# EXHIBIT BS

CLASS 345 COMPUTER GRAPHICS PROCESSING AND SELECTIVE VISUAL DIS-    345 - 1
PLAY SYSTEMS

| | |
|---|---|
| 418 | **COMPUTER GRAPHICS PROCESSING** |
| 419 | .Three-dimension |
| 420 | ..Solid modelling |
| 421 | ..Hidden line/surface determining |
| 422 | ...Z buffer (depth buffer) |
| 423 | ..Tessellation |
| 424 | ..Voxel |
| 426 | ..Lighting/shading |
| 427 | ..Space transformation |
| 428 | .Adjusting level of detail |
| 581 | .Attributes (surface detail or characteristic, display attributes) |
| 582 | ..Texture |
| 583 | ...Solid Texture |
| 584 | ...Bump map |
| 585 | ...Non-planar surface |
| 586 | ...Mathematically defined |
| 587 | ...MIP map |
| 588 | ...Repeating pattern |
| 589 | ..Color or intensity |
| 590 | ...Gamut clipping or adjustment |
| 591 | ...Color processing in perceptual color space |
| 592 | ...Transparency (mixing color values) |
| 593 | ...Color selection |
| 594 | ....Using GUI |
| 595 | ....Expert system or AI |
| 596 | ...Dither or halftone |
| 597 | ....Color |
| 598 | .....Spatial |
| 599 | ....Spatial |
| 600 | ...Color bit data modification or conversion |
| 601 | ....Using look up table |
| 602 | .....Plural look up tables |
| 603 | ....Format change (e.g., NTSC to RGB, RGB to composite, XYZ to RGB) |
| 604 | ....Color space transformation (e.g., RGB to YUV) |
| 605 | ....Change in number of bits for a designated color (e.g., 4 bits to 8 bits, 8 bits to 4 bits) |
| 606 | ..Interpolation of attribute values across object surface |
| 607 | ...In perspective |
| 608 | ...Tri-linear |
| 609 | ...Bi-linear |
| 610 | ...Linear |
| 611 | ..Anti-aliasing or image smoothing |
| 612 | ...Save attributes for each object affecting a given pixel |
| 613 | ...Subpixel processing |
| 614 | ...Pixel fragment |
| 615 | ...Convolving technique |
| 616 | ...Error diffusion |
| 617 | ..Contrast |
| 618 | ..Image with abnormal condition |
| 619 | .Graphic manipulation (object processing or display attributes) |
| 620 | ..Clipping |
| 621 | ...Based on model of objects |
| 622 | ....Testing or using bounding shape (e.g., bounding box sphere) |
| 623 | ....Object clipped to view volume |
| 624 | ....Object clipped to another object |
| 625 | ...Based on image data |
| 626 | ....Masking |
| 627 | ....Non-rectangular array |
| 628 | ....Rectangular region |
| 629 | ..Merge or overlay |
| 630 | ...Combining model representations |
| 631 | ...Reducing redundancy |
| 632 | ...Placing generated data in real scene |
| 633 | ....Augmented reality (real-time) |
| 634 | ...Image based |
| 635 | ....Non-overlapping |
| 636 | ....Character and graphics |
| 637 | ....Priority based |
| 638 | ....Insertion of bitmapped moving picture |
| 639 | ....Weighted |
| 640 | .....Weights vary across image (e.g., transition from foreground to background) |
| 641 | ....Fixed overlay pattern |
| 642 | ..Picking |
| 643 | ..Arithmetic processing of image data |
| 644 | ...Matrix calculations |
| 645 | ...Hierarchy of transformations (e.g., hierarchy of global and local coordinate) |
| 646 | ..Morphing |
| 647 | ..Distortion |
| 648 | ..Affine |

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|---|---|
| 649 | ..Rotation |
| 650 | ...Graphical user interface tools |
| 651 | ....Alignment functions (e.g., snapping, gravity) |
| 652 | ....Constrained manipulations (e.g., movement in less than all dimensions) |
| 653 | ....3D manipulations |
| 654 | ....2D manipulations |
| 655 | ...Object based |
| 656 | ...Image based (addressing) |
| 657 | ....By arbitrary angle |
| 658 | ....By 90 degrees increment |
| 659 | ....Image rotates in response to display device orientation |
| 660 | ..Scaling |
| 661 | ...Graphical user interface tools |
| 662 | ....Alignment functions (e.g., snapping, gravity) |
| 663 | ....Constrained manipulations (i.e., movement in less than all dimensions) |
| 664 | ....3D manipulations |
| 665 | ....2D manipulations |
| 666 | ...Object based |
| 667 | ...Image based (addressing) |
| 668 | ....By arbitrary ratio |
| 669 | ....By integer multiples |
| 670 | ....Reduction only |
| 671 | ....Enlargement only |
| 672 | ..Translation |
| 673 | ...Averaging technique |
| 674 | ...Copying data to create additional rows or columns |
| 676 | ...Graphical user interface tools |
| 677 | ....Alignment functions (e.g., snapping, gravity) |
| 678 | ....Constrained manipulations (i.e., movement in less than all dimensions) |
| 679 | ....3D manipulations |
| 680 | ....2D manipulations |
| 681 | ...Object based |
| 682 | ...Image based (addressing) |
| 683 | ....Sprite |
| 684 | ....Scrolling |
| 685 | .....Alphanumeric |
| 686 | .....Memory addressing |
| 687 | ......Smooth or continuous |
| 688 | .....Attribute changes during scrolling |

