosure parts which could be adopted independently from the movement typologies specified in G06F 1/1615 and subgroups)

1/1677 . . . . . (for detecting open or closed state or particular intermediate positions assumed by movable parts of the enclosure, e.g. detection of display lid position with respect to main body in a laptop, detection of opening of the cover of battery compartment)

1/1679 . . . . . (for locking or maintaining the movable parts of the enclosure in a fixed position, e.g. latching mechanism at the edge of the display in a laptop or for the screen protective cover of a PDA (G06F 1/1681 takes precedence))

1/1681 . . . . . (Details related solely to hinges (hinge details related to the transmission of signals or power are classified in G06F 1/1683))

1/1683 . . . . . (for the transmission of signal or power between the different housings, e.g. details of wired or wireless communication, passage of cabling)

1/1684 . . . . . (Constructional details or arrangements related to integrated I/O peripherals not covered by groups G06F 1/1635 - G06F 1/1675)

1/1686 . . . . . (the I/O peripheral being an integrated camera)

1/1688 . . . . . (the I/O peripheral being integrated loudspeakers)

1/169 . . . . . (the I/O peripheral being an integrated pointing device, e.g. trackball in the palm rest area, mini-joystick integrated between keyboard keys, touch pads or touch stripes (G06F 1/1643 takes precedence; constructional details of pointing devices G06F 3/033; joysticks in general G05G 9/047))

1/1692 . . . . . (the I/O peripheral being a secondary touch screen used as control interface, e.g. virtual buttons or sliders)

1/1694 . . . . . (the I/O peripheral being a single or a set of motion sensors for pointer control or gesture input obtained by sensing movements of the portable computer)

1/1696 . . . . . (the I/O peripheral being a printing or scanning device)

1/1698 . . . . . (the I/O peripheral being a sending/receiving arrangement to establish a cordless communication link, e.g. radio or infrared link, integrated cellular phone (details of antennas disposed inside a computer H01Q 1/2266))

1/18 . . . . . Packaging or power distribution (for electrical apparatus in general H05K, H02J)

1/181 . . . . . (Enclosures (for electric apparatus in general H05K 5/00; for portable computers G06F 1/1613))

1/182 . . . . . (with special features, e.g. for use in industrial environments; grounding or shielding against radio frequency interference [RFI] or electromagnetic interference [EMI] (in general H05K 9/00))

1/183 . . . . . (Internal mounting support structures, e.g. for printed circuit boards (in general H05K 7/1422), internal connecting means (for buses G06F 13/409))

1/184 . . . . . (Mounting of motherboards (in general H05K 7/1429))

1/185 . . . . . (Mounting of expansion boards (in general H05K 7/1417))

1/186 . . . . . (Securing of expansion boards in correspondence to slots provided at the computer enclosure (in general H05K 7/1402))

1/187 . . . . . (Mounting of fixed and removable disk drives (constructional details of disk drives housings in general G11B 33/00))

1/188 . . . . . (Mounting of power supply units (power supply for computers, per se G06F 1/26))

1/189 . . . . . (Power distribution)

1/20 . . . . . Cooling means

1/203 . . . . . (for portable computers, e.g. for laptops)

1/206 . . . . . (comprising thermal management)

1/22 . . . . . Means for limiting or controlling the pin/gate ratio

1/24 . . . . . Resetting means

1/26 . . . . . Power supply means, e.g. regulation thereof (for memories G11C)

1/263 . . . . . (Arrangements for using multiple switchable power supplies, e.g. battery and AC (G06F 1/30 takes precedence))

1/266 . . . . . (Arrangements to supply power to external peripherals either directly from the computer or under computer control, e.g. supply of power through the communication port, computer controlled power-strips)

1/28 . . . . . Supervision thereof, e.g. detecting power-supply failure by out of limits supervision

1/30 . . . . . Means for acting in the event of power-supply failure or interruption, e.g. power-supply fluctuations (for resetting only G06F 1/24)

1/305 . . . . . (in the event of power-supply fluctuations)

1/32 . . . . . Means for saving power

1/3203 . . . . . Power management, i.e. event-based initiation of power-saving mode
3007. [Digital input from or digital output to memories of the shift register type, e.g. magnetic bubble memories, CCD memories (magnetic bubble memories per se G11C 19/08, CCD memories per se G11C 19/28)]

3001. Input arrangements or combined input and output arrangements for interaction between user and computer (G06F 3/16 takes precedence)

3011. [Arrangements for interaction with the human body, e.g. for user immersion in virtual reality (for handicapped people in general A61F 4/00; robot control B25J; tactile signalling G09B; blind teaching G09B 21/00; for electrophonic musical instruments G10H 1/344; electronic switches characterised by the way in which the control signals are generated H03K 17/94)]

3012. [Head tracking input arrangements]

3013. [Eye tracking input arrangements (G06F 3/015 takes precedence)]

3014. [Hand-worn input/output arrangements, e.g. data gloves]

3015. [Input arrangements based on nervous system activity detection, e.g. brain waves [EEG] detection, electromyograms [EMG] detection, electrodermal response detection]

3016. [Input arrangements with force or tactile feedback as computer generated output to the user]

3017. [Gesture based interaction, e.g. based on a set of recognized hand gestures (interaction based on gestures traced on a digitiser G06F 3/04883)]

3018. [Input/output arrangements for oriental characters]

302. Input arrangements using manually operated switches, e.g. using keyboards or dials (keyboard switches per se H01H 13/00; switches per se H01H 13/70; electronic switches characterised by the way in which the control signals are generated H03K 17/94)

3020. [Constructional details or processes of manufacture of the input device]

30205. [Lever arrangements for operating keyboard cursor control keys in a joystick-like manner]

30208. [Arrangements for adjusting the tilt angle of a keyboard, e.g. pivoting legs (for keyboards integrated in a laptop computer G06F 1/1667)]

3021. [Arrangements integrating additional peripherals in a keyboard, e.g. card or barcode reader, optical scanner]

30213. [Arrangements providing an integrated pointing device in a keyboard, e.g. trackball, mini-joystick (for pointing devices integrated in a laptop computer G06F 1/1669; joysticks G05G 9/047; constructional details of pointing devices G06F 3/033)]

30216. [Arrangements for ergonomically adjusting the disposition of keys of a keyboard (for keyboards integrated in a laptop computer G06F 1/1664)]

30219. [Special purpose keyboards]
3/0221 . . . . [Arrangements for reducing keyboard size for transport or storage, e.g. foldable keyboards, keyboards with collapsible keys (G06F 3/0216 takes precedence; for keyboards integrated in a laptop computer G06F 1/1660)]

3/0224 . . . . [Key guide holders]

3/0227 . . . . [Cooperation and interconnection of the input arrangement with other functional units of a computer (G06F 3/023 - G06F 3/037 take precedence)]

3/023 . . . . Arrangements for converting discrete items of information into a coded form, e.g. arrangements for interpreting keyboard generated codes as alphanumeric codes, operand codes or instruction codes (coding in connection with keyboards or like devices in general H03M 11/00)]

3/0231 . . . . [Cordless keyboards]

3/0232 . . . . [Manual direct entries, e.g. key to main memory]

3/0233 . . . . [Character input methods]

3/0234 . . . . [using switches operable in different directions]

3/0235 . . . . [using chord techniques (G06F 3/0234 takes precedence)]

3/0236 . . . . [using selection techniques to select from displayed items]

3/0237 . . . . [Programmable keyboards (key guide holders G06F 3/0224)]

3/0238 . . . . [Programmable keyboards (key guide holders G06F 3/0224)]

3/027 . . . . for insertion of decimal point ([display of decimal point G06F 3/1407; complete desktop or hand-held calculators G06F 15/02)]

3/03 . . . . Arrangements for converting the position or the displacement of a member into a coded form

**NOTE**

In this group, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.


3/0308 . . . . [comprising a plurality of distinctive and separately oriented light emitters or reflectors associated to the pointing device, e.g. remote cursor controller with distinct and separately oriented LEDs at the tip whose radiations are captured by a photo-detector associated to the screen]

3/0312 . . . . [for tracking the rotation of a spherical or circular member, e.g. optical rotary encoders used in mice or trackballs using a tracking ball or in mouse scroll wheels (tracking relative movement in co-operation with a regularly or irregularly patterned surface, e.g. as in optical mice G06F 3/0317; constructional details of scroll or thumb-wheels G06F 3/0362; optical rotary encoders G01D 5/3473; thumb wheel switches H01H 19/00)]

3/0317 . . . . [in co-operation with a patterned surface, e.g. absolute position or relative movement detection for an optical mouse or pen positioned with respect to a coded surface]

3/0321 . . . . [by optically sensing the absolute position with respect to a regularly patterned surface forming a passive digitiser, e.g. pen optically detecting position indicative tags printed on a paper sheet (constructional details of pen-shaped pointing devices G06F 3/03545, G06F 3/03542, G06F 3/037)]

3/0325 . . . . [using a plurality of light emitters or reflectors or a plurality of detectors forming a reference frame from which to derive the orientation of the object, e.g. by triangulation or on the basis of reference deformation in the picked up image]

3/033 . . . . Pointing devices displaced or positioned by the user, e.g. mice, trackballs, pens or joysticks; Accessories therefor ([constructional details of joysticks G05G 9/047; arrangement for interfacing a joystick to a computer G06F 3/038)]

3/0334 . . . . [Foot operated pointing devices]

3/0338 . . . . [with detection of limited linear or angular displacement of an operating part of the device from a neutral position, e.g. isotonic or isometric joysticks]

3/0346 . . . . [with detection of the device orientation or free movement in a 3D space, e.g. 3D mice, 6-DOF (six degrees of freedom) pointers using gyroscopes, accelerometers or tilt-sensors]

3/0354 . . . . [with detection of 2D relative movements between the device, or an operating part thereof, and a plane or surface, e.g. 2D mice, trackballs, pens or pucks]

3/03541 . . . . [Mouse/trackball convertible devices, in which the same ball is used to track the 2D relative movement]

3/03542 . . . . [Light pens for emitting or receiving light]

3/03543 . . . . [Mice or pucks (G06F 3/03541 takes precedence)]

3/03544 . . . . [having dual sensing arrangement, e.g. two balls or two coils used to track rotation of the pointing device]

3/03545 . . . . [Pens or stylus]

3/03546 . . . . [using a rotatable ball at the tip as position detecting member]

3/03547 . . . . [Touch pads, in which fingers can move on a surface]
{Sliders, in which the moving part moves in a plane}

{Trackballs (G06F 3/03541 takes precedence)}

with detection of 1D translations or rotations of an operating part of the device, e.g. scroll wheels, sliders, knobs, rollers or belts

using the raster scan of a cathode-ray tube [CRT] for detecting the position of the member, e.g. light pens cooperating with CRT monitors

Control and interface arrangements therefor, e.g. drivers or device-embedded control circuitry

{Signal control means within the pointing device}

{for light pen}

Accessories therefor, e.g. mouse pads

**WARNING**

Group G06F 3/039 is impacted by reclassification into group G06F 3/0393.
Groups G06F 3/039 and G06F 3/0393 should be considered in order to perform a complete search.

{Accessories for touch pads or touch screens, e.g. mechanical guides added to touch screens for drawing straight lines, hard keys overlaying touch screens or touch pads}

**WARNING**

Group G06F 3/0393 is impacted by reclassification into group G06F 3/0393.
Groups G06F 3/039 and G06F 3/0393 should be considered in order to perform a complete search.

{Mouse pads}

Digitisers, e.g. for touch screens or touch pads, characterised by the transducing means

{Digitisers structurally integrated in a display}

{using force sensing means to determine a position}

**WARNING**

All groups listed in this Warning should be considered in order to perform a complete search.

{the force sensing means being located peripherally, e.g. disposed at the corners or at the side of a touch sensing plate}

**WARNING**

Group G06F 3/04142 is incomplete pending reclassification of documents from group G06F 3/0414.
Groups G06F 3/0414 and G06F 3/04142 should be considered in order to perform a complete search.

using an array of force sensing means (position sensing using the local deformation of sensor cells G06F 3/0447)

**WARNING**

Group G06F 3/04144 is incomplete pending reclassification of documents from group G06F 3/0414.
Groups G06F 3/0414 and G06F 3/04144 should be considered in order to perform a complete search.

{using pressure sensitive conductive elements delivering a boolean signal and located between crossing sensing lines, e.g. located between X and Y sensing line layers}

**WARNING**

Group G06F 3/04146 is incomplete pending reclassification of documents from group G06F 3/0414.
Groups G06F 3/0414 and G06F 3/04146 should be considered in order to perform a complete search.

{Control or interface arrangements specially adapted for digitisers}

**WARNING**

All groups listed in this Warning should be considered in order to perform a complete search.

{for exchanging data with external devices, e.g. smart pens, via the digitiser sensing hardware}

**WARNING**

Group G06F 3/04162 is incomplete pending reclassification of documents from group G06F 3/0416.
Groups G06F 3/0416 and G06F 3/04162 should be considered in order to perform a complete search.


3/04164 . . . . . . {Connections between sensors and controllers, e.g. routing lines between electrodes and connection pads}

**WARNING**

Group G06F 3/04164 is incomplete pending reclassification of documents from group G06F 3/0416.
Groups G06F 3/0416 and G06F 3/04164 should be considered in order to perform a complete search.

3/04166 . . . . . . {Details of scanning methods, e.g. sampling time, grouping of sub areas or time sharing with display driving (Synchronisation with the driving of the display or the backlighting unit to avoid interferences generated internally G06F 3/04184)}

**WARNING**

Group G06F 3/04166 is incomplete pending reclassification of documents from group G06F 3/0416.
Groups G06F 3/0416 and G06F 3/04166 should be considered in order to perform a complete search.

3/041661 . . . . . . {using detection at multiple resolutions, e.g. coarse and fine scanning; using detection within a limited area, e.g. object tracking window}

**WARNING**

Group G06F 3/041661 is incomplete pending reclassification of documents from group G06F 3/0416.
Groups G06F 3/0416 and G06F 3/041661 should be considered in order to perform a complete search.

3/041662 . . . . . . {using alternate mutual and self-capacitive scanning}

**WARNING**

Group G06F 3/041662 is incomplete pending reclassification of documents from group G06F 3/0416.
Groups G06F 3/0416 and G06F 3/041662 should be considered in order to perform a complete search.

3/0418 . . . . . . {for error correction or compensation, e.g. based on parallax, calibration or alignment}

**WARNING**

All groups listed in this Warning should be considered in order to perform a complete search.

3/04182 . . . . . . {Filtering of noise external to the device and not generated by digitiser components}

**WARNING**

Group G06F 3/04182 is incomplete pending reclassification of documents from group G06F 3/0418.
Groups G06F 3/0418 and G06F 3/04182 should be considered in order to perform a complete search.

3/04184 . . . . . . {Synchronisation with the driving of the display or the backlighting unit to avoid interferences generated internally}

**WARNING**

Group G06F 3/04184 is incomplete pending reclassification of documents from group G06F 3/0418.
Groups G06F 3/0418 and G06F 3/04184 should be considered in order to perform a complete search.

3/04186 . . . . . . {Touch location disambiguation}

**WARNING**

Group G06F 3/04186 is incomplete pending reclassification of documents from group G06F 3/0418.
Groups G06F 3/0418 and G06F 3/04186 should be considered in order to perform a complete search.

3/042 . . . . . . by opto-electronic means
3/0421 . . . . . . {by interrupting or reflecting a light beam, e.g. optical touch-screen}
3/0423 . . . . . . {using sweeping light beams, e.g. using rotating or vibrating mirror}
3/0425 . . . . . . {using a single imaging device like a video camera for tracking the absolute position of a single or a plurality of objects with respect to an imaged reference surface, e.g. video camera imaging a display or a projection screen, a table or a wall surface, on which a computer generated image is displayed or projected (tracking a projected light spot to determine a position on a display surface G06F 3/0386)}
3/0426 . . . . . . {tracking fingers with respect to a virtual keyboard projected or printed on the surface (virtual keyboards on touch screens G06F 3/04886)}
3/0428 . . . . . . {by sensing at the edges of the touch surface the interruption of optical paths, e.g. an illumination plane, parallel to the touch surface which may be virtual (sensing beam interruptions in a planar beam grid of an optical touch-screen G06F 3/0421)}
3/043 . . . . . . using propagating acoustic waves
1. This group covers subject matter where the focus is placed on the way the user can interact with the displayed data. The mere presence of a standard GUI in the context of the disclosure of a specific software application or a specific device capable of processing data related to its specific function, should be in general classified in the appropriate subclasses related to those software applications or specific devices.

2. In this group, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups, which is considered to represent information of interest for search, should be classified in each of those groups.

3/0433 . . . . (in which the acoustic waves are either generated by a movable member and propagated within a surface layer or propagated within a surface layer and captured by a movable member)

3/0436 . . . . (in which generating transducers and detecting transducers are attached to a single acoustic waves transmission substrate)

3/044 . . . . by capacitive means

**WARNING**


3/0441 . . . . (using active external devices, e.g. active pens, for receiving changes in electrical potential transmitted by the digitiser, e.g. tablet driving signals)

3/0442 . . . . (using active external devices, e.g. active pens, for transmitting changes in electrical potential to be received by the digitiser)

3/0443 . . . . (using a single layer of sensing electrodes)

3/0444 . . . . (using a single conductive element covering the whole sensing surface, e.g. by sensing the electrical current flowing at the corners)

3/0445 . . . . (using two or more layers of sensing electrodes, e.g. using two layers of electrodes separated by a dielectric layer)

3/0446 . . . . (using a grid-like structure of electrodes in at least two directions, e.g. using row and column electrodes)

3/0447 . . . . (Position sensing using the local deformation of sensor cells)

3/0448 . . . . (Details of the electrode shape, e.g. for enhancing the detection of touches, for generating specific electric field shapes, for enhancing display quality)

3/045 . . . . using resistive elements, e.g. single continuous surface or two parallel surfaces put in contact

3/046 . . . . by electromagnetic means

3/047 . . . . using sets of wires, e.g. crossed wires

3/048 . . . . Interaction techniques based on graphical user interfaces [GUI]

**NOTES**

1. This group covers subject matter where the focus is placed on the way the user can interact with the displayed data. The mere presence of a standard GUI in the context of the disclosure of a specific software application or a specific device capable of processing data related to its specific function, should be in general classified in the appropriate subclasses related to those software applications or specific devices.

2. In this group, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups, which is considered to represent information of interest for search, should be classified in each of those groups.

3/0481 . . . . based on specific properties of the displayed interaction object or a metaphor-based environment, e.g. interaction with desktop elements like windows or icons, or assisted by a cursor's changing behaviour or appearance

3/04812 . . . . (interaction techniques based on cursor appearance or behaviour being affected by the presence of displayed objects, e.g. visual feedback during interaction with elements of a graphical user interface through change in cursor appearance, constraint movement or attraction/repulsion with respect to a displayed object (interaction techniques based on cursor behaviour involving tactile or force feedback G06F 3/016))

3/04815 . . . . (Interaction with three-dimensional environments, e.g. control of viewpoint to navigate in the environment)

3/04817 . . . . (using icons (graphical programming languages using iconic symbols G06F 8/34))

3/0482 . . . . interaction with lists of selectable items, e.g. menus

3/0483 . . . . interaction with page-structured environments, e.g. book metaphor

3/0484 . . . . for the control of specific functions or operations, e.g. selecting or manipulating an object or an image, setting a parameter value or selecting a range

3/04842 . . . . (Selection of a displayed object (G06F 3/0482 takes precedence))

3/04845 . . . . (for image manipulation, e.g. dragging, rotation)

3/04847 . . . . (Interaction techniques to control parameter settings, e.g. interaction with sliders, dials)

3/0485 . . . . Scrolling or panning

3/04855 . . . . [Interaction with scrollbars]

3/0486 . . . . Drag-and-drop

3/0487 . . . . using specific features provided by the input device, e.g. functions controlled by the rotation of a mouse with dual sensing arrangements, or of the nature of the input device, e.g. tap gestures based on pressure sensed by a digitiser

3/0488 . . . . using a touch-screen or digitiser, e.g. input of commands through traced gestures

3/04883 . . . . (for entering handwritten data, e.g. gestures, text)

3/04886 . . . . (by partitioning the screen or tablet into independently controllable areas, e.g. virtual keyboards, menus (G06F 3/04883 takes precedence))

3/0489 . . . . using dedicated keyboard keys or combinations thereof
information retrieval G06F 16/00
memory systems or architectures G06F 12/00
systems G06F 11/00
correction, monitoring per se
networked record carriers ( recording or reproducing
(carriers, { e.g. RAID, emulated record carriers,
regarding storage
Digital input from or digital output to record
converter or output to d/a converter }
{ Dedicated interfaces to storage systems }
{ making use of a particular technique }
{ specifically adapted to achieve a particular effect }
{ Improving or facilitating administration,
 e.g. storage management }
(by facilitating the interaction with a user
or administrator)
(by facilitating the process of upgrading
existing storage systems, e.g. for
improving compatibility between host and
storage device)
(Saving storage space on storage systems)
[Improving I/O performance]
[in relation to response time]
[in relation to throughput]
[Improving the reliability of storage systems]
[in relation to life time, e.g. increasing
Mean Time Between Failures [MTBF]]
[in relation to availability]
[in relation to data integrity, e.g. data
losses, bit errors]
[Securing storage systems]
[in relation to access]
[in relation to content]
[Power saving in storage systems]
[Reducing size or complexity of storage systems]
[making use of a particular technique]
[Configuration or reconfiguration of storage systems]
(by allocating resources to storage systems]
(by initialisation or re-initialisation of
storage systems]
(by changing the state or mode of one or
more devices]
(by changing the path, e.g. traffic
rerouting, path reconfiguration]
Digital output to print unit, e.g. line printer, chain printer

3/1201 [Dedicated interfaces to print systems]
3/1202 [specifically adapted to achieve a particular effect]
3/1203 [Improving or facilitating administration, e.g. print management]
3/1204 [resulting in reduced user or operator actions, e.g. presetting, automatic actions, using hardware token storing data]
3/1205 [resulting in increased flexibility in print job configuration, e.g. job settings, print requirements, job tickets]
3/1206 [resulting in increased flexibility in input data format or job format or job type]
3/1207 [resulting in the user being informed about print result after a job submission]
3/1208 [resulting in improved quality of the output result, e.g. print layout, colours, workflows, print preview]
3/1209 [resulting in adapted or bridged legacy communication protocols, e.g. emulation, protocol extension]
3/121 [Facilitating exception or error detection and recovery, e.g. fault, media or consumables depleted]
3/1211 [Improving printing performance]
3/1212 [achieving reduced delay between job submission and print start]
3/1213 [at an intermediate node or at the final node]
3/1214 [at the submitting node]
3/1215 [achieving increased printing speed, i.e. reducing the time between printing start and printing end]
3/1217 [achieving reduced idle time at the output device or increased asset utilization]
3/1218 [Reducing or saving of used resources, e.g. avoiding waste of consumables or improving usage of hardware resources]
3/1219 [with regard to consumables, e.g. ink, toner, paper]
3/122 [with regard to computing resources, e.g. memory, CPU]
3/1221 [with regard to power consumption]
3/1222 [Increasing security of the print job]
3/1223 [specifically adapted to use a particular technique]
3/1224 [Client or server resources management]
3/1225 [Software update, e.g. print driver, modules, plug-ins, fonts]
3/1226 [Discovery of devices having required properties]

3/1227 [Printer definition files]
3/1228 [Printing driverless or using generic drivers]
3/1229 [Printer resources management or printer maintenance, e.g. device status, power levels]
3/123 [Software or firmware update, e.g. device firmware management]
3/1231 [Device related settings, e.g. IP address, Name, Identification]
3/1232 [Transmitting printer device capabilities, e.g. upon request or periodically]
3/1234 [Errors handling and recovery, e.g. reprinting] (G06F 3/1261 takes precedence)
3/1235 [caused by end of consumables, e.g. paper, ink, toner]
3/1236 [Connection management]
3/1237 [Print job management]
3/1238 [Secure printing, e.g. user identification, user rights for device usage, unallowed content, blanking portions or fields of a page, releasing held jobs]
3/1239 [Restricting the usage of resources, e.g. usage or user levels, credit limit, consumables, special fonts]
3/124 [Parallel printing or parallel ripping]
3/1241 [Dividing a job according to job requirements, e.g. black/white and colour pages, covers and body of books, tabs]
3/1242 [Image or content composition onto a page]
3/1243 [Variable data printing, e.g. document forms, templates, labels, coupons, advertisements, logos, watermarks, transactional printing, fixed content versioning]
3/1244 [Job translation or job parsing, e.g. page banding]
3/1245 [by conversion to intermediate or common format]
3/1246 [by handling markup languages, e.g. XSL, XML, HTML]
3/1247 [by conversion to printer ready format]
3/1248 [by printer language recognition, e.g. PDL, PCL, PDF]
3/125 [Page layout or assigning input pages onto output media, e.g. imposition]
3/1251 [for continuous media, e.g. web media, rolls]
3/1252 [for sheet based media]
3/1253 [Configuration of print job parameters, e.g. using UI at the client]
3/1254 [Automatic configuration, e.g. by driver]
3/1255 [Settings incompatibility, e.g. constraints, user requirements vs. device capabilities]
3/1256 [User feedback, e.g. print preview, test print, proofing, pre-flight checks]
3/1257 [by using pre-stored settings, e.g. job templates, presets, print styles]
3/1258 [by updating job settings at the printer]
3/1259 [Print job monitoring, e.g. job status]
G06F

3/126 . . . . . . . . . . . . [Job scheduling, e.g. queuing, determine appropriate device]
3/1261 . . . . . . . . . . . . [by using alternate printing]
3/1262 . . . . . . . . . . . . [by grouping or gang printing]
3/1263 . . . . . . . . . . . . [based on job priority, e.g. re-arranging the order of jobs, e.g. the printing sequence]
3/1264 . . . . . . . . . . . . [by assigning post-processing resources]
3/1265 . . . . . . . . . . . . [Printing by reference, e.g. retrieving document/image data for a job from a source mentioned in the job]
3/1267 . . . . . . . . . . . . [Job repository, e.g. non-scheduled jobs, delay printing]
3/1268 . . . . . . . . . . . . [Job submission, e.g. submitting print job order or request not the print data itself]
3/1269 . . . . . . . . . . . . [by broadcasting server]
3/127 . . . . . . . . . . . . [by using hot folders, e.g. folder for which print settings or print data management rules are set in advance]
3/1271 . . . . . . . . . . . . [Job submission at the printing node, e.g. creating a job from a data stored locally or remotely (G06F 3/1238 takes precedence)]
3/1272 . . . . . . . . . . . . [Digital storefront, e.g. e-ordering, web2print, submitting a job from a remote submission screen]
3/1273 . . . . . . . . . . . . [Print job history, e.g. logging, accounting, tracking]
3/1274 . . . . . . . . . . . . [Deleting of print job]
3/1275 . . . . . . . . . . . . [Print workflow management, e.g. defining or changing a workflow, cross publishing]
3/1276 . . . . . . . . . . . . [within a printer driver, e.g. driver resides either on a server or on a client]
3/1277 . . . . . . . . . . . . [using filter pipeline, e.g. outside the driver, adding traps]
3/1278 . . . . . . . . . . . . [specifically adapted to adopt a particular infrastructure]
3/1279 . . . . . . . . . . . . [Controller construction, e.g. aspects of the interface hardware]
3/128 . . . . . . . . . . . . [Direct printing, e.g. sending document file, using memory stick, printing from a camera]
3/1281 . . . . . . . . . . . . [Multi engine printer devices, e.g. one entity having multiple output engines]
3/1282 . . . . . . . . . . . . [High volume printer device]
3/1284 . . . . . . . . . . . . [Local printer device]
3/1285 . . . . . . . . . . . . [Remote printer device, e.g. being remote from client or server]
3/1286 . . . . . . . . . . . . [via local network]
3/1287 . . . . . . . . . . . . [via internet]
3/1288 . . . . . . . . . . . . [in client-server-printer device configuration]
3/1289 . . . . . . . . . . . . [in server-client-printer device configuration, e.g. the server does not see the printer]
3/129 . . . . . . . . . . . . [in server-printer device-client configuration, e.g. print flow goes from server to printer and then bidirectional from printer to client, i.e. the client does not communicate with the server]
3/1291 . . . . . . . . . . . . [Pool of printer devices; self-managing printing devices in a network, e.g. without a server]
3/1292 . . . . . . . . . . . . [Mobile client, e.g. wireless printing]
3/1293 . . . . . . . . . . . . [Printer information exchange with computer]
3/1294 . . . . . . . . . . . . [Status or feedback related to information exchange]
3/1295 . . . . . . . . . . . . [Buffering means]
3/1296 . . . . . . . . . . . . [Printer job scheduling or printer resource handling]
3/1297 . . . . . . . . . . . . [Printer code translation, conversion, emulation, compression; Configuration of printer parameters]
3/1298 . . . . . . . . . . . . [Printer language recognition, e.g. programme control language, page description language]
3/13 . . . . . . . . . . . . . Digital output to plotter; [Cooperation and interconnection of the plotter with other functional units]
3/14 . . . . . . . . . . . . . Digital output to display device; [Cooperation and interconnection of the display device with other functional units] (control of display in general G09G; arrangements for producing a permanent visual presentation of the output data G06K 15/00)
3/1407 . . . . . . . . . . . . . (General aspects irrespective of display type, e.g. determination of decimal point position, display with fixed or driving decimal point, suppression of non-significant zeros)
3/1415 . . . . . . . . . . . . [with means for detecting differences between the image stored in the host and the images displayed on the displays]
3/1423 . . . . . . . . . . . . [controlling a plurality of local displays, e.g. CRT and flat panel display]
3/1431 . . . . . . . . . . . . [using a single graphics controller]
3/1438 . . . . . . . . . . . . [using more than one graphics controller]
3/1446 . . . . . . . . . . . . [display composed of modules, e.g. video walls]
3/1454 . . . . . . . . . . . . [involving copying of the display data of a local workstation or window to a remote workstation or window so that an actual copy of the data is displayed simultaneously on two or more displays, e.g. teledisplay]
3/1462 . . . . . . . . . . . . [with means for detecting differences between the image stored in the host and the images displayed on the remote displays]
3/147 . . . . . . . . . . . . . using display panels
3/1475 . . . . . . . . . . . . [with conversion of CRT control signals to flat panel control signals, e.g. adapting the palette memory]
3/153 . . . . . . . . . . . . . using cathode-ray tubes
3/16 . . . . . . . . . . . . . Sound input; Sound output (speech processing G10L)
3/162 . . . . . . . . . . . . [Interface to dedicated audio devices, e.g. audio drivers, interface to CODECs]
3/165 . . . . . . . . . . . . [Management of the audio stream, e.g. setting of volume, audio stream path]
3/167 . . . . . . . . . . . . [Audio in a user interface, e.g. using voice commands for navigating, audio feedback]

5/00 Methods or arrangements for data conversion without changing the order or content of the data handled (by coding or decoding H03M)
5/01 . . . . . . . . . . . . . for shifting, e.g. justifying, scaling, normalising (digital stores in which the information is moved stepwise, e.g. shift-registers G11C 19/00; digital stores in which the information circulates G11C 21/00))
5/012 . . . . . . . . . . . . [in floating-point computations]
Methods or arrangements for processing data by operating upon the order or content of the data handled (logic circuits H03K 19/00)

7/02 . Comparing digital values (G06F 7/06, G06F 7/38 take precedence; information retrieval G06F 16/00; comparing pulses H03K 5/22)

7/03 . [adaptive, e.g. self learning]

7/06 . Arrangements for sorting, selecting, merging or comparing data on individual record carriers (sorting of postal letters B07C; conveying record carriers from one station to another G06K 13/02)

7/08 . Sorting, i.e. grouping record carriers in numerical or other ordered sequence according to the classification of at least some of the information they carry (by merging two or more sets of carriers in ordered sequence G06F 7/16)

7/10 . Selecting, i.e. obtaining data of one kind from those record carriers which are identifiable by data of a second kind from a mass of ordered or randomly-distributed record carriers

7/12 . with provision for printing-out a list of selected items

7/14 . Merging, i.e. combining at least two sets of record carriers each arranged in the same ordered sequence to produce a single set having the same ordered sequence

7/16 . Combined merging and sorting

7/20 . Comparing separate sets of record carriers arranged in the same sequence to determine whether at least some of the data in one set is identical with that in the other set or sets

7/22 . Arrangements for sorting or merging computer data on continuous record carriers, e.g. tape, drum, disc

7/24 . Sorting, i.e. extracting data from one or more carriers, rearranging the data in numerical or other ordered sequence, and rerecording the sorted data on the original carrier or on a different carrier or set of carriers (sorting methods in general) (G06F 7/36 takes precedence)

7/26 . the sorted data being recorded on the original record carrier within the same space in which the data had been recorded prior to their sorting, without using intermediate storage

7/32 . Merging, i.e. combining data contained in ordered sequence on at least two record carriers to produce a single carrier or set of carriers having all the original data in the ordered sequence (merging methods in general) (G06F 7/36 takes precedence)

7/36 . Combined merging and sorting

7/38 . Methods or arrangements for performing computations using exclusively denotational number representation, e.g. using binary, ternary, decimal representation

7/381 . [using cryogenic components, e.g. Josephson gates]

7/383 . [using magnetic or similar elements (parametric and resonant circuits G06F 7/388)]

7/385 . [magnetic bubbles]

7/386 . [decimal, radix 20 or 12 (G06F 7/385 takes precedence)]

7/388 . [using other various devices such as electrochemical, microwave, surface acoustic wave, neuristor, electron beam switching, resonant, e.g. parametric, ferro-resonant]

7/40 . [using contact-making devices, e.g. electromagnetc relay (G06F 7/46 takes precedence)]

7/405 . [binary]

7/42 . Adding; Subtracting (G06F 7/405 takes precedence)

7/44 . Multiplying; Dividing (G06F 7/405 takes precedence)

7/443 . [by successive additions or subtractions]

7/446 . [by partial product forming (with electric multiplication table)]

7/46 . using electromechanical counter-type accumulators

7/461 . [Adding; subtracting]

7/462 . [Multiplying; dividing]

7/463 . [by successive additions or subtractions]

7/465 . [by partial product forming (with electric multiplication table)]

7/466 . [by successive multiplication or division by 2]

7/467 . [by using preset multiples of the multiplicand or the divisor]

7/468 . [for evaluating functions by calculation]

7/48 . using non-contact-making devices, e.g. tube, solid state device; using unspecified devices

7/4806 . [Computations with complex numbers]

7/4812 . [Complex multiplication]

7/4818 . [using coordinate rotation digital computer [CORDIC]]

7/4824 . [using signed-digit representation]
7/483 . . . . Computations with numbers represented by a non-linear combination of denominational numbers, e.g. rational numbers, logarithmic number system, floating-point numbers (conversion to or from floating-point codes H03M 7/24)  
(G06F 7/4806, G06F 7/4824, G06F 7/49, G06F 7/491, G06F 7/544 take precedence)  
7/4833 . . . . [Logarithmic number system]  
7/4836 . . . . [Computations with rational numbers]  
7/485 . . . . Adding; Subtracting (G06F 7/4833, G06F 7/4836 take precedence)  
7/487 . . . . Multiplying; Dividing (G06F 7/4833, G06F 7/4836 take precedence)  
7/4873 . . . . [Dividing]  
7/4876 . . . . [Multiplying]  
7/49 . . . . Computations with a radix, other than binary, 8, 16 or decimal, e.g. ternary, negative or imaginary radices, mixed radix (non-linear PCM (G06F 7/4824 takes precedence)  
7/491 . . . . Computations with decimal numbers (radix 12 or 20, (G06F 7/4824 takes precedence)  
7/4912 . . . . (Adding; Subtracting (G06F 7/492, G06F 7/498 takes precedence)  
7/4915 . . . . (Multiplying; Dividing (G06F 7/492, G06F 7/498 takes precedence)  
7/4917 . . . . [Dividing]  
7/492 . . . . using a binary weighted representation within each denomination ((G06F 7/498 takes precedence)  
7/4925 . . . . (Adding; Subtracting (G06F 7/493 takes precedence)  
7/493 . . . . the representation being the natural binary coded representation, i.e. 8421-code  
7/494 . . . . Adding; Subtracting  
7/495 . . . . in digit-serial fashion, i.e. having a single digit-handling circuit treating all denominations after each other  
7/496 . . . . Multiplying; Dividing  
7/498 . . . . using counter-type accumulators  
7/4981 . . . . [Adding; Subtracting]  
7/4983 . . . . [Multiplying; Dividing]  
7/4985 . . . . [by successive additions or subtractions]  
7/4986 . . . . [by successive multiplication or division by 2]  
7/4988 . . . . [by table look-up]  
7/499 . . . . Denomination or exception handling, e.g. rounding, overflow  

**NOTE**  
{ documents published before 12-2005 are not systematically classified in the subgroups of G06F 7/499; See the relevant subgroup of G06F 7/48 and the ICOs G06F 7/499 + }  

7/49905 . . . . [Exception handling]  
7/4991 . . . . [Overflow or underflow]  
7/49915 . . . . [Mantissa overflow or underflow in handling floating-point numbers]  
7/49921 . . . . [Saturation, i.e. clipping the result to a minimum or maximum value]  
7/49926 . . . . [Division by zero]  
7/49931 . . . . [Modulo N reduction of final result]  
7/49936 . . . . [Normalisation mentioned as feature only]  
7/49942 . . . . [Significance control]  
7/49947 . . . . [Rounding]  
7/49952 . . . . [Sticky bit]  
7/49957 . . . . [Implementation of IEEE-754 Standard]  
7/49963 . . . . [Rounding to nearest (G06F 7/4995 takes precedence)]  
7/49968 . . . . [Rounding towards positive infinity (G06F 7/4995 takes precedence)]  
7/49973 . . . . [Rounding towards negative infinity, e.g. truncation of two's complement numbers (G06F 7/4995 takes precedence)]  
7/49978 . . . . [Rounding towards zero (G06F 7/4995 takes precedence)]  
7/49984 . . . . [Rounding away from zero]  
7/49989 . . . . [Interval arithmetic]  
7/49994 . . . . [Sign extension]  
7/50 . . . . Adding; Subtracting  
(G06F 7/483 - G06F 7/491, G06F 7/544 take precedence)  
7/501 . . . . Half or full adders, i.e. basic adder cells for one denomination (EXCLUSIVE-OR circuits H03K 19/21)  
7/5013 . . . . [using algebraic addition of the input signals, e.g. Kirchhoff adders]  
7/5016 . . . . [forming at least one of the output signals directly from the minterms of the input signals, i.e. with a minimum number of gate levels]  
7/502 . . . . Half adders; Full adders consisting of two cascaded half adders ((G06F 7/5013 takes precedence)  
7/503 . . . . using carry switching, i.e. the incoming carry being connected directly, or only via an inverter, to the carry output under control of a carry propagate signal  
7/504 . . . . in bit-serial fashion, i.e. having a single digit-handling circuit treating all denominations after each other  
7/5045 . . . . [for multiple operands]  
7/505 . . . . in bit-parallel fashion, i.e. having a different digit-handling circuit for each denomination (half or full adders G06F 7/5013)  
7/5052 . . . . [using carry completion detection, either over all stages or at sample stages only]  
7/5055 . . . . [in which one operand is a constant, i.e. incrementers or decrementers]  
7/5057 . . . . [using table look-up]; using programmable logic arrays (G06F 7/509 takes precedence)  
7/506 . . . . with simultaneous carry generation for, or propagation over, two or more stages  
7/507 . . . . using selection between two conditionally calculated carry or sum values  
7/508 . . . . using carry look-ahead circuits  
7/509 . . . . for multiple operands, e.g. digital integrators  
7/5095 . . . . [word-serial, i.e. with an accumulator-register]
7/52 . . . Multiplying; Dividing
(G06F 7/483 - G06F 7/491, G06F 7/544 take precedence)

7/523 . . . Multiplying only
7/5235 . . . (using indirect methods, e.g. quarter square method, via logarithmic domain)
7/525 . . . in serial-serial fashion, i.e. both operands being entered serially (G06F 7/533 takes precedence)
7/527 . . . in serial-parallel fashion, i.e. one operand being entered serially and the other in parallel (G06F 7/533 takes precedence)
7/5272 . . . {with row wise addition of partial products}
7/5275 . . . {using carry save adders}
7/5277 . . . {with column wise addition of partial products}

7/53 . . . in parallel-parallel fashion, i.e. both operands being entered in parallel (G06F 7/533 takes precedence)
7/5306 . . . {with row wise addition of partial products (G06F 7/5324 takes precedence)}
7/5312 . . . {using carry save adders}
7/5318 . . . {with column wise addition of partial products, e.g. using Wallace tree, Dadda counters (G06F 7/5324 takes precedence)}
7/5324 . . . {partitioned, i.e. using repetitively a smaller parallel parallel multiplier or using an array of such smaller multipliers}
7/533 . . . Reduction of the number of iteration steps or stages, e.g. using the Booth algorithm, log-sum, odd-even
7/5332 . . . {by skipping over strings of zeroes or ones, e.g. using the Booth Algorithm}
7/5334 . . . {by using multiple bit scanning, i.e. by decoding groups of successive multiplier bits in order to select an appropriate precalculated multiple of the multiplicand as a partial product}
7/5336 . . . {overlapped, i.e. with successive bitgroups sharing one or more bits being recoded into signed digit representation, e.g. using the Modified Booth Algorithm}
7/5338 . . . . . . {each bitgroup having two new bits, e.g. 2nd order MBA}
7/535 . . . Dividing only
7/537 . . . Reduction of the number of iteration steps or stages, e.g. using the Sweeney-Robertson-Tocher [SRT] algorithm
7/5375 . . . {Non restoring calculation, where each digit is either negative, zero or positive, e.g. SRT;}
7/544 . . . for evaluating functions by calculation (G06F 7/4824 takes precedence)
7/5443 . . . {Sum of products (for applications thereof, see the relevant places, e.g. G06F 7/7/10, H03H 17/00)}
7/5446 . . . {using crossaddition algorithms, e.g. CORDIC}
7/548 . . . Trigonometric functions; Co-ordinate transformations

7/552 . . . . . . Powers or roots, [e.g. Pythagorean sums]
7/5525 . . . . . . (Roots or inverse roots of single operands)
7/556 . . . . . . Logarithmic or exponential functions
7/57 . . . . . . Arithmetic logic units [ALU], i.e. arrangements or devices for performing two or more of the operations covered by groups G06F 7/483 - G06F 7/556 or for performing logical operations (instruction execution G06F 9/30) (G06F 7/49, G06F 7/491 take precedence; logic gate circuits H03K 19/00)
7/575 . . . . . . Basic arithmetic logic units, i.e. devices selectable to perform either addition, subtraction or one of several logical operations, using, at least partially, the same circuitry

7/58 . Random or pseudo-random number generators
7/582 . . . [Pseudo-random number generators]
7/584 . . . {using finite field arithmetic, e.g. using a linear feedback shift register}
7/586 . . . {using an integer arithmetic, e.g. using linear congruential method}
7/588 . . . {Random number generators, i.e. based on natural stochastic processes}
7/60 . Methods or arrangements for performing computations using a digital non-denominational number representation, i.e. number representation without radix; Computing devices using combinations of denominational and non-denominational quantity representations, e.g. using difference pulse trains, STEELE computers, phase computers (conversion of digital data to or from non-denominational form H03M 5/00, H03M 7/00)
7/602 . . . {using delta-sigma sequences}
7/605 . . . {Additive or subtractive mixing of two pulse rates into one (beat-frequency oscillators H03B 21/00; input circuits of electric counters, e.g. up-down counters H03K 21/00)}
7/607 . . . {number-of-ones counters, i.e. devices for counting the number of input lines set to ONE among a plurality of input lines, also called bit counters or parallel counters (for applications thereof, see the relevant places, e.g. G06F 7/49, G06F 7/5/013, G06F 7/709, H03M 1/00, H03M 7/201)}
7/62 . . . Performing operations exclusively by counting total number of pulses; {Multiplication, division or derived operations using combined denominational and incremental processing by counters, i.e. without column shift (G06F 7/68 takes precedence)}
7/64 . . . Digital differential analysers, i.e. computing devices for differentiation, integration or solving differential or integral equations, using pulses representing increments; Other incremental computing devices for solving difference equations (G06F 7/70 takes precedence; differential analysers using hybrid computing techniques G06J 1/02; {DAA application in numerical control G05B 19/18})
7/66 . . . wherein pulses represent unitary increments only
7/68 . . using pulse rate multipliers or dividers [pulse rate multipliers or dividers per se] (G06F 7/70 takes precedence; frequency division in electronic watches G04G 3/02; frequency multiplication or division in oscillators H03B 19/00; frequency dividing counters per se H03K 23/00 - H03K 29/00))

7/70 . . using stochastic pulse trains, i.e. randomly occurring pulses the average pulse rates of which represent numbers (conversion of analogue signals into stochastic pulse trains and vice versa H03M 1.04)

7/72 . . using residue arithmetic
7/721 . . [Modular inversion, reciprocal or quotient calculation (G06F 7/724, G06F 7/727, G06F 7/728 takes precedence)]
7/722 . . [Modular multiplication (G06F 7/724, G06F 7/727, G06F 7/728 takes precedence)]
7/723 . . [Modular exponentiation (G06F 7/724, G06F 7/727, G06F 7/728 takes precedence)]
7/724 . . [Finite field arithmetic (for error detection or correction in general H03M 13.00, in computers G06F 11/10)]
7/725 . . (over elliptic curves)
7/726 . . [Inversion; Reciprocal calculation; Division of elements of a finite field]
7/727 . . [Modulo N arithmetic, with N being either (2**n)-1, 2**n or (2**n)+1, e.g. mod 3, mod 4 or mod 5 (G06F 7/728 takes precedence)]
7/728 . . [using Montgomery reduction]
7/729 . . [using representation by a residue number system]
7/74 . . Selecting or encoding within a word the position of one or more bits having a specified value, e.g. most or least significant one or zero detection, priority encoders [with shifting G06F 5/01]
7/76 . . Arrangements for rearranging, permuting or selecting data according to predetermined rules, independently of the content of the data (according to the content of the data G06F 7/06, G06F 7/22; parallel / series conversion or vice versa H03M 9/00)
7/762 . . [having at least two separately controlled rearrangement levels, e.g. multistage interconnection networks (G06F 7/764 - G06F 7/768 take precedence)]
7/764 . . [Masking]
7/766 . . [Generation of all possible permutations]
7/768 . . [Data position reversal, e.g. bit reversal, byte swapping]
7/78 . . for changing the order of data flow, e.g. matrix transposition, LIPO buffers; Overflow or underflow handling therefor
7/785 . . [having a sequence of storage locations each being individually accessible for both enqueue and dequeue operations, e.g. using a RAM]