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| 689 | ..Textual entry or display of manipulation information (e.g., enter or display degree of rotation) |
| 440 | .Graph generating |
| 440.1 | ..Real-time waveform display |
| 440.2 | ..Bar graph |
| 441 | .Shape generating |
| 442 | ..Curve |
| 443 | ..Straight line |
| 467 | .Character generating |
| 468 | ..Character geometry processing |
| 469 | ...Character generation using control points or hints |
| 469.1 | ..Character border |
| 470 | ..Generating character fill data from outline data |
| 471 | ..Alteration of stored font |
| 472 | ...Scaling |
| 472.1 | ....Reduction only |
| 472.2 | ....Enlargement only |
| 472.3 | ..Calligraphic |
| 473 | .Animation |
| 474 | ..Motion planning or control |
| 475 | ..Temporal interpolation or processing |
| 156 | **DISPLAY PERIPHERAL INTERFACE INPUT DEVICE** |
| 157 | .Cursor mark position control device |
| 158 | ..Including orientation sensors (e.g., infrared, ultrasonic, remotely controlled) |
| 159 | ..Having variable cursor speed |
| 160 | ..Cursor key |
| 161 | ..Joystick |
| 162 | ..Positional storage means |
| 163 | ..Mouse |
| 164 | ...Rotatable ball detector |
| 165 | ....Photosensor encoder |
| 166 | ...Optical detector |
| 167 | ..Trackball |
| 168 | .Including keyboard |
| 169 | ..Portable (i.e., handheld, calculator, remote controller) |
| 170 | ..Light source associated with each key |
| 171 | ..Having foreign language capability (e.g., Japanese, Chinese) |
| 172 | ..Having programmable function key |
| 173 | .Touch panel |

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|---|---|
| 174 | ..Including impedance detection |
| 175 | ..Including optical detection |
| 176 | ..Transparent substrate having light entrapment capability (i.e., waveguides) |
| 177 | ..Including surface acoustic detection |
| 178 | ..With alignment or calibration capability (i.e., parallax problem) |
| 179 | .Stylus |
| 180 | .Light pen for CRT display |
| 181 | ..CRT having tracking capability |
| 182 | .Light pen for fluid matrix display panel |
| 183 | .Light pen for controlling plural light-emitting display elements (e.g., LED, lamps) |
| 184 | .Mechanical control (e.g., rotatable knob, slider) |
| 501 | **COMPUTER GRAPHIC PROCESSING SYSTEM** |
| 502 | .Plural graphics processors |
| 503 | ..Coprocessor (e.g., graphic accelerator) |
| 504 | ..Master-slave processors |
| 505 | ..Parallel processors (e.g., identical processors) |
| 506 | ..Pipeline processors |
| 519 | .Integrated circuit (e.g., single chip semiconductor device) |
| 520 | .Interface (e.g., controller) |
| 522 | .Graphic command processing |
| 530 | **COMPUTER GRAPHICS DISPLAY MEMORY SYSTEM** |
| 531 | .Graphic display memory controller |
| 532 | ..Plural memory controllers |
| 533 | ..Using different access modes |
| 534 | ..Memory access timing signals |
| 535 | ..Memory arbitration |
| 536 | .Plural storage devices |
| 537 | ..Data transfer between memories |
| 538 | ...Data transfer between system memory display memory |
| 539 | ..Double buffered |
| 540 | ..Interleaved |
| 541 | .Shared memory |
| 542 | ..Unified memory architecture (e.g., UMA) |
| 543 | .Memory allocation |
| 544 | .Memory partitioning |
| 545 | .Frame buffer |
| 546 | ..Multi-format frame buffer |
| 547 | ..Memory for storing video data |