8/00 Arrangements for software engineering (testing or debugging G06F 11/36; administrative, planning or organisation aspects of software project management G06Q 10/06)
8/10 . . Requirements analysis; Specification techniques
8/20 . . Software design
8/22 . . [Procedural]
8/24 . . [Object-oriented]
8/30 . . Creation or generation of source code
8/31 . . [Programming languages or programming paradigms]
8/311 . . [Functional or applicable languages; Rewrite languages]
8/312 . . [List processing, e.g. LISP programming language]
8/313 . . [Logic programming, e.g. PROLOG programming language]
8/3135 . . [Unification or backtracking]
8/314 . . [Parallel programming languages (G06F 8/313 takes precedence)]
8/315 . . [Object-oriented languages]
8/316 . . [Aspect-oriented programming techniques]
8/33 . . Intelligent editors
8/34 . . Graphical or visual programming
8/35 . . model driven
8/355 . . [Round-trip engineering]
8/36 . . Software reuse
8/37 . . [Compiler construction; Parser generation]
8/38 . . for implementing user interfaces
8/40 . . Transformation of program code
8/41 . . Compilation
8/42 . . [Syntactic analysis]
8/423 . . [Preprocessors]
8/425 . . [Lexical analysis]
8/427 . . [Parsing]
8/43 . . [Checking; Contextual analysis]
8/433 . . [Dependency analysis; Data or control flow analysis]
8/434 . . [Points; Aliasing]
8/436 . . [Semantic checking]
8/437 . . [Type checking]
8/44 . . [Encoding]
8/441 . . [Register allocation; Assignment of physical memory space to logical memory space]
8/443 . . [Optimisation]
8/4432 . . [Reducing the energy consumption]
8/4434 . . [Reducing the memory space required by the program code]
8/4435 . . [Detection or removal of dead or redundant code]
8/4436 . . [Exlining; Procedural abstraction]
8/4441 . . [Reducing the execution time required by the program code]
8/4442 . . [Reducing the number of cache misses; Data prefetching (cache prefetching G06F 12/0862)]
8/4443 . . [Inlining]
8/445 . . [Exploiting fine grain parallelism, i.e. parallelism at instruction level (run-time instruction scheduling G06F 9/3836)]
8/4451 . . [Avoiding pipeline stalls]
8/4452 . . [Software pipelining]
8/447 . . [Target code generation]
8/45 . . [Exploiting coarse grain parallelism in compilation, i.e. parallelism between groups of instructions]
8/451 . . [Code distribution (considering CPU load at run-time G06F 9/505; load rebalancing G06F 9/5083)]
8/452 . . [Loops]
8/453 . . [Data distribution]
8/454  . . . . (Consistency (cache consistency protocols in hierarchically structured memory systems G06F 12/0815))
8/456  . . . . [Parallelism detection]
8/457  . . . . [Communication (intertask communication G06F 9/54)]
8/458  . . . . [Synchronisation, e.g. post-wait, barriers, locks (synchronisation among tasks G06F 9/52)]
8/47  . . . . [Retargetable compilers]
8/48  . . . . [Incremental compilation (software reuse G06F 8/36)]
8/49  . . . . [Partial evaluation]
8/51  . . Source to source
8/52  . . Binary to binary
8/53  . . Decompilation; Disassembly
8/54  . . Link editing before load time
8/60  . Software deployment
8/61  . Installation
8/62  . [Uninstallation]
8/63  . . [Image based installation; Cloning; Build to order]
8/64  . . [Retargetable]
8/65  . . Updates (security arrangements therefor G06F 21/57)

**WARNING**

Group G06F 8/65 is impacted by reclassification into groups G06F 21/57 - G06F 21/577.

All groups listed in this Warning should be considered in order to perform a complete search.

8/654  . . . using techniques specially adapted for alterable solid state memories, e.g. for EEPROM or flash memories
8/656  . . . while running
8/658  . . . Incremental updates; Differential updates
8/66  . . . [of program code stored in read-only memory (ROM)]
8/70  . Software maintenance or management
8/71  . . Version control (security arrangements therefor G06F 21/57); Configuration management

**WARNING**

Group G06F 8/71 is impacted by reclassification into groups G06F 21/57-G06F 21/577.

All groups listed in this Warning should be considered in order to perform a complete search.

8/72  . . Code refactoring
8/73  . . Program documentation
8/74  . . Reverse engineering; Extracting design information from source code
8/75  . . Structural analysis for program understanding
8/751  . . [Code clone detection]
8/76  . . Adapting program code to run in a different environment; Porting
8/77  . . Software metrics
8/78  . . [Methods to solve the "Year 2000" [Y2K] problem]

9/00  . Arrangements for program control, e.g. control units (program control for peripheral devices G06F 13/10)
9/02  . . using wired connections, e.g. plugboards
9/04  . . using record carriers containing only program instructions (G06F 9/06 takes precedence)
9/06  . . using stored programs, i.e. using an internal store of processing equipment to receive or retain programs
9/22  . . Microcontrol or microprogram arrangements
9/23  . . . . [Execution means for microinstructions irrespective of the microinstruction function, e.g. decoding of microinstructions and nanoinstructions; timing of microinstructions; programmable logic arrays; delays and fan-out problems]
9/26  . . . . Address formation of the next micro-instruction (G06F 9/28 takes precedence) (; Microprogram storage or retrieval arrangements)
9/261  . . . . [Microinstruction address formation]
9/262  . . . . [Arrangements for next microinstruction selection]
9/264  . . . . . . [Microinstruction selection based on results of processing]
9/265  . . . . . . [by address selection on input of storage]
9/267  . . . . . . [by instruction selection on output of storage]
9/268  . . . . . . [Microinstruction selection not based on processing results, e.g. interrupt, patch, first cycle store, diagnostic programs]
9/28  . . . . . . Enhancement of operational speed, e.g. by using several microcontrol devices operating in parallel
9/30  . . . . . . Arrangements for executing machine instructions, e.g. instruction decode (for executing microinstructions G06F 9/22)
9/30003  . . . . . . [Arrangements for executing specific machine instructions]
9/30007  . . . . . . . [to perform operations on data operands]
9/3001  . . . . . . . . [Arithmetic instructions]
9/30014  . . . . . . . . . [with variable precision]
9/30018  . . . . . . . . . . [Bit or string instructions; instructions using a mask]
9/30021  . . . . . . . . . . . [Compare instructions, e.g. Greater-Than, Equal-To, MINMAX]
9/30025  . . . . . . . . . . [Format conversion instructions, e.g. Floating-Point to Integer, decimal conversion]
9/30029  . . . . . . . . . . . [Logical and Boolean instructions, e.g. XOR, NOT]
9/30032  . . . . . . . . . . . . [Movement instructions, e.g. MOVE, SHIFT, ROTATE, SHUFFLE]
9/30036  . . . . . . . . . . . . [Instructions to perform operations on packed data, e.g. vector operations]
9/3004  . . . . . . . . . . . . . [to perform operations on memory]
9/30043  . . . . . . . . . . . . . [LOAD or STORE instructions; Clear instruction]
9/30047  . . . . . . . . . . . . . [Prefetch instructions; cache control instructions]
9/3005  . . . . . . . . . . . . . [to perform operations for flow control]
9/30054 . . . . [Unconditional branch instructions]
9/30058 . . . . [Conditional branch instructions]
9/30061 . . . . [Multi-way branch instructions, e.g. CASE]
9/30065 . . . . (Loop control instructions; iterative instructions, e.g. LOOP, REPEAT)
9/30069 . . . . [Instruction skipping instructions, e.g. SKIP]
9/30072 . . . . [to perform conditional operations, e.g. using guard]
9/30076 . . . . [to perform miscellaneous control operations, e.g. NOP]
9/30079 . . . . [Pipeline control instructions]
9/30083 . . . . [Power or thermal control instructions]
9/30087 . . . . [Synchronisation or serialisation instructions]
9/3009 . . . . [Thread control instructions]
9/30094 . . . . [Condition code generation, e.g. Carry, Zero flag]
9/30098 . . . . [Register arrangements]
9/30101 . . . . [Special purpose registers]
9/30105 . . . . [Register structure]
9/30109 . . . . [having multiple operands in a single register]
9/30112 . . . . [for variable length data, e.g. single or double registers]
9/30116 . . . . [Shadow registers, e.g. coupled registers, not forming part of the register space]
9/3012 . . . . [Organisation of register space, e.g. banked or distributed register file]
9/30123 . . . . [according to context, e.g. thread buffers]
9/30127 . . . . [Register windows]
9/3013 . . . . [according to data content, e.g. floating-point registers, address registers]
9/30134 . . . . [Register stacks; shift registers]
9/30138 . . . . [Extension of register space, e.g. register cache]
9/30141 . . . . [Implementation provisions of register files, e.g. ports]
9/30145 . . . . [Instruction analysis, e.g. decoding, instruction word fields]
9/30149 . . . . [of variable length instructions]
9/30152 . . . . [Determining start or end of instruction; determining instruction length]
9/30156 . . . . [Special purpose encoding of instructions, e.g. Gray coding]
9/3016 . . . . [Decoding the operand specifier, e.g. specifier format]
9/30163 . . . . [with implied specifier, e.g. top of stack]
9/30167 . . . . [of immediate specifier, e.g. constants]
9/3017 . . . . [Runtime instruction translation, e.g. macros]
9/30174 . . . . [for non-native instruction set, e.g. Java byte, legacy code]
9/30178 . . . . [of compressed or encrypted instructions]
9/30181 . . . . [Instruction operation extension or modification]
9/30185 . . . . [according to one or more bits in the instruction, e.g. prefix, sub-opcode]
9/30189 . . . . [according to execution mode, e.g. mode flag]
9/30192 . . . . [according to data descriptor, e.g. dynamic data typing]
9/30196 . . . . [using decoder, e.g. decoder per instruction set, adaptable or programmable decoders]
9/32 . . . . [Address formation of the next instruction, e.g. by incrementing the instruction counter (G06F 9/38 takes precedence)]
9/321 . . . . [Program or instruction counter, e.g. incrementing]
9/322 . . . . [for non-sequential address]
9/324 . . . . [for program counter relative addressing]
9/325 . . . . [for loops, e.g. loop detection, loop counter]
9/327 . . . . [for interrupts]
9/328 . . . . [for runtime instruction patching]
9/34 . . . . [Addressing or accessing the instruction operand or the result; Formation of operand address; Addressing modes (address translation G06F 12/00)]
9/342 . . . . [Extension of operand address space]
9/345 . . . . [of multiple operands or results (addressing multiple banks G06F 12/06)]
9/3455 . . . . [using stride]
9/35 . . . . [Indirect addressing, i.e. using single address operand, e.g. address register]
9/355 . . . . [Indexed addressing, i.e. using more than one address operand]
9/3552 . . . . [using wraparound, e.g. modulo or circular addressing]
9/3555 . . . . [using scaling, e.g. multiplication of index]
9/3557 . . . . [using program counter as base address]
9/38 . . . . [Concurrent instruction execution, e.g. pipeline, look ahead]
9/3802 . . . . [Instruction prefetching]
9/3804 . . . . [for branches, e.g. hedging, branch folding]
9/3806 . . . . [using address prediction, e.g. return stack, branch history buffer]
9/3808 . . . . [for instruction reuse, e.g. trace cache, branch target cache]
9/381 . . . . [Loop buffering]
9/3812 . . . . [with instruction modification, e.g. store into instruction stream]
9/3814 . . . . [Implementation provisions of instruction buffers, e.g. prefetch buffer; banks]
9/3816 . . . . [Instruction alignment, e.g. cache line crossing]
9/3818 . . . . [Decoding for concurrent execution]
9/382 . . . . [Pipelined decoding, e.g. using predecoding]
9/3822 . . . . [Parallel decoding, e.g. parallel decode units]
9/3824 . . . . [Operand accessing]
9/3826 . . . . [Data result bypassing, e.g. locally between pipeline stages, within a pipeline stage]
9/3828 . . . . [with global bypass, e.g. between pipelines, between clusters]
9/383 . . . . [Operand prefetching (cache prefetching G06F 12/0862)]
9/3832 . . . . [Value prediction for operands; operand history buffers]
9/3834 . . . . [Maintaining memory consistency (cache consistency protocols G06F 12/0815)]
Functional units using a plurality of independent parallel processor G06F 15/8053 (peripheral processor G06F 13/12; vector correction G06F 11/00)

Exception handling (error detection or recovery, e.g. branch miss-prediction, exception handling (error detection or correction G06F 11/00))

Result writeback, i.e. updating the architectural state

With result invalidation, e.g. nullification

Recovery, e.g. branch miss-prediction, exception handling (error detection or correction G06F 11/00)

Using deferred exception handling, e.g. exception flags

Using instruction pipelines

Implementation aspects, e.g. pipeline latches; pipeline synchronisation and clocking

Asynchronous instruction pipeline, e.g. using handshake signals between stages

Variable length pipelines, e.g. elastic pipeline

Pipe-lining a single stage, e.g. super-pipelining

Using a slave processor, e.g. coprocessor (peripheral processor G06F 13/12; vector processor G06F 15/8053)

For non-native instruction execution, e.g. executing a command; for Java instruction set

Arrangements for communication of instructions and data

Two-engine architectures, i.e. stand-alone processor acting as a slave processor

Using a plurality of independent parallel functional units

Controlled by a single instruction, e.g. SIMD

Controlled by multiple instructions, e.g. MIMD, decoupled access or execute

Organised in groups of units sharing resources, e.g. clusters

Controlled in tandem, e.g. multiplier-accumulator

For complex operations, e.g. multidimensional or interleaved address generators, macros

With adaptable data path

Arrangements for executing specific programs

Bootstrapping (security arrangements therefor G06F 21/57)

Processor initialisation

Initialisation of multiprocessor systems

Loading of operating system

Boot device selection

Configuring for operating with peripheral devices; Loading of device drivers

Self describing peripheral devices

Network booting; Remote initial program loading [RIPL]

Suspend and resume; Hibernate and awake

Shutdown

Program loading or initiating (bootstrapping G06F 9/4401; security arrangements for program loading or initiating G06F 21/57)

WARNING

Group G06F 9/445 is impacted by reclassification into groups G06F 21/57 - G06F 21/577.

All groups listed in this Warning should be considered in order to perform a complete search.

Configuring for program initiating, e.g. using registry, configuration files

User profiles, roaming (user profiles for network-specific applications H04L 67/306)

Dynamic linking or loading; Link editing at or after load time, e.g. Java class loading

Plug-ins; Add-ons

Selecting among different versions

Retargetable

Fat binaries

Conflict resolution, i.e. enabling coexistence of conflicting executables

Code layout in executable memory

Sharing

Immediately runnable code

Execute-in-place [XIP]

Preparing or optimising for loading

Portable applications, i.e. making applications self-contained, e.g. U3 standard

Program code verification, e.g. Java bytecode verification, proof-carrying code (high-level semantic checks G06F 8/43; testing and debugging software G06F 11/36)

Unloading

Execution paradigms, e.g. implementations of programming paradigms

Procedural

Executing subprograms

Formation of subprogram jump address

Object-oriented
9/449 . . . . . . . [Object-oriented method invocation or resolution]
9/4491 . . . . . . . [Object persistence]
9/4492 . . . . . . . [Inheritance]
9/4493 . . . . . . . [Data driven]
9/4494 . . . . . . . [Unification in logic programming]
9/4496 . . . . . . . [Finite state machines]
9/4498 . . . . . . . Execution arrangements for user interfaces
9/451 . . . . . . . Remote windowing, e.g. X-Window System, desktop virtualisation (protocols for telewriting H04L 67/38)
9/453 . . . . . . . Help systems
9/454 . . . . . . . Multi-language systems; Localisation; Internationalisation
9/455 . . . . . . . Emulation; Interpretation; Software simulation, e.g. virtualisation or emulation of application or operating system execution engines
9/45504 . . . . . . . [Abstract machines for programme code execution, e.g. Java virtual machine [JVM], interpreters, emulators]
9/45508 . . . . . . . [Runtime interpretation or emulation, e.g. emulator loops, bytecode interpretation]
9/45512 . . . . . . . [Command shells]
9/45516 . . . . . . . [Runtime code conversion or optimisation]
9/4552 . . . . . . . [Involving translation to a different instruction set architecture, e.g. just-in-time translation in a JVM]
9/45525 . . . . . . . [Optimisation or modification within the same instruction set architecture, e.g. HP Dynamo]
9/45529 . . . . . . . [Embedded in an application, e.g. JavaScript in a Web browser]
9/45533 . . . . . . . [Hypervisors; Virtual machine monitors]
9/45537 . . . . . . . [Provision of facilities of other operating environments, e.g. WINE (I/O emulation G06F 13/105)]
9/45541 . . . . . . . [Bare-metal, i.e. hypervisor runs directly on hardware]
9/45545 . . . . . . . [Guest-host, i.e. hypervisor is an application program itself, e.g. VirtualBox]
9/4555 . . . . . . . [Para-virtualisation, i.e. guest operating system has to be modified]
9/45554 . . . . . . . [Instruction set architectures of guest OS and hypervisor or native processor differ, e.g. Bochs or VirtualPC on PowerPC MacOS]
9/45558 . . . . . . . [Hypervisor-specific management and integration aspects]
9/45562 . . . . . . . [Creating, deleting, cloning virtual machine instances]
9/45566 . . . . . . . [Nested virtual machines]
9/4557 . . . . . . . [Distribution of virtual machine instances; Migration and load balancing aspects (load distribution or balancing G06F 9/505; G06F 9/508; task migration G06F 9/456)]
9/45575 . . . . . . . [Starting, stopping, suspending, resuming virtual machine instances (program initiating G06F 9/445; task life-cycle in general G06F 9/485)]
Error detection; Error correction; Monitoring
(error detection, correction or monitoring in information storage based on relative movement between record carrier and transducer G11B 20/18; monitoring, i.e. supervising the progress of recording or reproducing G11B 27/36; in static stores G11C 29/00)

NOTE
In this group the indexing codes of G06F 1/00 - G06F 15/00 are added

11/002 . [protecting against parasitic influences, e.g. noise, temperatures]

WARNING
This group is no longer used for the classification of new documents as from January 1, 2011. The documents are classified in G06F 11/07 and subgroups according to the features used for protecting

11/004 . [Error avoidance (G06F 11/07 and subgroups take precedence)]
11/006 . [Identification (G06F 11/2289 takes precedence)]
11/008 . [Reliability or availability analysis]
11/07 . Responding to the occurrence of a fault, e.g. fault tolerance
11/0703 . . [Error or fault processing not based on redundancy, i.e. by taking additional measures to deal with the error or fault not making use of redundancy in operation, in hardware, or in data representation]
11/0706 . . . . [the processing taking place on a specific hardware platform or in a specific software environment]
11/0709 . . . . [in a distributed system consisting of a plurality of standalone computer nodes, e.g. clusters, client-server systems]
11/0712 . . . . . . [in a virtual computing platform, e.g. logically partitioned systems]
11/0715 . . . . . . . [in a system implementing multitasking (multitasking per se G06F 9/46)]
11/0718 . . . . . . . . [in an object-oriented system]
11/0721 . . . . . . . . . [within a central processing unit [CPU]]
11/0724 . . . . . . . . . [in a multiprocessor or a multi-core unit (multiprocessors per se G06F 15/80)]
11/0727 . . . . . . [in a storage system, e.g. in a DASD or network based storage system (circuits for error detection or correction within digital recording or reproducing units G11B 20/18; drivers for digital recording or reproducing units G06F 3/06; storage area networks H04L 29/085-49)]
11/073 . . . . [in a memory management context, e.g. virtual memory or cache management (memory management G06F 12/00; testing of static memory units G11C 29/00)]
11/0733 . . . . [in a data processing system embedded in an image processing device, e.g. printer, facsimile, scanner]
11/0736 . . . . [in functional embedded systems, i.e. in a data processing system designed as a combination of hardware and software dedicated to performing a certain function (testing or monitoring of automated control systems G05B 23/02)]

11/0739 . . . . [in a data processing system embedded in automotive or aircraft systems]

11/0742 . . . . [in a data processing system embedded in a mobile device, e.g. mobile phones, handheld devices]

11/0745 . . . . [in an input/output transactions management context (input/output processing in general G06F 13/00)]

11/0748 . . . . [in a remote unit communicating with a single-box computer node experiencing an error/fault (remote testing G06F 1/2294)]

11/0751 . . . . [Error or fault detection not based on redundancy (power supply failures G06F 1/30; network fault management H04L 41/06)]

11/0754 . . . . [by exceeding limits]

11/0757 . . . . [by exceeding a time limit, i.e. time-out, e.g. watchdogs]

11/076 . . . . [by exceeding a count or rate limit, e.g. word- or bit count limit]

11/0763 . . . . [by bit configuration check, e.g. of formats or tags]

11/0766 . . . . [Error or fault reporting or storing (reporting or storing of non-error data G06F 1/30, G06F 11/34)]

11/0769 . . . . [Readable error formats, e.g. cross-platform generic formats, human understandable formats]

11/0772 . . . . [Means for error signaling, e.g. using interrupts, exception flags, dedicated error registers]

11/0775 . . . . [Content or structure details of the error report, e.g. specific table structure, specific error fields]

11/0778 . . . . [Dumping, i.e. gathering error/state information after a fault for later diagnosis]

11/0781 . . . . [Error filtering or prioritizing based on a policy defined by the user or on a policy defined by a hardware/software module, e.g. according to a severity level]

11/0784 . . . . [Routing of error reports, e.g. with a specific transmission path or data flow]

11/0787 . . . . [Storage of error reports, e.g. persistent data storage, storage using memory protection]

11/079 . . . . [Root cause analysis, i.e. error or fault diagnosis (in a hardware test environment G06F 11/22; in a software test environment G06F 11/36)]

11/0793 . . . . [Remedial or corrective actions (by retry G06F 11/1402; recovery from an exception in an instruction pipeline G06F 9/3861; in a network context H04L 29/14)]

11/0796 . . . . [Safety measures, i.e. ensuring safe condition in the event of error, e.g. for controlling element]

11/08 . . . . [Error detection or correction by redundancy in data representation, e.g. by using checking codes]

11/085 . . . . [using codes with inherent redundancy, e.g. n-out-of-m codes]

11/10 . . . . [adding special bits or symbols to the coded information, e.g. parity check, casting out 9's or 11's]

11/1004 . . . . [to protect a block of data words, e.g. CRC or checksum (G06F 11/076 takes precedence; security arrangements for protecting computers or computer systems against unauthorized activity G06F 21/00)]

11/1008 . . . . [in individual solid state devices (G06F 11/004 takes precedence)]

11/1012 . . . . [using codes or arrangements adapted for a specific type of error (G06F 11/048 takes precedence)]

11/1016 . . . . [Error in accessing a memory location, i.e. addressing error]

11/102 . . . . [Error in check bits]

11/1024 . . . . [Identification of the type of error]

11/1028 . . . . [Adjacent errors, e.g. error in n-bit (n+1) wide storage units, i.e. package error]

11/1032 . . . . [Simple parity]

11/1036 . . . . [Unidirectional errors]

11/104 . . . . [using arithmetic codes, i.e. codes which are preserved during operation, e.g. modulo 9 or 11 check]

11/1044 . . . . [with specific ECC/EDC distribution]

11/1048 . . . . [using arrangements adapted for a specific error detection or correction feature]

11/1052 . . . . [Bypassing or disabling error detection or correction]

11/1056 . . . . [Updating check bits on partial write, i.e. read/modify/write]

11/106 . . . . [Correcting systematically all correctable errors, i.e. scrubbing]

11/1064 . . . . [in cache or content addressable memories]

11/1068 . . . . [in sector programmable memories, e.g. flash disk (G06F 11/072 takes precedence)]

11/1072 . . . . [in multilevel memories]

11/1076 . . . . [Parity data used in redundant arrays of independent storages, e.g. in RAID systems]

11/108 . . . . [Parity data distribution in semiconductor storages, e.g. in SSD]

11/1084 . . . . [Degraded mode, e.g. caused by single or multiple storage removals or disk failures]

11/1088 . . . . [Reconstruction on already foreseen single or plurality of spare disks]

11/1092 . . . . [Rebuilding, e.g. when physically replacing a failing disk]

11/1096 . . . . [Parity calculation or recalculation after configuration or reconfiguration of the system]

11/14 . . . . [Error detection or correction of the data by redundancy in operation (G06F 11/16 takes precedence)]

11/1402 . . . . [Saving, restoring, recovering or retrying]

11/1405 . . . . [at machine instruction level]

11/1407 . . . . [Checkpointing the instruction stream]

11/141 . . . . . [for bus or memory accesses]

11/1415 . . . . [at system level]

11/1417 . . . . . [Boot up procedures]
redundancy in hardware
Error detection or correction of the data by
counters or frequency dividers H03K 21/40
for correct operation G11C 29/00
transducer G11B 20/18
relative movement between record carrier and
or correction in information storage based on
G06F 11/1666
signals of redundant hardware (G06F 11/1629,
H03K 19/007; for pulse
; for logic
) }
{ where the fault affects the clock signals of a
processing unit and the redundancy is at or
within the level of clock signal generation
hardware }
{ Error detection by comparing the output
signals of redundant hardware (G06F 11/1629,
G06F 11/1666 take precedence; error detection
or correction in information storage based on
relative movement between record carrier and
transducer G11B 20/18; checking static stores
for correct operation G11C 29/00; for logic
circuits H03K 19/003, H03K 19/007; for pulse
counters or frequency dividers H03K 21/40) }
{ where the redundant component is
persistent storage }
{ where the redundant component is an I/O
device or an adapter therefor }
{ [Displays] }
{ [in communications, e.g. transmission,
interfaces] }
{ [Error detection by comparing the output
of redundant processing systems] }
{ [using mutual exchange of the output
between the redundant processing
components] }
{ [using additional compare functionality in
one or some but not all of the redundant
processing components] }
{ [where the comparison is not performed by
the redundant processing components] }
{ [and the comparison itself uses redundant
hardware] }
{ [with continued operation after detection of
the error] }
{ [where the output of only one of the
redundant processing components can drive
the attached hardware, e.g. memory or I/O] }
{ [Data re-synchronization of a redundant
component, or initial sync of replacement,
additional or spare unit] }
{ [the resynchronized component or unit
being a persistent storage device (re-
synchronization of failed mirror storage
G06F 11/2082; rebuild or reconstruction of
parity RAID storage G06F 11/1008)] }
{ [where the redundant component is memory or
memory area] }
{ [Error detection by comparing the memory
output] }
{ [Temporal synchronisation or re-
synchronisation of redundant processing
components] }
{ [at clock signal level] }
{ [at instruction level] }
{ [at event level, e.g. by interrupt or result of
polling] }
{ [using a quantum] }
{ [which are operating with time diversity] }
{ using passive fault-masking of the redundant
circuits (error detection by comparing the
output of redundant processing systems with
continued operation after detection of the error
G06F 11/165) }
{ [Eliminating the failing redundant
component] }
{ [based on mutual exchange of the output
between redundant processing components] }
{ [by voting, the voting not being performed
by the redundant components] }
{ [where the redundant components
implement processing functionality] }
{ [and the voting is itself performed
redundantly] }
{ [Passive fault masking when reading
multiple copies of the same data] }
{ [Voting techniques] }
{ [where exact match is not required] }
{ using active fault-masking, e.g. by switching
out faulty elements or by switching in spare
elements }
correction in information storage based on functionality is redundant (error detection or persistent mass storage control)

{ where persistent mass storage functionality }

G06F 11/2089 (redundant communication control

{ where processing functionality is redundant, redundant storage control functionality G06F 11/2089)

( redundant communication control

{ where memory access, memory control or I/O control functionality is redundant (redundant communication control

functionality G06F 11/2005; redundant storage control functionality G06F 11/2089)

( redundant communication control

{ where the redundant components share

persistent memory access, memory control or I/O control functionality (G06F 11/2089)

( redundant communication control

{ where the redundant components share

a common memory address space (G06F 11/2087)

( redundant communication control

{ where the redundant components share

persistent storage (G06F 11/2043 takes precedence)

( redundant communication control

{ where the redundant components share

neither address space nor persistent storage (G06F 11/2042 takes precedence)

( redundant communication control

{ where the redundant components share

in regular structures (G06F 11/2041)

( redundant communication control

{ where persistent mass storage functionality or persistent mass storage control functionality is redundant (error detection or correction in information storage based on relative movement between record carrier and transducer G11B 20/18)

( redundant communication control

{ by mirroring (G11B 20/18)

( redundant communication control

{ using more than 2 mirrored copies (G11B 20/18)

( redundant communication control

{ combined with de-clustering of data (G11B 20/18)

( redundant communication control

{ while ensuring consistency (G11B 20/18)

( redundant communication control

{ Optimisation of the communication load (G11B 20/18)

( redundant communication control

{ Management of state, configuration or failover (G11B 20/18)

( redundant communication control

{ using a plurality of controllers (G11B 20/18)

( redundant communication control

{ Asynchronous techniques (G11B 20/18)

( redundant communication control

{ Synchronous techniques (G11B 20/18)

( redundant communication control

{ Bidirectional techniques (G11B 20/18)

( redundant communication control

{ Data synchronisation (G11B 20/18)

( redundant communication control

{ on the same storage unit (G11B 20/18)

( redundant communication control

{ with a common controller (G11B 20/18)

( redundant communication control

{ Redundant storage control functionality (G11B 20/18)
11/303 . . . [Monitoring arrangements specially adapted to the computing system or computing system component being monitored]

11/306 . . . . [where the computing system is distributed, e.g. networked systems, clusters, multiprocessor systems (multiprogramming arrangements G06F 9/46; allocation of resources G06F 9/501)]

11/301 . . . . [where the computing system is a virtual computing platform, e.g. logically partitioned systems (virtual machines G06F 9/45533; logical partitioning of resources G06F 9/5077)]

11/3013 . . . [where the computing system is an embedded system, i.e. a combination of hardware and software dedicated to perform a certain function in mobile devices, printers, automotive or aircraft systems (testing or monitoring of control systems or parts thereof G05B 23/02)]

11/3017 . . . [where the computing system is implementing multitasking (multiprogramming arrangements G06F 9/46; allocation of resources G06F 9/50)]

11/302 . . . [where the computing system component is a software system]

11/3024 . . . [where the computing system component is a central processing unit [CPU]]

11/3027 . . . [where the computing system component is a bus]

11/3031 . . . [where the computing system component is a motherboard or an expansion card]

11/3034 . . . [where the computing system component is a storage system, e.g. DASD based or network based (digital recording or reproducing G11B 20/18; digital input from or digital output to record carriers G06F 3/00; arrangements and networking functions for distributed storage of data in a network H04L 29/08549)]

11/3037 . . . [where the computing system component is a memory, e.g. virtual memory, cache (accessing, addressing or allocating within memory systems or architectures G06F 12/00; checking stores for correct operation G11C 29/00)]

11/3041 . . . [where the computing system component is an input/output interface (interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units G06F 13/00)]

11/3044 . . . [where the computing system component is the mechanical casing of the computing system]

11/3048 . . . [where the topology of the computing system or computing system component explicitly influences the monitoring activity, e.g. serial, hierarchical systems]

11/3051 . . . [Monitoring arrangements for monitoring the configuration of the computing system or of the computing system component, e.g. monitoring the presence of processing resources, peripherals, I/O links, software programs (verification or detection of system hardware configuration G06F 11/2247)]

11/3055 . . . [Monitoring arrangements for monitoring the status of the computing system or of the computing system component, e.g. monitoring if the computing system is on, off, available, not available (error or fault processing without redundancy G06F 11/0703; error detection or correction by redundancy in data representation G06F 11/08; error detection or correction by redundancy in operation G06F 11/14; error detection or correction by redundancy in hardware G06F 11/16)]

11/3058 . . . [Monitoring arrangements for monitoring environmental properties or parameters of the computing system or of the computing system component, e.g. monitoring of power, currents, temperature, humidity, position, vibrations (thermal management in cooling arrangements of a computing system G06F 1/206)]

11/3062 . . . [where the monitored property is the power consumption (power management in a computing system G06F 1/3203)]

11/3065 . . . [Monitoring arrangements determined by the means or processing involved in reporting the monitored data (error or fault reporting or logging G06F 11/0766)]

11/3068 . . . [where the reporting involves data format conversion]

11/3072 . . . [where the reporting involves data filtering, e.g. pattern matching, time or event triggered, adaptive or policy-based reporting]

11/3075 . . . [the data filtering being achieved in order to maintain consistency among the monitored data, e.g. ensuring that the monitored data belong to the same timeframe, to the same system or component]

11/3079 . . . [the data filtering being achieved by reporting only the changes of the monitored data]

11/3082 . . . [the data filtering being achieved by aggregating or compressing the monitored data]

11/3086 . . . [where the reporting involves the use of self describing data formats, i.e. metadata, markup languages, human readable formats]

11/3089 . . . [Monitoring arrangements determined by the means or processing involved in sensing the monitored data, e.g. interfaces, connectors, sensors, probes, agents (software debugging using additional hardware using a specific debug interface G06F 11/3656; performance evaluation by tracing or monitoring G06F 11/3466)]

11/3093 . . . [Configuration details thereof, e.g. installation, enabling, spatial arrangement of the probes]

11/3096 . . . [wherein the means or processing minimize the use of computing system or of computing system component resources, e.g. non-intrusive monitoring which minimizes the probe effect: sniffing, intercepting, indirectly deriving the monitored data from other directly available data]

11/32 . . . [with visual [or acoustical] indication of the functioning of the machine]

11/321 . . . [Display for diagnostics, e.g. diagnostic result display, self-test user interface]
Software debugging

- Software testing (software testing in telephone exchanges H04M 3/242; testing of hardware G06F 11/23)

- Test management

- (for test results analysis)

- Methods or tools to render software testable

12/00 Accessing, addressing or allocating within memory systems or architectures (digital input from, or digital output to record carriers, e.g. to disk storage units, G06F 3/00)

12/02 . Addressing or allocation; Relocation (program address sequencing G06F 9/00; arrangements for selecting an address in a digital store G11C 8/00)

12/0207 . (with multidimensional access, e.g. row/column, matrix)

12/0215 . (with look ahead addressing means)

12/0223 . (User address space allocation, e.g. contiguous or non contiguous base addressing)

12/023 . (Free address space management)

12/0238 . \{ Memory management in non-volatile memory, e.g. resistive RAM or ferroelectric memory \}

12/0246 . . . . (in block erasable memory, e.g. flash memory)

12/0253 . . . . (Garbage collection, i.e. reclamation of unreferenced memory)

12/0261 . . . . (using reference counting)

12/0269 . . . . (Incremental or concurrent garbage collection, e.g. in real-time systems G06F 12/0261; arrangements for test results analysis)

12/0276 . . . . \{ Generational garbage collection \}

12/0284 . . . . (Multiple user address space allocation, e.g. using different base addresses (interprocessor communication G06F 15/163))

12/0292 . . . . \{ using tables or multilevel address translation means (G06F 12/023 takes precedence; address translation in virtual memory systems G06F 12/10) \}

12/04 . Addressing variable-length words or parts of words

12/06 . Addressing a physical block of locations, e.g. base addressing, module addressing, memory dedication (G06F 12/08 takes precedence)

**NOTE**

This group is limited to Module addressing or allocation; base addressing is classified in G06F 12/0223.

12/0607 . . . . (Interleaved addressing)

12/0615 . . . . (Address space extension)

12/0623 . . . . (for memory modules)
virtual memory systems, e.g. associating addressing means, e.g. caches
access to the desired data or data block requires associating addressing means, e.g. caches
with main memory updating (G06F 12/0806 takes precedence)
Multituser, multiprocessor or multiprocessing cache systems
with cache invalidating means (G06F 12/0815 takes precedence)
with multilevel cache hierarchies
with a network or matrix configuration
Cache consistency protocols
using directory methods
using bus scheme, e.g. with bus monitoring or watching means
(in combination with broadcast means (e.g. for invalidation or updating))
for main memory peripheral accesses (e.g. I/O or DMA)
with software control, e.g. non-cacheable data
with a shared cache
for multiprocessing or multitasking
Multiple simultaneous or quasi-simultaneous cache accessing
Cache with multiple tag or data arrays being simultaneously accessible
Cache with multiple tag or data arrays
{Partitioned cache, e.g. separate instruction and operand caches}

Cache with multiport tag or data arrays
Overlapped cache accessing, e.g. pipeline (G06F 12/0846 takes precedence)
by multiple requestors
with reload from main memory
prefetch
using pseudo-associative means, e.g. set-associative or hashing
for peripheral storage systems, e.g. disk cache
Data transfer between cache memory and other subsystems, e.g. storage devices or host systems
Allocation or management of cache space
Mapping of cache memory to specific storage devices or parts thereof
with dedicated cache, e.g. instruction or stack
Cache access modes
Burst mode
Page mode
Parallel mode, e.g. in parallel with main memory or CPU
Variable-length word access

WARNING
Group G06F 12/0851 is impacted by reclassification into group G06F 12/0886.
Groups G06F 12/0851 and G06F 12/0886 should be considered in order to perform a complete search.

Cache with interleaved addressing

WARNING
Group G06F 12/0886 is incomplete pending reclassification of documents from group G06F 12/0851.
Groups G06F 12/0851 and G06F 12/0886 should be considered in order to perform a complete search.

using selective caching, e.g. bypass
using clearing, invalidating or resetting means
Caches characterised by their organisation or structure
of parts of caches, e.g. directory or tag array
with two or more cache hierarchy levels (with multilevel cache hierarchies G06F 12/0811)
Address translation
using page tables, e.g. page table structures
involving hashing techniques, e.g. inverted page tables
using associative or pseudo-associative address translation means, e.g. translation look-aside buffer (TLB)
12/1036 . . . . for multiple virtual address spaces, e.g. segmentation (G06F 12/1045 takes precedence)

**WARNING**

Group G06F 12/1036 is incomplete pending reclassification of documents from group G06F 12/109. Groups G06F 12/109 and G06F 12/1036 should be considered in order to perform a complete search.

12/1045 . . . . associated with a data cache
12/1054 . . . . {the data cache being concurrently physically addressed}
12/1063 . . . . {the data cache being concurrently virtually addressed}
12/1072 . . . . Decentralised address translation, e.g. in distributed shared memory systems
12/1081 . . . . for peripheral access to main memory, e.g. direct memory access [DMA]
12/109 . . . . for multiple virtual address spaces, e.g. segmentation (G06F 12/1036 takes precedence)

**WARNING**

Group G06F 12/109 is impacted by reclassification into group G06F 12/1036. Groups G06F 12/109 and G06F 12/1036 should be considered in order to perform a complete search.

12/12 . . . . Replacement control
12/121 . . . . using replacement algorithms
12/122 . . . . of the least frequently used [LFU] type, e.g. with individual count value
12/123 . . . . with age lists, e.g. queue, most recently used [MRU] list or least recently used [LRU] list
12/124 . . . . {being minimized, e.g. non MRU}
12/125 . . . . {being generated by decoding an array or storage}
12/126 . . . . with special data handling, e.g. priority of data or instructions, handling errors or pinning
12/127 . . . . using additional replacement algorithms
12/128 . . . . adapted to multidimensional cache systems, e.g. set-associative, multicache, multiset or multilevel
12/14 . . . . Protection against unauthorised use of memory {or access to memory}
12/1408 . . . . {by using cryptography (for digital transmission [H04L 9/00])}
12/1416 . . . . {by checking the object accessibility, e.g. type of access defined by the memory independently of subject rights (G06F 12/1458 takes precedence)}
12/1425 . . . . {the protection being physical, e.g. cell, word, block}
12/1433 . . . . {for a module or a part of a module}
12/1441 . . . . {for a range}
12/145 . . . . {the protection being virtual, e.g. for virtual blocks or segments before a translation mechanism}
12/1458 . . . . {by checking the subject access rights}
12/1466 . . . . {Key-lock mechanism}

12/1475 . . . . {in a virtual system, e.g. with translation means}
12/1483 . . . . {using an access-table, e.g. matrix or list}
12/1491 . . . . {in a hierarchical protection system, e.g. privilege levels, memory rings}
12/16 . . . . Protection against loss of memory contents {contains no material, see G06F 11/00}

13/00 Interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units (interface circuits for specific input/output devices G06F 3/00; multiprocessor systems G06F 15/16 {multiprogram control therefor G06F 9/46})

13/10 . . . . Program control for peripheral devices (G06F 13/14 - G06F 13/42 take precedence)
13/102 . . . . {where the programme performs an interfacing function, e.g. device driver (G06F 13/105 takes precedence; scheduling within device drivers G06F 9/52; contention policies within device drivers G06F 9/4881)}
13/105 . . . . {where the programme performs an input/output emulation function}
13/107 . . . . {Terminal emulation}
13/12 . . . . using hardware independent of the central processor, e.g. channel or peripheral processor
13/122 . . . . {where hardware performs an I/O function other than control of data transfer}
13/124 . . . . {where hardware is a sequential transfer control unit, e.g. microprocessor, peripheral processor or state-machine}
13/126 . . . . {and has means for transferring I/O instructions and statuses between control unit and main processor}
13/128 . . . . {for dedicated transfers to a network (for protocol converters G06F 13/387)}
13/14 . . . . Handling requests for interconnection or transfer
13/16 . . . . {for access to memory bus (G06F 13/28 takes precedence)}
13/1605 . . . . {based on arbitration (arbitration in handling access to a common bus or bus system G06F 13/36)}
13/161 . . . . {with latency improvement}
13/1615 . . . . {using a concurrent pipeline structure}
13/1621 . . . . {by maintaining request order}
13/1626 . . . . {by reordering requests}
13/1631 . . . . {through address comparison}
13/1636 . . . . {using refresh}
13/1642 . . . . {with request queuing}
13/1647 . . . . {with interleaved bank access}
13/1652 . . . . {in a multiprocessor architecture (interprocessor communication using common memory G06F 15/167)}
13/1657 . . . . {Access to multiple memories}
13/1663 . . . . {Access to shared memory}
13/1668 . . . . {Details of memory controller}
13/1673 . . . . {using buffers}
13/1678 . . . . {using bus width}
13/1684 . . . . {using multiple buses}
13/1689 . . . . {Synchronisation and timing concerns (synchronisation on a memory bus G06F 13/4234)}
13/1694 . . . . {Configuration of memory controller to different memory types}
13/18 . . . based on priority control (G06F 13/1605 takes precedence)
13/20 . . . . for access to input/output bus
13/22 . . . using successive scanning, e.g. polling
(G06F 13/24 takes precedence)
13/225 . . . . . . [with priority control]
13/24 . . . using interrupt (G06F 13/32 takes precedence)
13/26 . . . . with priority control
13/28 . . . . using burst mode transfer, e.g. direct memory access (DMA), cycle steal
(G06F 13/32 takes precedence)
13/282 . . . . . . [Cycle stealing DMA (G06F 13/30 takes precedence)]
13/285 . . . . . . [Halt processor DMA (G06F 13/30 takes precedence)]
13/287 . . . . . . [Multiplexed DMA (G06F 13/30 takes precedence)]
13/30 . . . . with priority control
13/32 . . . . using combination of interrupt and burst mode transfer
13/34 . . . . with priority control
13/36 . . . . for access to common bus or bus system
13/362 . . . . with centralised access control
13/3625 . . . . . . [using a time dependent access]
13/364 . . . . using independent requests or grants, e.g. using separated request and grant lines
13/366 . . . . using a centralised polling arbiter
13/368 . . . . with decentralised access control
13/37 . . . . using a physical-position-dependent priority, e.g. daisy chain, round robin or token passing
13/372 . . . . using a time-dependent priority, e.g. individually loaded time counters or time slot
13/374 . . . . using a self-select method with individual priority code comparator
13/376 . . . . using a contention resolving method, e.g. collision detection, collision avoidance
13/378 . . . . using a parallel poll method
13/38 . . . . Information transfer, e.g. on bus (G06F 13/14 takes precedence)
13/382 . . . . . . [using universal interface adapter]
13/385 . . . . [for adaptation of a particular data processing system to different peripheral devices]
13/387 . . . . [for adaptation of different data processing systems to different peripheral devices, e.g. protocol converters for incompatible systems, open system]
13/40 . . . . Bus structure { (for computer networks G06F 15/16; for optical bus networks H04B 10/25)
13/4004 . . . . [Coupling between buses]
13/4009 . . . . . . [with data restructuring]
13/4013 . . . . . . . [with data re-ordering, e.g. Endian conversion]
13/4018 . . . . . . [with data-width conversion]
13/4022 . . . . . . [using switching circuits, e.g. switching matrix, connection or expansion network (G06F 13/4009 takes precedence)]
13/4027 . . . . . . [using bus bridges (G06F 13/4022 takes precedence)]
13/4031 . . . . . . [with arbitration]
13/4036 . . . . . . . [and deadlock prevention]
13/404 . . . . . . . [with address mapping]
13/4045 . . . . . . [where the bus bridge performs an extender function]
13/405 . . . . . . [where the bridge performs a synchronising function]
13/4054 . . . . . . [where the function is bus cycle extension, e.g. to meet the timing requirements of the target bus]
13/4059 . . . . . . [where the synchronisation uses buffers, e.g. for speed matching between buses]
13/4063 . . . . . . [Device-to-bus coupling]
13/4068 . . . . . . [Electrical coupling]
13/4072 . . . . . . [Drivers or receivers (G06F 13/4086 takes precedence; for multistate logic circuits H03K 19/0002)]
13/4077 . . . . . . [Precharging or discharging]
13/4081 . . . . . . [Live connection to bus, e.g. hot-plugging (current or voltage limitation during live insertion H02H 9/004)]
13/4086 . . . . . . [Bus impedance matching, e.g. termination]
13/409 . . . . . . [Mechanical coupling (back panels H05K 7/1438)]
13/4095 . . . . . . [in incremental bus architectures, e.g. bus stacks]
13/42 . . . . Bus transfer protocol, e.g. handshake; Synchronisation
13/4204 . . . . . . [on a parallel bus]
13/4208 . . . . . . [being a system bus, e.g. VME bus, Futurebus, Multibus]
13/4213 . . . . . . [with asynchronous protocol]
13/4217 . . . . . . [with synchronous protocol]
13/4221 . . . . . . [being an input/output bus, e.g. ISA bus, EISA bus, PCI bus, SCSI bus]
13/4226 . . . . . . [with asynchronous protocol]
13/423 . . . . . . [with synchronous protocol]
13/4234 . . . . . . [being a memory bus]
13/4239 . . . . . . [with asynchronous protocol]
13/4243 . . . . . . [with synchronous protocol]
13/4247 . . . . . . [on a daisy chain bus]
13/4252 . . . . . . [using a handshaking protocol]
13/4256 . . . . . . [using a clocked protocol]
13/426 . . . . . . [using an embedded synchronisation, e.g. Firewire bus, Fibre Channel bus, SSA bus]
13/4265 . . . . . . . . . . . [on a point to point bus (G06F 13/4247, G06F 13/4282 takes precedence)]
13/4269 . . . . . . [using a handshaking protocol, e.g. Centronics connection]
13/4273 . . . . . . [using a clocked protocol]
13/4278 . . . . . . [using an embedded synchronisation]
13/4282 . . . . . . . . . . . [on a serial bus, e.g. I2C bus, SPI bus (on daisy chain buses G06F 13/4247)]
13/4286 . . . . . . [using a handshaking protocol, e.g. RS232C link]
13/4291 . . . . . . [using a clocked protocol]
13/4295 . . . . . . [using an embedded synchronisation]
Calculating-punches