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| 548 | ..Off-screen memory |
| 549 | ..Color memory |
| 550 | ...Multiple planes |
| 551 | ..Character memory |
| 552 | .Texture memory |
| 553 | .Display list memory |
| 554 | .Multi-port memory |
| 555 | .For storing compressed data |
| 556 | .For storing condition code, flag or status |
| 557 | .Cache |
| 558 | .First in first out (i.e., FIFO) |
| 559 | .Register |
| 560 | .Row buffer (e.g., line memory) |
| 561 | .Logical operations |
| 562 | ..Bit block transfer |
| 563 | ..Mask data operation |
| 564 | .Addressing |
| 565 | ..Using memory for storing address information |
| 566 | ..Address manipulation |
| 567 | ...Using decoding |
| 568 | ...Address translation (e.g., between virtual and physical addresses) |
| 569 | ..For 2D coordinate to linear address conversion |
| 570 | ..Page mode |
| 571 | ..Memory addresses arranged in matrix row and column addresses) |
| 572 | ..Address generator |
| 573 | ...Plural address generators |
| 574 | ...Read/Write address generator |
| 204 | **DISPLAY DRIVING CONTROL CIRCUITRY** |
| 205 | .Physically integral with display elements |
| 206 | ..Having common base or substrate |
| 207 | .Light detection means (e.g., with photodetector) |
| 690 | .Intensity or color driving control (e.g., gray scale) |
| 691 | ..Temporal processing (e.g., pulse width variation over time |
| 692 | ...Binary weighted |
| 693 | ...Non-binary weighted |
| 694 | ..Spatial processing (e.g., patterns or subpixel configuration) |
| 695 | ...Subpixels have different shapes |
| 696 | ...Changing of subpixel location over time |
| 697 | ..Including optical means |

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| | |
|---|---|
| 698 | .Adjusting display pixel size or pixels per given area (i.e., resolution) |
| 699 | ..Controller automatically senses monitor resolution |
| 208 | .Waveform generator coupled to display elements |
| 209 | ..Field period polarity reversal |
| 210 | ..Having three or more voltage levels |
| 211 | .Display power source |
| 212 | ..Regulating means |
| 213 | ..Synchronizing means |
| 214 | .Controlling the condition of display elements |
| 215 | ..Including priming means |
| 1.1 | **PLURAL DISPLAY SYSTEMS** |
| 1.2 | .Data transmitted or received at surface of display |
| 1.3 | .Tiling or modular adjacent displays |
| 2.1 | .Remotely located |
| 2.2 | ..Presentation of similar images |
| 2.3 | ..Wireless connection |
| 3.1 | .Diverse systems (e.g., CRT or LCD interface) |
| 3.2 | ..Frame, field or scan rate conversion |
| 3.3 | ..Number of pixels per row or column conversion (i.e., resolution conversion) |
| 3.4 | ...Controller automatically senses monitor resolution |
| 4 | **SINGLE DISPLAY SYSTEM HAVING STACKED SUPERIMPOSED DISPLAY DEVICES (E.G., TANDEM)** |
| 5 | .Diverse display devices |
| 6 | .Three-dimensional arrays |
| 7 | **IMAGE SUPERPOSITION BY OPTICAL MEANS (E.G., HEADS-UP DISPLAY)** |
| 8 | .Operator body-mounted heads-up display (e.g., helmet mounted display) |
| 9 | .Plural image superposition |
| 10 | **DATA RESPONSIVE CRT DISPLAY CONTROL** |
| 11 | .CRT provides display control |
| 12 | .Data responsive deflection and intensity control |
| 13 | .Data responsive deflection control |
| 14 | ..X and Y axis deflection control |
| 15 | ..Curvilinear deflection control (e.g., lissajous) |
| 16 | ..Stroke or vector |
| 17 | ...Strokes for forming characters |
| 18 | ...Up/down counter |
| 19 | ..Impedance Array |
| 20 | .Data responsive intensity control |
| 21 | ..Magnetic element array |
| 22 | .Color display |
| 23 | .Graphic and alphanumeric display |
| 24 | .Graphic display |
| 25 | .Alphanumeric display |
| 26 | ..Character generator |
| 27 | .Combined with storage means |
| 28 | ..Addressing |
| 29 | .Delay line |
| 30 | **PLURAL PHYSICAL DISPLAY ELEMENT CONTROL SYSTEM (E.G., NON-CRT)** |
| 31 | .Physically movable array |
| 32 | .Optical means interposed in viewing path (e.g., filters, lens, etc.) |
| 33 | .Segmented display elements |
| 34 | ..Seven segment display |
| 35 | ..Bar graph |
| 36 | ...Electroluminescent display elements |
| 37 | ...Gas discharge display segments (e.g., plasma) |
| 38 | ...Liquid crystal display segments |
| 39 | ...Light-emitting diode segments (LEDS) |
| 40 | ...Plural (e.g., stacked, adjacent) |
| 41 | ..Fluid light-emitting display elements (e.g., gas, plasma) |
| 42 | ...Controlling circuitry |
| 43 | ..Mask or electrode shape |
| 44 | ..Solid light-emitting display elements |
| 45 | ...Electroluminescent |
| 46 | ...Light-emitting diodes |
| 47 | ..Fluorescent elements |
| 48 | ..Light-controlling display elements |
| 49 | ...Electrochromic elements |
| 50 | ...Liquid crystal elements |
| 51 | ....Display element selection circuitry |
| 52 | ....Power supply generating circuitry |
| 53 | ....Specific waveform (e.g., square waveforms, sinusoidal) |
| 54 | .....Field period polarity reversal |

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