Interprocessor communication

using a common memory, e.g. mailbox

using an input/output type connection, e.g. channel, I/O port

using an interconnection network, e.g. matrix, shuffle, pyramid, star, snowflake

Interconnection techniques

Routing techniques specific to parallel machines, e.g. wormhole, store and forward, shortest path problem congestion (routing on a LAN H04L 45/00)

Parallel communications techniques, e.g. gather, scatter, reduce, rooadcast, multicast, all to all

Synchronisation; Hardware support therefor (intertask synchronisation G06F 9/52)

Distributed shared memory [DSM], e.g. remote direct memory access (RDMA)

Direct connection machines, e.g. completely connected computers, point to point communication networks (coupling between buses G06F 13/4001)

wherein the interconnection is dynamically configurable, e.g. having loosely coupled nearest neighbor architecture (reconfigurable processors arrays G06F 15/7867)

Network adapters, e.g. SCI, Myrinet (protocol engines H04L 29/06081)

Indirect interconnection networks

[non hierarchical topologies]

[One dimensional, e.g. linear array, ring]

[Two dimensional, e.g. mesh, torus]

[Three dimensional, e.g. hypercubes]

[having multistage networks, e.g. broadcasting scattering, gathering, hot spot contention, combining/ decombining]

Initialisation or configuration control (processor initialisation G06F 9/4405)

Architectures of general purpose stored program computers (with program plugboard G06F 15/08; multicomputers G06F 15/16)

[Indexing scheme relating to architectures of general purpose stored programme computers]

[ASIC]

[Cache]

[Flash EPROM]

[Gate array]

comprising a single central processing unit

System on board, i.e. computer system on one or more PCB, e.g. motherboards, daughterboards or blades

(System on chip, i.e. computer system on a single chip; System in package, i.e. computer system on one or more chips in a single package)

[On-chip cache; Off-chip memory]

[Specially adapted for real time processing, e.g. comprising hardware timers]

[Specially adapted for signal processing, e.g. Harvard architectures]

[Tightly coupled to memory, e.g. computational memory, smart memory, processor in memory]

[ Globally asynchronous, locally synchronous, e.g. network on chip]

[without memory]

[on one IC chip (single chip microprocessors)]

[more than one IC chip]

[with memory]

[on one IC chip (single chip microcontrollers)]

[On-chip cache and off-chip main memory]

[with decentralized control, e.g. smart memories]

[including a ROM]

[using interleaved memory (addressing G06F 12/0607)]

[using a single memory module]

[more than one IC chip]

[with reconfigurable architecture]

[Reconfiguration support, e.g. configuration loading, configuration switching, or hardware OS]

[for multiple contexts]

[for pipeline reconfiguration]

[for self reconfiguration]

[Runtime interface, e.g. data exchange, runtime control]

[Reconfigurable logic implemented as a co-processor (instruction execution using a coprocessor G06F 9/3877)]
Information retrieval; Database structures therefor; File system structures therefor

16/00

File systems; File servers
16/10

File system administration, e.g. details of archiving or snapshots (file system backup G06F 11/14)
16/11

[Details of archiving (lifecycle management in storage systems G06F 3/0649; backup systems G06F 11/1446)]
16/13

[Details of conversion of file system types or formats]
16/16

[Details of migration of file systems (migration mechanisms in storage systems G06F 3/0647)]
16/19

[Details of non-transparently synchronising file systems]
16/122

[using management policies (backup systems G06F 11/1446; file migration policies for HSM systems G06F 16/185)]
16/125

[characterised by the use of retention policies (retention policies for HSM systems G06F 16/185)]
16/128

[Details of file system snapshots on the file-level, e.g. snapshot creation, administration, deletion (use of snapshots for error detection or correction G06F 11/14, G06F 11/16)]
16/13

[File access structures, e.g. distributed indices (arrangements of input from, or output to, record carriers G06F 3/06)]
16/134

[Distributed indices]
16/137

[Hash-based (content-based indexing of textual data G06F 16/31)]
16/14

[Details of searching files based on file metadata]
16/144

[Query formulation]
16/148

[File search processing]
16/152

[using file content signatures, e.g. hash values]
16/156

[Query results presentation]
16/16

[File or folder operations, e.g. details of user interfaces specifically adapted to file systems]
16/162

[Delete operations (erasing in storage systems G06F 3/0652)]
16/164

[File meta data generation]
16/166

[File name conversion]
16/168

[Details of user interfaces specifically adapted to file systems, e.g. browsing and visualisation, 2d or 3d GUIs (query results presentation G06F 16/156)]
16/17

[Details of further file system functions]
16/172

[Caching, prefetching or hoarding of files]
16/1724

[Details of de-fragmentation performed by the file system (saving storage space on storage systems G06F 3/0608; management of blocks in storage devices G06F 3/064)]
16/1727

[Details of free space management performed by the file system (saving storage space on storage devices G06F 3/0608; management of blocks in storage devices G06F 3/064)]
16/173

[Customisation support for file systems, e.g. localisation, multi-language support, personalisation]
16/1734

[Details of monitoring file system events, e.g. by the use of hooks, filter drivers, logs]
16/1737

[for reducing power consumption or coping with limited storage space, e.g. in mobile devices (saving storage space on storage devices G06F 3/0608; power saving in storage systems G06F 3/0625)]
16/174

[Redundancy elimination performed by the file system (management of the data involved in backup or backup restore using de-duplication of the data G06F 11/14)]
16/1744

[using compression, e.g. sparse files]
16/1748

[De-duplication implemented within the file system, e.g. based on file segments (de-duplication techniques in storage systems for the management of data blocks G06F 3/0641)]
16/1752

[based on file chunks]
16/1756

[based on delta files]
16/176

[Support for shared access to files; File sharing support]
16/1767

[Concurrency control, e.g. optimistic or pessimistic approaches]
16/1774

[Locking methods, e.g. locking methods for file systems allowing shared and concurrent access to files]
16/178

[Techniques for file synchronisation in file systems]
16/1787

[Details of non-transparently synchronising file systems]
16/1794

[Details of file format conversion]

WARNING

Group G06F 16/1794 is impacted by reclassification into group G06F 16/258
Groups G06F 16/1794 and G06F 16/258 should be considered in order to perform a complete search.

16/18

File system types
16/1805

[Append-only file systems, e.g. using logs or journals to store data]
16/181

[providing write once read many (WORM) semantics]
16/1815 . . . . {Journaling file systems}
16/182 . . . . Distributed file systems
16/1824 . . . . {implemented using Network-attached Storage [NAS] architecture (distributed or networked storage systems G06F 3/067; protocols for distributed storage of data in a network H04L 67/1097)}
16/1827 . . . . {Management specifically adapted to NAS (management of storage area networks [SAN] G06F 3/067)}
16/183 . . . . {Provision of network file services by network file servers, e.g. by using NFS, CIFS (network file access protocols H04L 67/1097)}
16/1834 . . . . {implemented based on peer-to-peer networks, e.g. gnutella (p2p communication protocols H04L 67/104d)}
16/1837 . . . . {Management specially adapted to peer-to-peer storage networks (topology management mechanisms of peer-to-peer networks H04L 67/1042)}
16/184 . . . . {implemented as replicated file system}
16/1844 . . . . {Management specifically adapted to replicated file systems}
16/1847 . . . . {specifically adapted to static storage, e.g. adapted to flash memory or SSD}
16/185 . . . . Hierarchical storage management [HSM] systems, e.g. file migration or policies thereof (details of archiving G06F 16/1L)
16/1858 . . . . {Parallel file systems, i.e. file systems supporting multiple processors}
16/1865 . . . . {Transactional file systems}
16/1873 . . . . {Versioning file systems, temporal file systems, e.g. file system supporting different historic versions of files}
16/188 . . . . Virtual file systems
16/192 . . . . {Implementing virtual folder structures}
16/196 . . . . {Specific adaptations of the file system to access devices and non-file objects via standard file system access operations, e.g. pseudo file systems (dedicated interfaces to storage systems G06F 3/0601)}
16/20 . . . . of structured data, e.g. relational data
16/21 . . . . Design, administration or maintenance of databases
16/211 . . . . {Schema design and management}
16/212 . . . . {with details for data modelling support}
16/213 . . . . {with details for schema evolution support}
16/214 . . . . {Database migration support}
16/215 . . . . Improving data quality; Data cleansing, e.g. de-duplication, removing invalid entries or correcting typographical errors
16/217 . . . . {Database tuning (G06F 16/2282 takes precedence; database performance monitoring G06F 11/3409)}
16/219 . . . . {Managing data history or versioning (querying versioned data G06F 16/2474; querying temporal data G06F 16/2477)}
16/22 . . . . Indexing; Data structures therefor; Storage structures
16/221 . . . . {Column-oriented storage; Management thereof}
16/2219 . . . . {Large Object storage; Management thereof}
16/2228 . . . . {Indexing structures}
16/2237 . . . . {Vectors, bitmaps or matrices}
16/2246 . . . . {Trees, e.g. B+trees}
16/2255 . . . . {Hash tables}
16/2264 . . . . {Multidimensional index structures}
16/2272 . . . . {Management thereof}
16/2282 . . . . {Tablespace storage structures; Management thereof}
16/2291 . . . . {User-Defined Types; Storage management thereof}
16/23 . . . . Updating

**WARNING**

Group G06F 16/23 is impacted by reclassification into group G06F 16/25.

Groups G06F 16/23 and G06F 16/25 should be considered in order to perform a complete search.

16/2308 . . . . {Concurrency control (transaction processing G06F 9/466)}

**WARNING**

Group G06F 16/2308 is impacted by reclassification into groups G06F 16/2315, G06F 16/2322, G06F 16/2329, G06F 16/2336, and G06F 16/2343.

All groups listed in this Warning should be considered in order to perform a complete search.

16/2315 . . . . {Optimistic concurrency control}

**WARNING**

Groups G06F 16/2315 - G06F 16/2329 are incomplete pending reclassification of documents from group G06F 16/2308.

Groups G06F 16/2308 and G06F 16/2315 - G06F 16/2329 should be considered in order to perform a complete search.

16/2322 . . . . {using timestamps}
16/2329 . . . . {using versioning}
16/2336 . . . . {Pessimistic concurrency control approaches, e.g. locking or multiple versions without time stamps}

**WARNING**

Groups G06F 16/2336 and G06F 16/2343 are incomplete pending reclassification of documents from group G06F 16/2308.

Groups G06F 16/2308, G06F 16/2336, and G06F 16/2343 should be considered in order to perform a complete search.

16/2343 . . . . {Locking methods, e.g. distributed locking or locking implementation details}
16/235 . . . . {Update request formulation}
16/2358 . . . . {Change request formulation (replication G06F 16/227)}
16/2365 . . . . {Ensuring data consistency and integrity}
16/2372 . . . . {Updates performed during offline database operations}
16/2379 . . . . {Updates performed during online database operations; commit processing}
16/2386 . . . . [Bulk updating operations (data conversion details G06F 16/258)]
16/2393 . . . . [Updating materialised views]
16/24 . . . . Querying
16/242 . . . . Query formulation
16/2423 . . . . [Interactive query statement specification based on a database schema]
16/2425 . . . . [Iterative querying; Query formulation based on the results of a preceding query]
16/2428 . . . . [Query predicate definition using graphical user interfaces, including menus and forms (G06F 16/2423 takes precedence)]
16/243 . . . . [Natural language query formulation]
16/2433 . . . . [Query languages]
16/2435 . . . . [Active constructs]
16/2438 . . . . [Embedded query languages]
16/244 . . . . [Grouping and aggregation]
16/2443 . . . . [Stored procedures]
16/2445 . . . . [Data retrieval commands; View definitions]
16/2448 . . . . [for particular applications; for extensibility, e.g. user defined types]
16/245 . . . . Query processing
16/2452 . . . . Query translation
16/24522 . . . . [Translation of natural language queries to structured queries]
16/24524 . . . . [Access plan code generation and invalidation; Reuse of access plans]
16/24526 . . . . [Internal representations for queries]
16/24528 . . . . [Standardisation; Simplification]
16/2453 . . . . Query optimisation
16/24532 . . . . [of parallel queries]
16/24534 . . . . [Query rewriting; Transformation]
16/24535 . . . . [of sub-queries or views]
16/24537 . . . . [of operators]
16/24539 . . . . [using cached or materialised query results]
16/2454 . . . . [Optimisation of common expressions]
16/24542 . . . . [Plan optimisation]
16/24544 . . . . [Join order optimisation]
16/24545 . . . . [Selectivity estimation or determination]
16/24547 . . . . [Optimisations to support specific applications; Extensibility of optimisers]
16/24549 . . . . [Run-time optimisation]
16/2455 . . . . Query execution
16/24552 . . . . [Database cache management]
16/24553 . . . . [of query operations]
16/24554 . . . . [Unary operations; Data partitioning operations]
16/24556 . . . . [Aggregation; Duplicate elimination]
16/24557 . . . . [Efficient disk access during query execution]
16/24558 . . . . [Binary matching operations]
16/2456 . . . . [Join operations]
16/24561 . . . . [Intermediate data storage techniques for performance improvement]
16/24562 . . . . [Pointer or reference processing operations]
16/24564 . . . . [Applying rules; Deductive queries]
16/24565 . . . . [Triggers; Constraints]
16/24566 . . . . [Recursive queries]
16/24568 . . . . [Data stream processing; Continuous queries]
16/24569 . . . . [Query processing with adaptation to specific hardware, e.g. adapted for using GPUs or SSDs]
16/2457 . . . . with adaptation to user needs
16/24573 . . . . [using data annotations, e.g. user-defined metadata]
16/24575 . . . . [using context]
16/24578 . . . . [using ranking]
16/2458 . . . . [Special types of queries, e.g. statistical queries, fuzzy queries or distributed queries]
16/2462 . . . . [Approximate or statistical queries]
16/2465 . . . . [Query processing support for facilitating mining operations in structured databases]
16/2468 . . . . [Fuzzy queries]
16/2471 . . . . [Distributed queries]
16/2474 . . . . [Sequence data queries, e.g. querying versioned data]
16/2477 . . . . [Temporal data queries]
16/248 . . . . Presentation of query results
16/25 . . . . Integrating or interfacing systems involving database management systems

**WARNING**

Group G06F 16/25 is incomplete pending reclassification of documents from group G06F 16/23.

Groups G06F 16/23 and G06F 16/25 should be considered in order to perform a complete search.

16/252 . . . . [between a Database Management System and a front-end application]
16/254 . . . . [Extract, transform and load [ETL] procedures, e.g. ETL data flows in data warehouses]
16/256 . . . . [in federated or virtual databases]
16/258 . . . . [Data format conversion from or to a database]

**WARNING**

Groups G06F 16/258 is incomplete pending reclassification of documents from group G06F 16/1794.

Groups G06F 16/1794 and G06F 16/258 should be considered in order to perform a complete search.

16/26 . . . . Visual data mining; Browsing structured data
16/27 . . . . Replication, distribution or synchronisation of data between databases or within a distributed database system; Distributed database system architectures therefor

**WARNING**

Group G06F 16/27 is impacted by reclassification into groups G06F 16/273, G06F 16/275, and G06F 16/278.

All groups listed in this Warning should be considered in order to perform a complete search.
16/273 . . . [Asynchronous replication or reconciliation]

**WARNING**

Groups G06F 16/273 is incomplete pending reclassification of documents from group G06F 16/27.

Groups G06F 16/27 and G06F 16/273 should be considered in order to perform a complete search.

16/275 . . . [Synchronous replication]

**WARNING**

Groups G06F 16/275 is incomplete pending reclassification of documents from group G06F 16/27.

Groups G06F 16/27 and G06F 16/275 should be considered in order to perform a complete search.

16/278 . . . [Data partitioning, e.g. horizontal or vertical partitioning]

**WARNING**

Groups G06F 16/278 is incomplete pending reclassification of documents from group G06F 16/27.

Groups G06F 16/27 and G06F 16/278 should be considered in order to perform a complete search.

16/28 . . . [Hierarchical databases, e.g. IMS, LDAP data stores or Lotus Notes]

16/283 . . . [Multi-dimensional databases or data warehouses, e.g. MOLAP or ROLAP]

16/284 . . . [Relational databases]

16/285 . . . . . . [Clustering or classification]

16/287 . . . . . . . [Visualization; Browsing]

16/288 . . . . . . [Entity relationship models]

16/289 . . . . . . [Object oriented databases]

16/29 . . . [Geographical information databases]

16/30 . . . [Unstructured textual data (document management systems G06F 16/93)]

**NOTE**


16/31 . . . [Indexing; Data structures therefor; Storage structures]

16/313 . . . [Selection or weighting of terms for indexing]

16/316 . . . [Indexing structures]

16/319 . . . . [Inverted lists]

16/322 . . . . [Trees]

16/325 . . . . [Hash tables]

16/328 . . . . [Management therefor]

16/33 . . . Querying

16/332 . . . Query formulation

16/3322 . . . . [using system suggestions (G06F 16/3325 takes precedence)]

16/3323 . . . . [using document space presentation or visualization, e.g. category, hierarchy or range presentation and selection]

16/3325 . . . . [Reformulation based on results of preceding query]

16/3326 . . . . . [using relevance feedback from the user, e.g. relevance feedback on documents, documents sets, document terms or passages]

16/3328 . . . . . . [using graphical result space presentation or visualisation]

16/3329 . . . . . . [Natural language query formulation or dialogue systems]

16/3331 . . . . [Query processing]

16/3332 . . . . [Query translation]

16/3334 . . . . . [Selection or weighting of terms from queries, including natural language queries]

16/3335 . . . . . [Syntactic pre-processing, e.g. stopword elimination, stemming]

16/3337 . . . . . [Translation of the query language, e.g. Chinese to English]

16/3338 . . . . [Query expansion]

16/334 . . . [Query execution (G06F 16/335 takes precedence)]

16/3341 . . . . [using boolean model]

16/3343 . . . . . [using phonetics]

16/3344 . . . . . [using natural language analysis]

16/3346 . . . . . . [using probabilistic model]

16/3347 . . . . . . [using vector based model]

16/3349 . . . . . [Reuse of stored results of previous queries]

16/335 . . . . . . [Filtering based on additional data, e.g. user or group profiles (filtering in web context G06F 16/9535, G06F 16/9536)]

16/337 . . . . [Profile generation, learning or modification]

16/338 . . . . . Presentation of query results

16/34 . . . . . Browsing; Visualisation therefor

16/345 . . . . . [Summarisation for human users]

16/35 . . . . . . [Clustering; Classification]

16/353 . . . . . . . [into predefined classes]

16/355 . . . . . . . [Class or cluster creation or modification]

16/358 . . . . . . [Browsing; Visualisation therefor]

16/36 . . . . . . [Creation of semantic tools, e.g. ontology or thesauri]

16/367 . . . . . [Ontology]

16/374 . . . . . [Thesaurus]
16/38 . . . Retrieval characterised by using metadata, e.g. metadata not derived from the content or metadata generated manually

WARNING
Group G06F 16/38 is impacted by reclassification into groups G06F 16/383 and G06F 16/387.

All groups listed in this Warning should be considered in order to perform a complete search.

16/381 . . . [using identifiers, e.g. barcodes, RFIDs (for URLs G06F 16/9554)]
16/382 . . . [using citations (hypermedia G06F 16/94)]
16/383 . . . using metadata automatically derived from the content

WARNING
Group G06F 16/383 is incomplete pending reclassification of documents from group G06F 16/38.

Groups G06F 16/38 and G06F 16/383 should be considered in order to perform a complete search.

16/387 . . . using geographical or spatial information, e.g. location

WARNING
Group G06F 16/387 is incomplete pending reclassification of documents from group G06F 16/38.

Groups G06F 16/38 and G06F 16/387 should be considered in order to perform a complete search.

16/40 . . . of multimedia data, e.g. slideshows comprising image and additional audio data (retrieval of still image data G06F 16/50; retrieval of audio data G06F 16/60; retrieval of video data G06F 16/70)

NOTE
In groups G06F 16/40, G06F 16/41, G06F 16/43, G06F 16/432, G06F 16/433, G06F 16/434, G06F 16/435, G06F 16/436, G06F 16/437, G06F 16/438, G06F 16/439, G06F 16/44, G06F 16/444, G06F 16/447 and G06F 16/45, subject matter relevant to retrieval characterised by using metadata, when it is determined to be novel and non-obvious, must also be classified in groups G06F 16/48, G06F 16/483, G06F 16/487 and G06F 16/489.

WARNING
Group G06F 16/40 is impacted by reclassification into groups G06F 16/45, G06F 16/48, G06F 16/483, G06F 16/487, and G06F 16/489.

All groups listed in this Warning should be considered in order to perform a complete search.

16/41 . . . Indexing; Data structures therefor; Storage structures

16/43 . . . Querying

WARNING
Group G06F 16/43 is impacted by reclassification into groups G06F 16/432, G06F 16/48, G06F 16/483, G06F 16/487, and G06F 16/489.

All groups listed in this Warning should be considered in order to perform a complete search.

16/432 . . . Query formulation

WARNING
Group G06F 16/432 is incomplete pending reclassification of documents from group G06F 16/43.

Groups G06F 16/43 and G06F 16/432 should be considered in order to perform a complete search.

16/433 . . . [using audio data]
16/434 . . . [using image data, e.g. images, photos, pictures taken by a user]
16/435 . . . Filtering based on additional data, e.g. user or group profiles
16/436 . . . [using biological or physiological data of a human being, e.g. blood pressure, facial expression, gestures]
16/437 . . . [Administration of user profiles, e.g. generation, initialisation, adaptation, distribution]
16/438 . . . Presentation of query results
16/4387 . . . [by the use of playlists]
16/4393 . . . [Multimedia presentations, e.g. slide shows, multimedia albums]
16/44 . . . Browsing; Visualisation therefor
16/444 . . . [Spatial browsing, e.g. 2D maps, 3D or virtual spaces]
16/447 . . . [Temporal browsing, e.g. timeline]
16/45 . . . Clustering; Classification

WARNING
Group G06F 16/45 is incomplete pending reclassification of documents from group G06F 16/40.

Groups G06F 16/40 and G06F 16/45 should be considered in order to perform a complete search.

16/48 . . . Retrieval characterised by using metadata, e.g. metadata not derived from the content or metadata generated manually

WARNING
Group G06F 16/48 is incomplete pending reclassification of documents from groups G06F 16/40 and G06F 16/43.

Groups G06F 16/40, G06F 16/43, and G06F 16/48 should be considered in order to perform a complete search.
16/483 . . . using metadata automatically derived from the content

**WARNING**

Group G06F 16/483 is incomplete pending reclassification of documents from groups G06F 16/40 and G06F 16/43.
Groups G06F 16/40, G06F 16/43, and G06F 16/483 should be considered in order to perform a complete search.

16/487 . . . using geographical or spatial information, e.g. location

**WARNING**

Group G06F 16/487 is incomplete pending reclassification of documents from groups G06F 16/40 and G06F 16/43.
Groups G06F 16/40, G06F 16/43, and G06F 16/487 should be considered in order to perform a complete search.

16/489 . . . [using time information]

**WARNING**

Group G06F 16/489 is incomplete pending reclassification of documents from groups G06F 16/40 and G06F 16/43.
Groups G06F 16/40, G06F 16/43, and G06F 16/489 should be considered in order to perform a complete search.

16/50 . . . of still image data

**NOTE**

In groups G06F 16/50, G06F 16/51, G06F 16/53, G06F 16/532, G06F 16/535, G06F 16/538, G06F 16/54, G06F 16/55 and G06F 16/56, subject matter relevant to retrieval characterised by using metadata, when it is determined to be novel and non-obvious, must also be classified in groups G06F 16/58, G06F 16/583, G06F 16/5838, G06F 16/5846, G06F 16/5854, G06F 16/5862 and G06F 16/587.

**WARNING**

Group G06F 16/50 is impacted by reclassification into groups G06F 16/53, G06F 16/532, G06F 16/535, G06F 16/538, and G06F 16/55.
All groups listed in this Warning should be considered in order to perform a complete search.

16/51 . . . Indexing; Data structures therefor; Storage structures

16/53 . . . Querying

**WARNING**

Group G06F 16/53 is incomplete pending reclassification of documents from group G06F 16/50.
Groups G06F 16/50 and G06F 16/53 should be considered in order to perform a complete search.

16/52 . . . Query formulation, e.g. graphical querying

**WARNING**

Group G06F 16/532 is incomplete pending reclassification of documents from group G06F 16/50.
Groups G06F 16/50 and G06F 16/532 should be considered in order to perform a complete search.

16/535 . . . Filtering based on additional data, e.g. user or group profiles

**WARNING**

Group G06F 16/535 is incomplete pending reclassification of documents from group G06F 16/50.
Groups G06F 16/50 and G06F 16/535 should be considered in order to perform a complete search.

16/538 . . . Presentation of query results

**WARNING**

Group G06F 16/538 is incomplete pending reclassification of documents from group G06F 16/50.
Groups G06F 16/50 and G06F 16/538 should be considered in order to perform a complete search.

16/54 . . . Browsing; Visualisation therefor

16/55 . . . Clustering; Classification

**WARNING**

Group G06F 16/55 is incomplete pending reclassification of documents from group G06F 16/50.
Groups G06F 16/50 and G06F 16/55 should be considered in order to perform a complete search.

16/56 . . . having vectorial format

16/58 . . . Retrieval characterised by using metadata, e.g. metadata not derived from the content or metadata generated manually

**WARNING**

Group G06F 16/58 is impacted by reclassification into group G06F 16/587.
Groups G06F 16/58 and G06F 16/587 should be considered in order to perform a complete search.

16/583 . . . using metadata automatically derived from the content

16/5838 . . . [using colour]

**WARNING**

Group G06F 16/5838 is impacted by reclassification into groups G06F 16/5846, G06F 16/5854, and G06F 16/5862.
All groups listed in this Warning should be considered in order to perform a complete search.
16/5846 . . . [using extracted text]

**WARNING**

Group G06F 16/5846 is incomplete pending reclassification of documents from group G06F 16/5838.

Groups G06F 16/5838 and G06F 16/5846 should be considered in order to perform a complete search.

16/5854 . . . [using shape and object relationship]

**WARNING**

Group G06F 16/5854 is incomplete pending reclassification of documents from group G06F 16/5838.

Groups G06F 16/5838 and G06F 16/5854 should be considered in order to perform a complete search.

16/5862 . . . [using texture]

**WARNING**

Group G06F 16/5862 is incomplete pending reclassification of documents from group G06F 16/5838.

Groups G06F 16/5838 and G06F 16/5862 should be considered in order to perform a complete search.

16/5866 . . . [using information manually generated, e.g. tags, keywords, comments, manually generated location and time information]

**WARNING**

Group G06F 16/5866 is impacted by reclassification into group G06F 16/587.

Groups G06F 16/5866 and G06F 16/587 should be considered in order to perform a complete search.

16/587 . . . using geographical or spatial information, e.g. location

**WARNING**

Group G06F 16/587 is incomplete pending reclassification of documents from groups G06F 16/58 and G06F 16/5866.

Groups G06F 16/58, G06F 16/5866, and G06F 16/587 should be considered in order to perform a complete search.

16/60 . . . of audio data

**NOTE**

In groups G06F 16/60, G06F 16/61, G06F 16/63, G06F 16/632, G06F 16/634, G06F 16/635, G06F 16/636, G06F 16/637, G06F 16/638, G06F 16/639, G06F 16/64, and G06F 16/65, subject matter relevant to retrieval characterised by using metadata, when it is determined to be novel and non-obvious, must also be classified in groups G06F 16/68, G06F 16/683, G06F 16/685, G06F 16/686 and G06F 16/687.

16/61 . . . Indexing; Data structures therefor; Storage structures

16/63 . . . Querying

**WARNING**

Group G06F 16/63 is incomplete pending reclassification of documents from group G06F 16/60.

Groups G06F 16/60 and G06F 16/63 should be considered in order to perform a complete search.

16/632 . . . Query formulation

16/634 . . . [Query by example, e.g. query by humming]

16/635 . . . Filtering based on additional data, e.g. user or group profiles

16/636 . . . [by using biological or physiological data]

16/637 . . . [Administration of user profiles, e.g. generation, initialization, adaptation or distribution]

16/638 . . . Presentation of query results

16/639 . . . [using playlists]

16/64 . . . Browsing; Visualisation therefor (generation of a list or set of audio data G06F 16/638)

16/65 . . . Clustering; Classification

**WARNING**

Group G06F 16/65 is incomplete pending reclassification of documents from group G06F 16/60.

Groups G06F 16/60 and G06F 16/65 should be considered in order to perform a complete search.

16/68 . . . Retrieval characterised by using metadata, e.g. metadata not derived from the content or metadata generated manually

**WARNING**

Group G06F 16/68 is impacted by reclassification into group G06F 16/687.

Groups G06F 16/68 and G06F 16/687 should be considered in order to perform a complete search.

16/683 . . . using metadata automatically derived from the content

16/685 . . . [using automatically derived transcript of audio data, e.g. lyrics (speech recognition G10L 15/00)]
16/686 . . . [using information manually generated, e.g. tags, keywords, comments, title or artist information, time, location or usage information, user ratings]

**WARNING**

Group G06F 16/686 is impacted by reclassification into group G06F 16/687. Groups G06F 16/686 and G06F 16/687 should be considered in order to perform a complete search.

16/687 . . . using geographical or spatial information, e.g. location

**WARNING**

Group G06F 16/687 is incomplete pending reclassification of documents from groups G06F 16/68 and G06F 16/686. Groups G06F 16/68, G06F 16/686, and G06F 16/687 should be considered in order to perform a complete search.

16/70 . . . of video data

**NOTE**

In groups G06F 16/70, G06F 16/71, G06F 16/73, G06F 16/732, G06F 16/738, G06F 16/738.5, G06F 16/734, G06F 16/734.5, G06F 16/735, G06F 16/738, G06F 16/739, G06F 16/74, G06F 16/743, G06F 16/745, G06F 16/78 and G06F 16/787, subject matter relevant to retrieval characterised by using metadata, when it is determined to be novel and non-obvious, must also be classified in groups G06F 16/78, G06F 16/783, G06F 16/783.4, G06F 16/783.7, G06F 16/784, G06F 16/784.4, G06F 16/784.7, G06F 16/785, G06F 16/785.4, G06F 16/785.7, G06F 16/786, G06F 16/786.4, G06F 16/786.7 and G06F 16/787.

**WARNING**

Group G06F 16/70 is impacted by reclassification into group G06F 16/75. Groups G06F 16/70 and G06F 16/75 should be considered in order to perform a complete search.

16/71 . . . Indexing; Data structures therefor; Storage structures

16/73 . . . Querying

**WARNING**

Group G06F 16/73 is impacted by reclassification into group G06F 16/732. Groups G06F 16/73 and G06F 16/732 should be considered in order to perform a complete search.

16/732 . . . Query formulation

**WARNING**

Group G06F 16/732 is incomplete pending reclassification of documents from group G06F 16/73. Groups G06F 16/73 and G06F 16/732 should be considered in order to perform a complete search.

16/738 . . . { Query by example, e.g. a complete video frame or video sequence (graphical querying G06F 16/733.5) }

16/735 . . . { Graphical querying, e.g. query-by-region, query-by-sket-ch, query-by-trajectory, GUIs for designating a person/face/object as a query predicate (end-user interface involving hot spots associated with the video H04N 21/4725; end-user interface for selecting a Region of Interest H04N 21/4728) }

16/7343 . . . { Query language or query format }

16/734 . . . Filtering based on additional data, e.g. user or group profiles

16/738 . . . Presentation of query results

16/739 . . . { in form of a video summary, e.g. the video summary being a video sequence, a composite still image or having synthesized frames }

16/74 . . . Browsing; Visualisation therefor (end-user interfaces for requesting or interacting with video content, e.g. video on demand interfaces or electronic program guides, H04N 21/472)

16/743 . . . { a collection of video files or sequences }

16/745 . . . { the internal structure of a single video sequence }

16/748 . . . { Hypervideo (linking data to content, e.g. by linking an URL to a video object in the context of video distribution systems H04N 21/858) }

16/75 . . . Clustering; Classification

**WARNING**

Group G06F 16/75 is incomplete pending reclassification of documents from group G06F 16/70. Groups G06F 16/70 and G06F 16/75 should be considered in order to perform a complete search.

16/78 . . . Retrieval characterised by using metadata, e.g. metadata not derived from the content or metadata generated manually

**WARNING**

Group G06F 16/78 is impacted by reclassification into group G06F 16/787. Groups G06F 16/78 and G06F 16/787 should be considered in order to perform a complete search.

16/783 . . . using metadata automatically derived from the content

16/7834 . . . { using audio features }

16/7837 . . . { using objects detected or recognised in the video content }
16/835 . . . Query processing

**WARNING**

Group G06F 16/835 is incomplete pending reclassification of documents from group G06F 16/83.

Groups G06F 16/83 and G06F 16/835 should be considered in order to perform a complete search.

16/8358 . . . (Query translation)
16/8356 . . . (Query optimisation)
16/8373 . . . (Query execution)
16/838 . . . Presentation of query results
16/84 . . Mapping; Conversion
16/86 . . . Mapping to a database
16/88 . . . [Mark-up to mark-up conversion (conversion for visualization in web browsing G06F 16/9577)]

16/90 . Details of database functions independent of the retrieved data types

**NOTE**

In groups G06F 16/90, G06F 16/901, G06F 16/9014, G06F 16/9017, G06F 16/902, G06F 16/9024, G06F 16/9027, G06F 16/903, G06F 16/9032, G06F 16/90324, G06F 16/90328, G06F 16/90332, G06F 16/90335, G06F 16/90339, G06F 16/9034, G06F 16/90344, G06F 16/90348, G06F 16/9035, G06F 16/9038, G06F 16/904, G06F 16/906, subject matter relevant to retrieval characterised by using metadata, when it is determined to be novel and non-obvious, must also be classified in groups G06F 16/907, G06F 16/907, and G06F 16/909.

**WARNING**

Group G06F 16/90 is impacted by reclassification into group G06F 16/906.

Groups G06F 16/90 and G06F 16/906 should be considered in order to perform a complete search.

16/901 . . Indexing; Data structures therefor; Storage structures (for retrieval from the web G06F 16/951)
16/9014 . . . (hash tables)
16/9017 . . . [using directory or table look-up (use of a directory or look-up table in file systems G06F 16/13)]
16/902 . . . [using more than one table in sequence, i.e. systems with three or more layers]
16/9024 . . . [Graphs; Linked lists (G06F 16/9027 takes precedence)]
16/9027 . . . [Trees]
16/903 . . Querying (for retrieval from the web G06F 16/953)

**WARNING**

Group G06F 16/903 is impacted by reclassification into group G06F 16/9035.

Groups G06F 16/903 and G06F 16/9035 should be considered in order to perform a complete search.
16/9032 . . . Query formulation
16/90324 . . . [using system suggestions]
16/90328 . . . [using search space presentation or visualization, e.g. category or range presentation and selection]
16/90332 . . . [Natural language query formulation or dialogue systems]
16/90335 . . . [Query processing]
16/90339 . . . [by using parallel associative memories or content-addressable memories]
16/90344 . . . [by using string matching techniques]
16/90348 . . . [by searching ordered data, e.g. alphanumerically ordered data]
16/9035 . . . Filtering based on additional data, e.g. user or group profiles

**WARNING**

Group G06F 16/9035 is incomplete pending reclassification of documents from group G06F 16/903.

Groups G06F 16/903 and G06F 16/9035 should be considered in order to perform a complete search.

16/9038 . . . Presentation of query results
16/904 . . . Browsing; Visualisation therefor (for navigating the web G06F 16/954; browsing optimisation for the web G06F 16/957)
16/906 . . . Clustering; Classification

**WARNING**

Group G06F 16/906 is incomplete pending reclassification of documents from group G06F 16/90.

Groups G06F 16/90 and G06F 16/906 should be considered in order to perform a complete search.

16/907 . . . Retrieval characterised by using metadata, e.g. metadata not derived from the content or metadata generated manually

**WARNING**

Group G06F 16/907 is impacted by reclassification into groups G06F 16/908 and G06F 16/909.

Groups G06F 16/907, G06F 16/908, and G06F 16/909 should be considered in order to perform a complete search.

16/908 . . . using metadata automatically derived from the content

**WARNING**

Group G06F 16/908 is incomplete pending reclassification of documents from group G06F 16/907.

Groups G06F 16/907 and G06F 16/908 should be considered in order to perform a complete search.

16/909 . . . using geographical or spatial information, e.g. location (spatiotemporally dependent retrieval from the web G06F 16/9537)

**WARNING**

Group G06F 16/909 is incomplete pending reclassification of documents from group G06F 16/907.

Groups G06F 16/907 and G06F 16/909 should be considered in order to perform a complete search.

16/93 . . . Document management systems
16/94 . . . [Hypermedia (hyperlinking within text processing G06F 17/2235)]
16/95 . . . Retrieval from the web
16/951 . . . Indexing; Web crawling techniques

**WARNING**

Group G06F 16/951 is impacted by reclassification into groups G06F 16/953, G06F 16/9532 and G06F 16/9538.

All groups listed in this Warning should be considered in order to perform a complete search.

16/953 . . . Querying, e.g. by the use of web search engines

**WARNING**

Group G06F 16/953 is incomplete pending reclassification of documents from group G06F 16/951.

Groups G06F 16/951 and G06F 16/953 should be considered in order to perform a complete search.

16/9532 . . . Query formulation

**WARNING**

Group G06F 16/9532 is incomplete pending reclassification of documents from group G06F 16/951.

Groups G06F 16/951 and G06F 16/9532 should be considered in order to perform a complete search.

16/9535 . . . Search customisation based on user profiles and personalisation

**WARNING**

Group G06F 16/9535 is impacted by reclassification into groups G06F 16/9536 and G06F 16/9538.

Groups G06F 16/9535, G06F 16/9536, and G06F 16/9538 should be considered in order to perform a complete search.
Search customisation based on social or collaborative filtering

**WARNING**

Group **G06F 16/9536** is incomplete pending reclassification of documents from group **G06F 16/9535**.

Groups **G06F 16/9535** and **G06F 16/9536** should be considered in order to perform a complete search.

Spatial or temporal dependent retrieval, e.g. spatiotemporal queries

**WARNING**

Group **G06F 16/9538** is incomplete pending reclassification of documents from groups **G06F 16/951** and **G06F 16/9535**.

Groups **G06F 16/951**, **G06F 16/9535**, and **G06F 16/9538** should be considered in order to perform a complete search.

Navigation, e.g. using categorised browsing

using information identifiers, e.g. uniform resource locators [URL]

by using bar codes

(Details of hyperlinks; Management of linked annotations)

(Bookmark management)

(URL specific, e.g. using aliases, detecting broken or misspelled links)

Browsing optimisation, e.g. caching or content distillation

(of access to content, e.g. by caching)

(Optimising the visualization of content, e.g. distillation of HTML documents)

Organisation or management of web site content, e.g. publishing, maintaining pages or automatic linking

Access to data in other repository systems, e.g. legacy data or dynamic Web page generation

(Document structures and storage, e.g. HTML extensions)

Digital computing or data processing equipment or methods, specially adapted for specific functions (information retrieval, database structures or file system structures therefor **G06F 16/00**)

Complex mathematical operations (function generation by table look-up **G06F 1/03**; evaluation of elementary functions by calculation **G06F 7/544**)

for solving equations, e.g. nonlinear equations, general mathematical optimization problems (optimization specially adapted for a specific administrative, business or logistic context **G06Q 10/04**)

Simultaneous equations, e.g. systems of linear equations

Differential equations (using digital differential analysers **G06F 7/64**)

Fourier, Walsh or analogous domain transformations, e.g. Laplace, Hilbert, Karhunen-Loeve, transforms (for correlation function computation **G06F 17/156**; spectrum analysers **G01K 23/16**)

{Discrete Fourier transforms}

{Fast Fourier transforms, e.g. using a Cooley-Tukey type algorithm}

{Prime factor Fourier transforms, e.g. Winograd transforms, number theoretic transforms}

{Square transforms, e.g. Hadamard, Walsh, Haar, Hough, Slant transforms}

{Discrete orthonormal transforms, e.g. discrete cosine transform, discrete sine transform, and variations therefrom, e.g. modified discrete cosine transform, integer transforms approximating the discrete cosine transform (**G06F 17/145** takes precedence)}

{Wavelet transforms}

Correlation function computation (including computation of convolution operations (arithmetic circuits for sum of products per se, e.g. multiply-accumulators **G06F 7/5443**; digital filters, e.g. FIR, IIR, adaptive filters **H03H 17/00**)

{Multidimensional correlation or convolution}

{using a domain transform, e.g. Fourier transform, polynomial transform, number theoretic transform}

Matrix or vector computation, e.g. matrix-matrix or matrix-vector multiplication, matrix factorization (matrix transposition **G06F 7/78**)

Function evaluation by approximation methods, e.g. inter- or extrapolation, smoothing, least mean square method (**G06F 17/18** takes precedence) ; interpolation for numerical control **G05B 19/18**

{of multidimensional data}

for evaluating statistical data, e.g. average values, frequency distributions, probability functions, regression analysis (forecasting specially adapted for a specific administrative, business or logistic context **G06Q 10/04**)

Handling natural language data (speech analysis or synthesis **G10L**)

Text processing (**G06F 17/27**, **G06F 17/28** take precedence; systems for composing machines **B41B 27/00**)

{Formatting, i.e. changing of presentation of document (**G06F 17/25**, **G06F 17/26** take precedence)}

{Display of layout of document; Preview}

{Font handling; Temporal and kinetic typography}

{Mathematical or scientific, subscripts, superscripts}

{Pagination}

{Tagging; Marking up (details of markup languages **G06F 17/22**); Designating a block; Setting of attributes (style sheets, e.g. eXtensible Stylesheet Language Transformation [XSL-T] **G06F 17/227**)}

Manipulating or registering by use of codes, e.g. in sequence of text characters {compression **H03M 7/30**}
17/2205 . . . . [Storage facilities]
17/2211 . . . . [Calculation of differences between files]
17/2217 . . . . [Character encodings]
17/2223 . . . . [Handling non-latin characters, e.g. kana-to-kanji conversion]
17/2229 . . . . [Fragmentation of text-files, e.g. reusable text-blocks, including linking to the fragments, XInclude, Namespaces]
17/2235 . . . . [Hyperlinking (information retrieval based on hyperlinks G06F 16/94)]
17/2241 . . . . [Hierarchical processing, e.g. outlines]
17/2247 . . . . [Tree structured documents; Markup, e.g. Standard Generalized Markup Language [SGML], Document Type Definition [DTD] (validation and parsing G06F 17/2705; data retrieval G06F 16/00; coding and compression H03M 7/30)]
17/2252 . . . . [Coding or compression of tree-structured data (coding and compression in general H03M 7/30)]
17/2258 . . . . [Adaptation of the text data for streaming purposes, e.g. XStream]
17/2264 . . . . [Transformation]
17/227 . . . . [Tree transformation for tree-structured or markup documents, e.g. eXtensible Stylesheet Language Transformation (XSL-T) stylesheets, Omnimmak, Balise]
17/2276 . . . . [using dictionaries or tables]
17/2282 . . . . [Automatic learning of transformation rules, e.g. by example]
17/2288 . . . . [Version control]
17/2294 . . . . [Handling of whitespace]
17/24 . . . . Editing, e.g. insert/delete [(G06F 17/22 takes precedence)]
17/241 . . . . [Annotation, e.g. comment data, footnotes]
17/242 . . . . [by use of digital ink]
17/243 . . . . [Form filling; Merging, e.g. graphical processing of form or text]
17/245 . . . . [Tables; Ruled lines]
17/246 . . . . [Spreadsheets (relational data bases G06F 16/284; form-filling G06F 17/243)]
17/247 . . . . [Tabulation, e.g. one dimensional positioning]
17/248 . . . . [Templates]
17/25 . . . . [Automatic justification]
17/26 . . . . [Automatic hyphenation]
17/27 . . . . [Automatic analysis, e.g. parsing {(speech recognition, analysis or synthesis G10L)}]
17/2705 . . . . [Parsing]
17/271 . . . . [Syntactic parsing, e.g. based on context-free grammar [CFG], unification grammars]
17/2715 . . . . [Statistical methods]
17/272 . . . . [Parsing markup language streams (streaming G06F 17/2258)]
17/2725 . . . . [Validation]
17/273 . . . . [Orthographic correction, e.g. spelling checkers, vowelisation]
17/2735 . . . . [Dictionaries]
17/274 . . . . [Grammatical analysis; Style critique]
17/2745 . . . . [Heading extraction; Automatic titling, numbering]
17/275 . . . . [Language Identification]
17/2755 . . . . [Morphological analysis]
17/276 . . . . [Stenotyping, code gives word, guess-ahead for partial word input]
17/2765 . . . . [Recognition]
17/277 . . . . [Lexical analysis, e.g. tokenisation, collocates]
17/2775 . . . . [Phrasal analysis, e.g. finite state techniques, chunking]
17/278 . . . . [Named entity recognition]
17/2785 . . . . [Semantic analysis]
17/279 . . . . [Discourse representation]
17/2795 . . . . [Thesaurus; Synonyms]
17/28 . . . . [Processing or translating of natural language (G06F 17/22 takes precedence)]
17/2809 . . . . [Data driven translation]
17/2818 . . . . [Statistical methods, e.g. probability models]
17/2827 . . . . [Example based machine translation; Alignment]
17/2836 . . . . [Machine assisted translation, e.g. translation memory]
17/2845 . . . . [Using very large corpora, e.g. the world wide web [WWW]]
17/2854 . . . . [Translation evaluation]
17/2863 . . . . [Processing of non-latin text (kana-to-kanji conversion G06F 17/2223, vowelisation G06F 17/273)]
17/2872 . . . . [Rule based translation]
17/2881 . . . . [Natural language generation]
17/289 . . . . [Use of machine translation, e.g. multi-lingual retrieval, server side translation for client devices, real-time translation (data retrieval G06F 16/00, administrative and business methods G06Q 10/00, G06Q 30/00)]
17/40 . . . . Data acquisition and logging (for input to computer G06F 3/00; displays as computer output G06F 3/14; for image data processing G06T 9/00; compression in general H03M 7/30; for transmission H04B 1/66; for pictorial communication H04N; arrangements in telecontrol or telemetry systems for selectively calling a substation from a main station H04Q 9/00)
17/5045 . . . [Circuit design (G06F 17/5068 takes precedence; logic circuits H03K 19/00)]

17/505 . . . [Logic synthesis, e.g. technology mapping, optimisation]

17/5054 . . . [for user-programmable logic devices, e.g. field programmable gate arrays [FPGA]]

17/5059 . . . [Delay-insensitive circuit design, e.g. asynchronous, self-timed]

17/5063 . . . [Analog circuit design, e.g. amplifiers]

17/5068 . . . [Physical circuit design, e.g. layout for integrated circuits or printed circuit boards]

17/5072 . . . [Floorplanning, e.g. partitioning, placement]

17/5077 . . . [Routing]

17/5081 . . . [Layout analysis, e.g. layout verification, design rule check]

17/5086 . . . [Mechanical design, e.g. parametric or variational design]

17/509 . . . [Network design, e.g. positioning, routing, graphs (circuit design G06F 17/5068)]

17/5095 . . . [Vehicle design, e.g. aircraft or automotive design]

19/00 Digital computing or data processing equipment or methods, specially adapted for specific applications (specially adapted for specific functions G06F 17/00; data processing systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes G06Q; healthcare informatics G16H)

**WARNING**

Group G06F 19/00 is no longer used for the classification of documents as of 02-01-2019. The content of this group is being reclassified into group G16Z 99/00.

Groups G06F 19/00 and G16Z 99/00 should be considered in order to perform a complete search.

19/32 . . . [Medical data management, e.g. systems or protocols for archival or communication of medical images, computerised patient records or computerised general medical references (information retrieval or databases per se G06F 16/00; data security aspects G06F 21/00)]

**WARNING**

Group G06F 19/32 is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 10/00 – G16H 80/00.

Groups G06F 19/32 and G16H 10/00 – G16H 80/00 should be considered in order to perform a complete search.

19/321 . . . [Management of medical image data, e.g. communication or archiving systems such as picture archiving and communication systems [PACS] or related medical protocols such as digital imaging and communications in medicine protocol [DICOM]; Editing of medical image data, e.g. adding diagnosis information (image data processing in general G06T; image data processing related to 3D objects G06F 17/00; biomedical image inspection G06F 7/0012)]

**WARNING**

Group G06F 19/321 is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 30/00 – G16H 30/40.

Groups G06F 19/321 and G16H 30/00 – G16H 30/40 should be considered in order to perform a complete search.

19/324 . . . [Management of patient independent data, e.g. medical references in digital format]

**WARNING**

Group G06F 19/324 is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 70/00 and G16H 70/60.

Groups G06F 19/324, G16H 70/00, and G16H 70/60 should be considered in order to perform a complete search.

19/325 . . . [Medical practices, e.g. general treatment protocols]

**WARNING**

Group G06F 19/325 is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 70/20 and G16H 70/60.

Groups G06F 19/325, G16H 70/20, and G16H 70/60 should be considered in order to perform a complete search.
**Group G06F 19/326** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 70/40 and G16H 70/60.

Groups G06F 19/326, G16H 70/40, and G16H 70/60 should be considered in order to perform a complete search.

**Group G06F 19/328** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G06Q 10/10 and G06Q 40/08.

Groups G06F 19/328, G06Q 10/10 and G06Q 40/08 should be considered in order to perform a complete search.

**Group G06F 19/34** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 10/00 – G16H 80/00. Groups G06F 19/34 and G16H 10/00 – G16H 80/00 should be considered in order to perform a complete search.

**Group G06F 19/3418** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 40/40, G16H 40/60, G16H 40/67.

Groups G06F 19/3418, G16H 40/40, G16H 40/60, and G16H 40/67 should be considered in order to perform a complete search.

**Group G06F 19/3456** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 20/10, G16H 20/60, G16H 20/70, and G16H 20/90.

All groups listed in this Warning should be considered in order to perform a complete search.

**Group G06F 19/3462** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 40/40, G16H 40/60, and G16H 40/67.

All groups listed in this Warning should be considered in order to perform a complete search.

**Group G06F 19/3468** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 20/17, G16H 20/60, G16H 20/70, and G16H 20/90.

All groups listed in this Warning should be considered in order to perform a complete search.

**Group G06F 19/3475** is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 20/60, G16H 20/70 and G16H 20/90.

Groups G06F 19/3475, G16H 20/60, G16H 20/70 and G16H 20/90 should be considered in order to perform a complete search.
19/3481 . . . [Computer-assisted prescription or delivery of treatment by physical action, e.g. surgery or physical exercise (surgical instruments, devices or methods A61B 17/00; apparatuses for physical training A63B)]

**WARNING**

Group G06F 19/3481 is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 20/30, G16H 20/40, G16H 20/70 and G16H 20/90.

Groups G06F 19/3481, G16H 20/30, G16H 20/40, G16H 20/70 and G16H 20/90 should be considered in order to perform a complete search.

19/36 . . . [Computer-assisted acquisition of medical data, e.g. computerised clinical trials or questionnaires (measuring analogue medical signals A61B 5/00)]

**WARNING**

Group G06F 19/36 is no longer used for the classification of documents as of January 1, 2018. The content of this group is being reclassified into groups G16H 10/00 – G16H 10/40.

Groups G06F 19/36 and G16H 10/00 – G16H 10/40 should be considered in order to perform a complete search.

21/00 Security arrangements for protecting computers, components thereof, programs or data against unauthorised activity

21/10 . . . Protecting distributed programs or content, e.g. vending or licensing of copyrighted material

21/105 . . . [Tools for software license management or administration, e.g. managing licenses at corporate level]

21/12 . . . Protecting executable software

21/121 . . . [Restricting unauthorised execution of programs]

21/123 . . . . . [by using dedicated hardware, e.g. dongles, smart cards, cryptographic processors, global positioning systems (GPS) devices]

21/125 . . . . . [by manipulating the program code, e.g. source code, compiled code, interpreted code, machine code]

21/126 . . . . . . [Interacting with the operating system]

21/128 . . . . . . [involving web programs, i.e. using technology especially used in internet, generally interacting with a web browser, e.g. hypertext markup language [HTML], applets, java]

21/14 . . . against software analysis or reverse engineering, e.g. by obfuscation

21/16 . . . Program or content traceability, e.g. by watermarking

21/30 . . . Authentication, i.e. establishing the identity or authorisation of security principals

21/305 . . . [by remotely controlling device operation]

21/31 . . . User authentication

21/313 . . . [using a call-back technique via a telephone network]

21/316 . . . [by observing the pattern of computer usage, e.g. typical user behaviour]

21/32 . . . using biometric data, e.g. fingerprints, iris scans or voiceprints

21/33 . . . using certificates

21/335 . . . [for accessing specific resources, e.g. using Kerberos tickets]

21/34 . . . involving the use of external additional devices, e.g. dongles or smart cards

21/35 . . . communicating wirelessly

21/36 . . . by graphic or iconic representation

21/40 . . . by quorum, i.e. whereby two or more security principals are required

21/41 . . . where a single sign-on provides access to a plurality of computers

21/42 . . . using separate channels for security data

21/43 . . . wireless channels

21/44 . . . Program or device authentication

21/445 . . . [by mutual authentication, e.g. between devices or programs]

21/45 . . . Structures or tools for the administration of authentication

21/46 . . . by designing passwords or checking the strength of passwords

21/50 . . . Monitoring users, programs or devices to maintain the integrity of platforms, e.g. of processors, firmware or operating systems

21/51 . . . at application loading time, e.g. accepting, rejecting, starting or inhibiting executable software based on integrity or source reliability

21/52 . . . during program execution, e.g. stack integrity {; Preventing unwanted data erasure; Buffer overflow}

21/53 . . . by executing in a restricted environment, e.g. sandbox or secure virtual machine

21/54 . . . by adding security routines or objects to programs

21/55 . . . Detecting local intrusion or implementing counter-measures

21/552 . . . [involving long-term monitoring or reporting]

21/554 . . . [involving event detection and direct action]

21/556 . . . [involving covert channels, i.e. data leakage between processes (inhibiting the analysis of circuitry or operation with measures against power attack G06F 21/755)]

21/56 . . . Computer malware detection or handling, e.g. anti-virus arrangements

21/561 . . . [Virus type analysis]

21/562 . . . [Static detection]

21/563 . . . [by source code analysis]

21/564 . . . [by virus signature recognition]

21/565 . . . [by checking file integrity]

21/566 . . . [Dynamic detection, i.e. detection performed at run-time, e.g. emulation, suspicious activities]

21/567 . . . [using dedicated hardware]

21/568 . . . [eliminating dedicated hardware]
21/57 . . . Certifying or maintaining trusted computer platforms, e.g. secure boots or power-downs, version controls, system software checks, secure updates or assessing vulnerabilities

**WARNING**

Group G06F 21/57 - G06F 21/577 is incomplete pending reclassification of documents from groups G06F 8/65, G06F 8/71, and G06F 9/445.

All groups listed in this Warning should be considered in order to perform a complete search.

21/572 . . . [Secure firmware programming, e.g. of basic input output system [BIOS]]

21/575 . . . [Secure boot]

21/577 . . . [Assessing vulnerabilities and evaluating computer system security]

21/60 . . . Protecting data

21/602 . . . [Providing cryptographic facilities or services]

21/604 . . . [Tools and structures for managing or administering access control systems]

21/606 . . . [by securing the transmission between two devices or processes]

21/608 . . . [Secure printing]

21/62 . . . Protecting access to data via a platform, e.g. using keys or access control rules

21/6209 . . . [to a single file or object, e.g. in a secure envelope, encrypted and accessed using a key, or with access control rules appended to the object itself]

21/6218 . . . [to a system of files or objects, e.g. local or distributed file system or database]

21/6227 . . . . . . [where protection concerns the structure of data, e.g. records, types, queries]

21/6236 . . . . . . [between heterogeneous systems]

21/6245 . . . . . . [Protecting personal data, e.g. for financial or medical purposes]

21/6254 . . . . . . . [by anonymising data, e.g. decorrelating personal data from the owner's identification]

21/6263 . . . . . . . [during internet communication, e.g. revealing personal data from cookies]

21/6272 . . . . . . . [by registering files or documents with a third party]

21/6281 . . . . . . . . . [at program execution time, where the protection is within the operating system]

21/629 . . . . . . . . . . . [to features or functions of an application]

21/64 . . . Protecting data integrity, e.g. using checksums, certificates or signatures

21/645 . . . . . . . . . . . [using a third party]

21/70 . . . Protecting specific internal or peripheral components, in which the protection of a component leads to protection of the entire computer

21/71 . . . . . . . . . . . to assure secure computing or processing of information

21/72 . . . . . . . . . . . in cryptographic circuits

21/725 . . . . . . . . . . . . . . . . . . . [operating on a secure reference time value]

21/73 . . . . . . . . . . . . . . . . . . . by creating or determining hardware identification, e.g. serial numbers

21/74 . . . . . . . . . . . . . . . . . . . operating in dual or compartmented mode, i.e. at least one secure mode

21/75 . . . . . . . . . . . by inhibiting the analysis of circuitry or operation

**WARNING**

Group G06F 21/75 is impacted by reclassification into group G06F 21/755.

Groups G06F 21/75 and G06F 21/755 should be considered in order to perform a complete search.

21/755 . . . . . . . . . . . [with measures against power attack]

**WARNING**

Group G06F 21/755 is incomplete pending reclassification of documents from group G06F 21/75.

Groups G06F 21/75 and G06F 21/755 should be considered in order to perform a complete search.

21/76 . . . . . . . . . . . in application-specific integrated circuits [ASICs] or field-programmable devices, e.g. field-programmable gate arrays [FPGAs] or programmable logic devices [PLDs]

21/77 . . . . . . . . . . . smart cards

21/78 . . . . . . . . . . . to assure secure storage of data (address-based protection against unauthorised use of memory G06F 12/14; record carriers for use with machines and with at least a part designed to carry digital markings G06F 19/00)

21/79 . . . . . . . . . . . in semiconductor storage media, e.g. directly-addressable memories

21/80 . . . . . . . . . . . in storage media based on magnetic or optical technology, e.g. disks with sectors (preventing unauthorised reproduction or copying of disc-type recordable media G11B 20/00)

21/805 . . . . . . . . . . . . [using a security table for the storage subsystem]

21/81 . . . . . . . . . . . by operating on the power supply, e.g. enabling or disabling power-on, sleep or resume operations

21/82 . . . . . . . . . . . Protecting input, output or interconnection devices

21/83 . . . . . . . . . . . input devices, e.g. keyboards, mice or controllers thereof

21/84 . . . . . . . . . . . output devices, e.g. displays or monitors

21/85 . . . . . . . . . . . interconnection devices, e.g. bus-connected or in-line devices

21/86 . . . . . . . . . . . Secure or tamper-resistant housings

21/87 . . . . . . . . . . . by means of encapsulation, e.g. for integrated circuits

21/88 . . . . . . . . . . . Detecting or preventing theft or loss

2101/00 Indexing scheme relating to the type of digital function generated

2101/02 . . . Linear multivariable functions, i.e. sum of products

2101/04 . . . Trigonometric functions

2101/06 . . . Co-ordinate transformations

2101/08 . . . Powers or roots

2101/10 . . . Logarithmic or exponential functions

2101/12 . . . Reciprocal functions

2101/14 . . . Probability distribution functions

2101/16 . . . PCM companding functions

2200/00 Indexing scheme relating to G06F 1/04 - G06F 1/32

2200/16 . . . Indexing scheme relating to G06F 1/16 - G06F 1/18
Monitoring specific for caches

INDEXING SCHEME RELATING TO

g06f 3/040 - g06f 3/048

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Group G06f 2203/041 is impacted by reclassification into group G06f 2203/04114.
Groups G06F 2203/041 and G06F 2203/04114 should be considered in order to perform a complete search.
2203/04101 . . . 2.5D-digitiser, i.e. digitiser detecting the X/Y position of the input means, finger or stylus, also when it does not touch, but is proximate to the digitiser's interaction surface and also measures the distance of the input means within a short range in the Z direction, possibly with a separate measurement setup

2203/04102 . . . Flexible digitiser, i.e. constructional details for allowing the whole digitising part of a device to be flexed or rolled like a sheet of paper

2203/04103 . . . Manufacturing, i.e. details related to manufacturing processes specially suited for touch sensitive devices

2203/04104 . . . Multi-touch detection in digitiser, i.e. details about the simultaneous detection of a plurality of touching locations, e.g. multiple fingers or pen and finger

2203/04105 . . . Pressure sensors for measuring the pressure or force exerted on the touch surface without providing the touch position

2203/04106 . . . Multi-sensing digitiser, i.e. digitiser using at least two different sensing technologies simultaneously or alternatively, e.g. for detecting pen and finger, for saving power or for improving position detection

2203/04107 . . . Shielding in digitiser, i.e. guard or shielding arrangements, mostly for capacitive touchscreens, e.g. driven shields, driven grounds

2203/04108 . . . Touchless 2D-digitiser, i.e. digitiser detecting the X/Y position of the input means, finger or stylus, also when it does not touch, but is proximate to the digitiser's interaction surface without distance measurement in the Z direction

2203/04109 . . . FTIR in optical digitiser, i.e. touch detection by frustrating the total internal reflection within an optical waveguide due to changes of optical properties or deformation at the touch location

2203/04111 . . . Cross over in capacitive digitiser, i.e. details of structures for connecting electrodes of the sensing pattern where the connections cross each other, e.g. bridge structures comprising an insulating layer, or vias through substrate

2203/04112 . . . Electrode mesh in capacitive digitiser: electrode for touch sensing is formed of a mesh of very fine, normally metallic, interconnected lines that are almost invisible to see. This provides a quite large but transparent electrode surface, without need for ITO or similar transparent conductive material

2203/04113 . . . Peripheral electrode pattern in resistive digitisers, i.e. electrodes at the periphery of the resistive sheet are shaped in patterns enhancing linearity of induced field

2203/04114 . . . Touch screens adapted for alternating or simultaneous interaction with active pens and passive pointing devices like fingers or passive pens

**WARNING**

Group G06F 2203/04114 is incomplete pending reclassification of documents from group G06F 2203/041.

Groups G06F 2203/041 and G06F 2203/04114 should be considered in order to perform a complete search.
2206/00 Indexing scheme related to dedicated interfaces for computers
2206/10 . . . Indexing scheme related to storage interfaces for computers, indexing schema related to group G06F 3/06
2206/1004 . . . Defragmentation
2206/1008 . . . Graphical user interface [GUI]
2206/1012 . . . Load balancing
2206/1014 . . . One time programmable [OTP] memory, e.g. PROM, WORM
2206/15 . . . Indexing scheme related to printer interfaces for computers, indexing schema related to group G06F 3/12
2206/1504 . . . Cost estimation
2206/1506 . . . Degraded mode, e.g. in view of consumables depleted, thresholds reached
2206/1508 . . . Load balancing
2206/151 . . . Pre-printed media, e.g. media stock, forms, logos
2206/1512 . . . Print-to a presentation device other than a printer, e.g. e-reader, e-paper, tablet
2206/1514 . . . Sub-job
2206/20 . . . Indexing scheme related to audio interfaces for computers, indexing schema related to group G06F 3/16

G06F

2207/00 Indexing scheme relating to methods or arrangements for processing data by operating upon the order or content of the data handled
2207/02 . . . Indexing scheme relating to groups G06F 7/02 - G06F 7/026
2207/025 . . . String search, i.e. pattern matching, e.g. find identical word or best match in a string
2207/22 . . . Indexing scheme relating to groups G06F 7/22 - G06F 7/36
2207/222 . . . Binary data tree
2207/224 . . . External sorting
2207/226 . . . Priority queue, i.e. 1 word in, 1 word out sorter; Output word, i.e. min or max of words in memory
2207/228 . . . Sorting or merging network
2207/38 . . . Indexing scheme relating to groups G06F 7/38 - G06F 7/575
2207/3804 . . . Details
2207/3808 . . . concerning the type of numbers or the way they are handled
2207/3812 . . . Devices capable of handling different types of numbers
2207/3816 . . . Accepting numbers of variable word length
2207/382 . . . Reconfigurable for different fixed word lengths (multigauge devices G06F 2207/3828)
2207/3824 . . . Accepting both fixed-point and floating-point numbers
2207/3828 . . . Multigauge devices, i.e. capable of handling packed numbers without unpacking them
2207/3832 . . . Less usual number representations
2207/3836 . . . One’s complement
2207/384 . . . Octal
2207/3844 . . . Hexadecimal
2207/3848 . . . Unit distance code
2207/3852 . . . Calculation with most significant digit first
2207/3856 . . .Operand swapping
2207/386 . . . Special constructional features
2207/3864 . . . Clockless, i.e. asynchronous operation used as a design principle (G06F 2207/3888 takes precedence)
2207/3868 . . . Bypass control, i.e. possibility to transfer an operand unchanged to the output
2207/3872 . . . Precharge of output to prevent leakage
2207/3876 . . . Alternation of true and inverted stages
2207/388 . . . Skewing
2207/3884 . . . Pipelining
2207/3888 . . . Wave pipelining, i.e. processing multiple subsequent operand sets asynchronously within each pipeline stage
2207/3892 . . . Systolic array
2207/3896 . . . Bit slicing
2207/48 . . . Indexing scheme relating to groups G06F 7/48 - G06F 7/575
2207/4802 . . . Special implementations
2207/4804 . . . Associative memory or processor
2207/4806 . . . Cascade or current mode logic
2207/4808 . . . Charge transfer devices
2207/481 . . . Counters performing arithmetic operations
2207/4812 . . . Multiplexers
2207/4814 . . . Non-logic devices, e.g. operational amplifiers
2207/4816 . . . Pass transistors
2207/4818 . . . Threshold devices
2207/482 . . . using capacitive adding networks
2207/4822 . . . Majority gates
2207/4824 . . . Neural networks
2207/4826 . . . using transistors having multiple electrodes of the same type, e.g. multi-emitter devices, neuron-MOS devices
2207/4828 . . . Negative resistance devices, e.g. tunnel diodes, gunn effect devices
2207/483 . . . Indexing scheme relating to group G06F 7/483
2207/4835 . . . Computations with rational numbers
2207/491 . . . Indexing scheme relating to groups G06F 7/491 - G06F 7/4917
2207/49105 . . . Determining 9’s or 10’s complement
2207/4911 . . . Decimal floating-point representation
2207/49115 . . . Duodecimal numbers
2207/4912 . . . Non-specified BCD representation
2207/49125 . . . Non-specified decimal representation
2207/4913 . . . Sterling system, i.e. mixed radix with digit weights of 10-20-12
2207/49135 . . . Using 036012 or 3612 code, i.e. binary coded decimal representation with digit weight of (0), 3, 6, (0), 1 and 2 respectively
2207/4914 . . . Using 2-out-of-5 code, i.e. binary coded decimal representation with digit weight of 2, 4, 2 and 1 respectively
2207/49145 . . . Using 2421 code, i.e. non-weighted representation in which 2 out of 5 bits are “1” for each decimal digit
2207/4915 . . . Using 4221 code, i.e. binary coded decimal representation with digit weight of 4, 2, 2 and 1 respectively
2207/49155 . . . Using 51111 code, i.e. binary coded decimal representation with digit weight of 5, 1, 1, 1 and 1 respectively
G06F

2207/4916 . . Using 5211 code, i.e. binary coded decimal representation with digit weight of 5, 2, 1 and 1 respectively
2207/49165 . . Using 5311 code, i.e. binary coded decimal representation with digit weight of 5, 3, 1 and 1 respectively
2207/4917 . . Using 5321 or 543210 code, i.e. binary coded decimal representation with digit weight of 5,(4,), 3, 2, 1 (and 0) respectively
2207/49175 . . Using 54321 code, i.e. binary coded decimal representation with digit weight of 5, 4, 3, 2 and 1 respectively
2207/4918 . . Using Aiken code, i.e. using both first and last 5 of 16 possible 4-bit values, rendering the code symmetrical within the series of 16 values
2207/49185 . . Using biquinary code, i.e. combination of 5-valued and 2-valued digits, having values 0, 1, 2, 3, 4 and 5, or 0, 2, 4, 6, 8 and 0, 1 respectively
2207/4919 . . Using excess-3 code, i.e. natural BCD + offset of 3, rendering the code symmetrical within the series of 16 possible 4 bit values
2207/49195 . . Using pure decimal representation, e.g. 10-valued voltage signal, 1-out-of-10 code
2207/492 . . Indexing scheme relating to groups G06F 7/492 - G06F 7/496
2207/4921 . . Single digit adding or subtracting
2207/4922 . . Multi-operand adding or subtracting
2207/4923 . . Incrementer or decrementer
2207/4924 . . Digit-parallel adding or subtracting
2207/506 . . Indexing scheme relating to groups G06F 7/506 - G06F 7/508
2207/5063 . . 2-input gates, i.e. only using 2-input logical gates, e.g. binary carry look-ahead, e.g. Kogge-Stone or Ladner-Fischer adder
2207/535 . . Indexing scheme relating to groups G06F 7/535 - G06F 7/5375
2207/5351 . . Multiplicative non-restoring division, e.g. SRT, using multiplication in quotient selection
2207/5352 . . Non-restoring division not covered by G06F 7/5375
2207/5353 . . Restoring division
2207/5354 . . Using table lookup, e.g. for digit selection in division by digit recurrence
2207/5355 . . Using iterative approximation not using digit recurrence, e.g. Newton Raphson or Goldschmidt
2207/5356 . . Via reciprocal, i.e. calculate reciprocal only, or calculate reciprocal first and then the quotient from the reciprocal and the numerator
2207/544 . . Indexing scheme relating to group G06F 7/544
2207/5442 . . Absolute difference
2207/552 . . Indexing scheme relating to groups G06F 7/552 - G06F 7/5525
2207/5521 . . Inverse root of a number or a function, e.g. the reciprocal of a Pythagorean sum
2207/5523 . . Calculates a power, e.g. the square, of a number or a function, e.g. polynomials
2207/5525 . . Pythagorean sum, i.e. the square root of a sum of squares
2207/5526 . . Roots or inverse roots of single operands
2207/5528 . . Non-restoring calculation, where each result digit is either negative, zero or positive, e.g. SRT
2207/556 . . Indexing scheme relating to group G06F 7/556
2207/5561 . . Exponentiation by multiplication, i.e. calculating Y**X where X is the integer part of Y
2207/5562 . . Indexing scheme relating to groups G06F 7/552 - G06F 7/5525
2207/58 . . Indexing scheme relating to groups G06F 7/58 - G06F 7/588
2207/581 . . Generating an LFSR sequence, e.g. an m-sequence; sequence may be generated without LFSR, e.g. using Galois Field arithmetic
2207/582 . . Parallel finite field implementation, i.e. at least partially parallel implementation of finite field arithmetic, generating several new bits or trits per step, e.g. using a GF multiplier
2207/583 . . Serial finite field implementation, i.e. serial implementation of finite field arithmetic, generating one new bit or trit per step, e.g. using an LFSR or several independent LFSRs; also includes PRNGs with parallel operation between LFSR and outputs
2207/72 . . Indexing scheme relating to groups G06F 7/72 - G06F 7/729
2207/7204 . . Prime number generation or prime number testing
2207/7209 . . Calculation via subfield, i.e. the subfield being GF(q) with q a prime power, e.g. GF ((2**m)**n) via GF(2**m)
2207/7214 . . Calculation via prime subfield, i.e. the subfield being GF(p) with p an integer prime > 3; e.g. GF(p**(k+*)) via GF(p)
2207/7219 . . Countermeasures against side channel or fault attacks
2207/7223 . . Randomisation as countermeasure against side channel attacks
2207/7228 . . . . Random curve mapping, e.g. mapping to an isomorphous or projective curve
2207/7233 . . . . Masking, e.g. (A**e)+r mod n
2207/7238 . . . . Operand masking, i.e. message blending, e.g. (A+r)**e mod n; k.(P+R)
2207/7242 . . . . Exponent masking, i.e. key masking, e.g. A**(e+r) mod n; (k+r).P
2207/7247 . . . . Modulo masking, e.g. A**e mod (n+r)
2207/7252 . . . . of operation order, e.g. starting to treat the exponent at a random place, or in a randomly chosen direction
2207/7257 . . . . Random modification not requiring correction
2207/7261 . . . . Uniform execution, e.g. avoiding jumps, or using formulae with the same power profile
2207/7266 . . . . Hardware adaptation, e.g. dual rail logic; calculate add and double simultaneously
2207/7271 . . . . Fault verification, e.g. comparing two values which should be the same, unless a computational fault occurred
2207/7276 . . . . Additional details of aspects covered by group G06F 7/723
2207/7278 . . . . using repeated square-and-multiply, i.e. right-to-left binary exponentiation
2207/7285 . . . . using the window method, i.e. left-to-right binary exponentiation
2207/729 . . . . Sliding-window exponentiation
2207/7295 . . . . using an addition chain, or an addition-subtraction chain
2209/00 . . Indexing scheme relating to G06F 9/00
2209/46 . . Indexing scheme relating to G06F 9/46
2209/461 . . Bridge
2209/462 . . . Lookup
2209/463 . . . Naming
2209/48 . . . Indexing scheme relating to G06F 9/48
2209/481 . . . Exception handling
2209/482 . . . Application
2209/483 . . . Multiproc
2209/484 . . . Precedence
2209/485 . . . Resource constraint
2209/486 . . . Scheduler internals
2209/50 . . . Indexing scheme relating to G06F 9/50
2209/501 . . . Performance criteria
2209/5011 . . . Pool
2209/5012 . . . Processor sets
2209/5013 . . . Request control
2209/5014 . . . Reservation
2209/5015 . . . Service provider selection
2209/5016 . . . Session
2209/5017 . . . Task decomposition
2209/5018 . . . Thread allocation
2209/5019 . . . Workload prediction
2209/502 . . . Proximity
2209/5021 . . . Priority
2209/5022 . . . Workload threshold
2209/503 . . . Resource availability
2209/504 . . . Resource capping
2209/505 . . . Clust
2209/506 . . . Constraint
2209/507 . . . Low-level
2209/508 . . . Monitor
2209/509 . . . Offload
2209/52 . . . Indexing scheme relating to G06F 9/52
2209/521 . . . Atomic
2209/522 . . . Manager
2209/523 . . . Mode
2209/54 . . . Indexing scheme relating to G06F 9/54
2209/541 . . . Client-server
2209/542 . . . Intercept
2209/543 . . . Local
2209/544 . . . Remote
2209/545 . . . Gui
2209/546 . . . Xcast
2209/547 . . . Messaging middleware
2209/548 . . . Queue
2209/549 . . . Remote execution

2211/00 Indexing scheme relating to details of data-processing equipment not covered by groups G06F 3/00 - G06F 13/00
2211/001 . . . In-Line Device
2211/002 . . . Bus
2211/003 . . . Mutual Authentication Bi-Directional Authentication, Dialogue, Handshake
2211/004 . . . Notarisation, Time-Stamp, Date-StAMP
2211/005 . . . Network, LAN, Remote Access, Distributed System
2211/006 . . . E-Mail
2211/007 . . . Encryption, En-/decode, En-/decipher, Scramble, (De-)compress
2211/008 . . . Public Key, Asymmetric Key, Asymmetric Encryption
2211/009 . . . Trust
2211/10 . . . Indexing scheme relating to G06F 11/10
2211/1002 . . . Indexing scheme relating to G06F 11/1076
2211/1004 . . . Adaptive RAID, i.e. RAID system adapts to changing circumstances, e.g. RAID1 becomes RAID5 as disks fill up
2211/1007 . . . Addressing errors, i.e. silent errors in RAID, e.g. sector slipping and addressing errors
2211/1009 . . . Cache, i.e. caches used in RAID system with parity
2211/1011 . . . Clustered RAID, i.e. clustered or de-clustered RAID where data and parity are spread over more disks than blocks in a parity group
2211/1014 . . . Compression, i.e. RAID systems with parity using compression techniques
2211/1016 . . . Continuous RAID, i.e. RAID system that allows streaming or continuous media, e.g. VOD
2211/1019 . . . Fast writes, i.e. signaling the host that a write is done before data is written to disk
2211/1021 . . . Different size blocks, i.e. mapping of blocks of different size in RAID systems with parity
2211/1023 . . . Different size disks, i.e. non uniform size of disks in RAID systems with parity
2211/1026 . . . Different size groups, i.e. non uniform size of groups in RAID systems with parity
2211/1028 . . . Distributed, i.e. distributed RAID systems with parity
2211/103 . . . Hybrid, i.e. RAID systems with parity comprising a mix of RAID types
2211/1033 . . . Inactive data in parity groups, i.e. RAID parity groups where parity is calculated on only occupied or busy bits in the stripe
2211/1035 . . . Keeping track, i.e. keeping track of data and parity changes
2211/1038 . . . LFS, i.e. Log Structured File System used in RAID systems with parity
2211/104 . . . Metadata, i.e. metadata associated with RAID systems with parity
2211/1042 . . . NanoRAID, i.e. RAID systems using nanotechnology
2211/1045 . . . Nested RAID, i.e. implementing a RAID scheme in another RAID scheme
2211/1047 . . . No striping, i.e. parity calculation on a RAID involving no stripes, where a stripe is an independent set of data
2211/105 . . . On the fly coding, e.g. using XOR accumulators
2211/1052 . . . RAID padding, i.e. completing a redundancy group with dummy data
2211/1054 . . . Parity-fast hardware, i.e. dedicated fast hardware for RAID systems with parity
2211/1057 . . . Parity-multiple bits-RAID6, i.e. RAID 6 implementations
2211/1059 . . . Parity-single bit-RAID5, i.e. RAID 5 implementations
2211/1061 . . . Parity-single bit-RAID4, i.e. RAID 4 implementations
2211/1064 . . . Parity-single bit-RAID3, i.e. RAID 3 implementations
2211/1066 . . . Parity-small writes, i.e. improved small or partial write techniques in RAID systems
2211/1069 . . . Phantom write, i.e. write were nothing is actually written on the disk of a RAID system
2211/1071 . . . Power loss, i.e. interrupted writes due to power loss in a RAID system
Problems due to wear-out failures in RAID systems
RAID, i.e. RAID on platters
RAID, i.e. RAID on removable media
RAIT, i.e. RAID on tape drive
Reserve area on a disk of a RAID system
RMW, i.e. Read-Modify-Write method for RAID systems
Scrubbing in RAID systems with parity
Sector level checksum or ECC, i.e. sector or stripe level checksum or ECC in addition to the RAID parity calculation
Single disk raid, i.e. RAID with parity on a single disk
Writes number reduction, i.e. reducing the number of writes in a RAID array with parity
Boot, Start, Initialise, Power
Spectral purity improvement for digital function generators by adding a dither signal, e.g. noise

Indexing scheme relating to accessing, addressing or allocation within memory systems or architectures

Providing a specific technical effect
Compatibility, e.g. with legacy hardware
Correctness of operation, e.g. memory ordering
Design facilitation
Performance improvement
Hit rate improvement
Latency reduction
Power efficiency
Reliability improvement, data loss prevention, degraded operation etc
Life time enhancement
Resource optimization
Space efficiency improvement
Scalability
Security improvement
Simplification
Use in a specific computing environment
Emulated environment, e.g. virtual machine
Virtualized environment, e.g. logically partitioned system
Networked environment
General purpose computing application
Portable computer, e.g. notebook
Server or database system
Mainframe system
Embedded application
Portable consumer electronics, e.g. mobile phone
Non-portable consumer electronics
Home entertainment system, e.g. television set
Vehicle or other transportation
Telecommunications system
Industrial control system
Smart card
Electronic token or RFID
Employing a main memory using a specific memory technology
Non-volatile memory
Flash memory
Rewritable memory not requiring erasing, e.g. resistive or ferroelectric RAM

Battery-backed RAM
Hybrid memory, e.g. using both volatile and non-volatile memory
Memory mapped I/O
Employing a record carrier using a specific recording technology
Optical disk storage
with a removable carrier, e.g. DVD
Tape storage
Solid state disk
using write-once memory, e.g. OTPROM
being detachable, e.g., USB memory
Hybrid disk, e.g. using both magnetic and solid state storage devices
Employing cache memory using specific memory technology
Static RAM
Non-volatile memory
Battery-backed RAM
Disk storage
Hybrid cache memory, e.g. having both volatile and non-volatile portions
Using a specific main memory architecture
Local memory within processor subsystem
being configurable for different purposes, e.g. as cache or non-cache memory
Centralized memory
comprising a plurality of modules
Distributed memory
Non-uniform memory access [NUMA] architecture
Using a specific storage system architecture
Storage comprising a plurality of storage devices
configured as RAID
Network storage, e.g. SAN or NAS
Remote server
Using a specific cache architecture
Non-uniform cache access [NUCA] architecture
Cache only memory architecture [COMA]
Using a specific disk cache architecture
Single cache
Partitioned cache
Plural cache memories
being distributed
Redundant cache memory
Mirrored cache memory
Providing cache or TLB in specific location of a processing system
In special purpose processing node, e.g. vector processor
In image processor or graphics adapter
In peripheral interface, e.g. I/O adapter or channel
In peripheral device, e.g. printer
In main memory subsystem
being part of a memory device, e.g. cache DRAM
being part of a memory device, e.g. cache DRAM
In system interconnect, e.g. between two buses
Providing disk cache in a specific location of a storage system
In host system
In storage controller
Details of virtual memory and virtual address arrangements
Details of cache specific to multiprocessor cache
Details of cache memory
TLB
Control mechanisms for virtual memory, cache or cache
Caching storage objects of specific type in disk cache

Sector or disk block
Track or segment
File
Multimedia object, e.g. image, video
Structured object, e.g. database record
Metadata, control data
The specific object being partially cached
Control mechanisms for virtual memory, cache or TLB
using adaptive policy
using speculative control
details of cache memory
Reconfiguration of cache memory
doing of operating mode, e.g. cache mode or local memory mode
details relating to cache prefetching
Using a prefetch buffer or dedicated prefetch cache
History based prefetching
Prefetching based on access pattern detection, e.g. stride based prefetch
Prefetching based on hints or prefetch instructions
of operating mode, e.g. cache mode or local memory mode
Way prediction in set-associative cache
details relating to cache allocation
Allocation of cache space to multiple users or processors
Using a specific cache allocation policy other than replacement policy
details relating to cache mapping
Way prediction in set-associative cache
details of cache specific to multiprocessor cache arrangements
Coherency control relating to peripheral accessing, e.g. from DMA or I/O device
State-only directory, i.e. not recording identity of sharing or owning nodes
details of virtual memory and virtual address translation
Multi-level translation tables
Page size control
Page colouring
Look-ahead translation
Same page detection
Address space sharing
Virtual address space management
Details of translation lookaside buffer [TLB]
Multi-level TLB, e.g. microTLB and main TLB
Multiprocessor TLB consistency
Invalidation
TLB miss handling
details relating to dynamic memory management
Conservative garbage collection
details relating to flash memory management
Logical to physical mapping or translation of blocks or pages
Capacity control, e.g. partitioning, end-of-life degradation
Cleaning, compaction, garbage collection, erase control
Reconfiguration of flash memory system
management of metadata or control data
Multiple device management, e.g. distributing data over multiple flash devices
Validity control, e.g. using flags, time stamps or sequence numbers
Wear leveling

Indexing scheme relating to interconnection of, or transfer of information or other signals between, memories, input/output devices or central processing units
Serial port, e.g. RS232C
Parallel ports, e.g. centronics
Extension to the industry standard architecture [EISA]
High speed serial bus, e.g. Fiber channel
High speed serial bus, e.g. IEEE P1394
Futurebus
Inter-integrated circuit (I2C)
Industry standard architecture [ISA]
Multibus
Peripheral component interconnect [PCI]
PCI express
Serial attached SCSI [SAS]
Serial ATA [SATA]
Sun microsystems bus [SBus]
Small computer system interface [SCSI]
System on Chip
Universal serial bus [USB]
Versatile modular eurobus [VME]
Assignment of addresses or identifiers to the modules of a bus system
Split transaction bus
Use of address and non-data lines as data lines for specific data transfers to temporarily enlarge the data bus and increase information transfer rate
Bus-related hardware virtualisation
Bandwidth consumption reduction during transfers
Latency reduction in handling transfers
Memory access
Memory access type
Avoidance of interrupt starvation
Generation of an interrupt or a group of interrupts after a predetermined number of interrupts
G06F

2213/2406 . Generation of an interrupt or a group of interrupts after a fixed or calculated time elapses
2213/2408 . Reducing the frequency of interrupts generated from peripheral to a CPU
2213/2412 . Dispatching of interrupt load among interrupt handlers in processor system or interrupt controller
2213/2414 . Routing of interrupt among interrupt handlers in processor system or interrupt controller
2213/2416 . Determination of the interrupt source among a plurality of incoming interrupts
2213/2418 . Signal interruptions by means of a message
2213/2422 . Sharing of interrupt line among a plurality of interrupt sources
2213/2424 . Interrupt packet, e.g. event
2213/28 . DMA
2213/2802 . DMA using DMA transfer descriptors
2213/2804 . Systems and methods for controlling the DMA frequency on an access bus
2213/2806 . Space or buffer allocation for DMA transfers
2213/2808 . Very long instruction word DMA
2213/36 . Arbitration
2213/3602 . Coding information on a single line
2213/3604 . Coding information on multiple lines
2213/38 . Universal adapter
2213/3802 . Harddisk connected to a computer port
2213/3804 . Memory card connected to a computer port directly or by means of a reader/writer
2213/3806 . Mobile device
2213/3808 . Network interface controller
2213/3812 . USB port controller
2213/3814 . Wireless link with a computer system port
2213/3852 . Converter between protocols
2213/3854 . Control is performed at the peripheral side
2213/40 . Bus coupling
2213/4002 . Universal serial bus hub with a single upstream port
2213/4004 . Universal serial bus hub with a plurality of upstream ports

2216/00 Indexing scheme relating to additional aspects of information retrieval not explicitly covered by G06F 16/00 and subgroups
2216/01 . Automatic library building
2216/03 . Data mining
2216/05 . Energy-efficient information retrieval
2216/07 . Guided tours
2216/09 . Obsolescence
2216/11 . Patent retrieval
2216/13 . Prefetching
2216/15 . Synchronised browsing
2216/17 . Web printing

2217/00 Indexing scheme relating to computer aided design [CAD]
2217/02 . Component-based CAD
2217/04 . CAD in a network environment
2217/06 . Constraint-based CAD
2217/08 . Multi-objective optimization
2217/10 . Probabilistic or stochastic CAD
2217/12 . Design for manufacturability
2217/14 . Design for testability
2217/16 . Numerical modeling
2217/32 . Cloth
2217/34 . Pipes
2217/36 . Cables, cable trees, wire harnesses
2217/38 . Packaging
2217/40 . Chip packaging
2217/41 . Molding
2217/42 . Sheet material
2217/44 . Composites
2217/46 . Fuselage
2217/62 . Clock network
2217/64 . Structured ASICs
2217/66 . IP blocks
2217/68 . Processors
2217/70 . Fault tolerant, i.e. transient fault suppression
2217/72 . Spare resources, i.e. permanent fault suppression
2217/74 . Symbolic schematics
2217/76 . Ageing analysis and optimization
2217/78 . Power analysis and optimization
2217/80 . Thermal analysis and optimization
2217/82 . Noise analysis and optimization
2217/84 . Timing analysis and optimization
2217/86 . Hardware-Software co-design

2219/00 Indexing scheme relating to application aspects of data processing equipment or methods
2219/10 . Environmental application, e.g. waste reduction, pollution control, compliance with environmental legislation

2221/00 Indexing scheme relating to security arrangements for protecting computers, components thereof, programs or data against unauthorised activity
2221/03 . Indexing scheme relating to G06F 21/50, monitoring users, programs or devices to maintain the integrity of platforms
2221/031 . Protect user input by software means
2221/032 . Protect output to user by software means
2221/033 . Test or assess software
2221/034 . Test or assess a computer or a system
2221/07 . Indexing scheme relating to G06F 21/10, protecting distributed programs or content
2221/0702 . Binding
2221/0704 . Device
2221/0706 . Domain
2221/0708 . Location
2221/0711 . Token
2221/0713 . User
2221/0715 . Characteristics
2221/0717 . Domain
2221/072 . Knowledge
2221/0722 . Content
2221/0724 . Editing
2221/0726 . Personalisation
2221/0728 . Conversion
2221/0731 . On user or administrative requirements
2221/0733 . Watermark
2221/0735 . Restriction at operating system level
2221/0737 . Traceability
2221/074 . Tracing pattern recognition
2221/0742 . Enhanced product
2221/0744 . Unique instance (G06F 2221/0702 takes precedence)
2221/0746 . Emerging technologies

CPC - 2019.05
Hiding
Key
Distribution
Generation
Licence
Conversion
Definition
Grace period
Language
Editing
Revocation
Recurrent authorisation
Logging
Return
Transfer
Backup or restore
Fragments
Indirect via third party
Peer-to-Peer [P2P]
Superdistribution
Synchronisation
Transaction with ACID [Atomicity, Consistency, Isolation and Durability] properties
using dedicated hardware at the client
Indexing scheme relating to G06F 21/00 and subgroups addressing additional information or applications relating to security arrangements for protecting computers, components thereof, programs or data against unauthorised activity
Auditing as a secondary aspect
Challenge-response
Dual mode as a secondary aspect
File encryption
Game systems
Location-sensitive, e.g. geographical location, GPS
Multi-level security, e.g. mandatory access control
Third party
User registration
Authenticating web pages, e.g. with suspicious links
Chip on media, e.g. a disk or tape with a chip embedded in its case
Dummy operation
Just-in-time application of countermeasures, e.g., on-the-fly decryption, just-in-time obfuscation or de-obfuscation
Bluffing
Authenticate client device independently of the user
Lost password, e.g. recovery of lost or forgotten passwords
Verifying human interaction, e.g., Captcha
Metering
Time limited access, e.g. to a computer or data
Recurrent verification
Access rights, e.g. capability lists, access control lists, access tables, access matrices
Clearing memory, e.g. to prevent the data from being stolen