

Q What are the three popular strategies for allocating free memory blocks to processes in dynamic memory partitioning? Explain briefly how each strategy works.

A First-fit: chooses the first free block in the list that is large enough for the request. Best-fit: chooses the free block that is closest in size to the request. Next-fit: chooses the first free block that is large enough for request and comes after the "Last Allocated Block" in the list.

Q True or False? Buddy Strategy always allocates memory in chunks of size power of two and uses a data structure based on a binary tree.

A: True.

Q Give an example drawing of a partially allocated memory and appropriate pointers in which each strategy ends up allocating a different free memory block to satisfy a memory request for 16 MB. Indicate clearly which strategy allocates which memory block.

A: Refer to the example in Chapter 7 slides.

Q What interrupt is created when a desired page frame is not currently resident in RAM?

A: Page fault trap.

Q How does the hardware 'know' that a desired page frame is not currently resident in RAM?

A: Valid bit.

Q What precisely does it mean if the 'dirty bit' is set for a page frame?

A: The page frame has been modified.

Q What is 'good' vs. 'bad' program locality?

A: 'Good' locality means that the process executes in clustered pages. 'Bad' locality means that the process executes in scattered pages.

Q Explain when/how internal fragmentation may occur.

A: When fixed-sized pages are used, the last page of a program may be partially filled. This is called internal fragmentation.

Q Explain when/how external fragmentation may occur.

A: Segmentation system breaks up the memory space into variable-sized pieces. After a sequence of allocation and deallocations, free memory may get fragmented into small pieces. Even if the total size of free memory is large enough to satisfy large memory requests, a large request may not be met due to external fragmentation. Compaction is needed to put free blocks into one large memory block.

Q What is a global allocation scheme?

A: Global replacement allows a process to select a replacement frame from the set of all frames, even if that frame is currently allocated to some other process; one process can take a frame from another.

Q What is a working set model?

A: The working set model assumes that processes execute in localities. The working set is the set of pages in the current locality. Accordingly, each process should be allocated enough frames for its current working set.

Q Comparing global allocation vs. working set allocation, which would be more adversely affected by a program with 'bad' locality? And WHY would that be true?

A: Working set allocation would be more adversely affected by a program with 'bad' locality. This is because the program with 'bad' locality has poorly defined working sets and therefore, many page faults are likely to occur.

Q Which one of the following is not among the set of events that may take place during the time a page fault occurs and the time the faulting process resumes execution? (a) OS blocks the process and puts it into a wait queue. (b) One of the processes in the ready queue is selected to run. (c) A DMA is initiated to load the page from disk into main memory. (d) A page replacement strategy is used to find a page frame to load the new page. (e) Page table is updated to reflect the change. (f) None of the above

A: f.

Q Which one of the following is not among the set of events that may take place between the time a page fault occurs and the time the faulting process resumes execution? (a) OS blocks the process and puts it into a wait queue. (b) One of the processes in the ready queue is selected to run. (c) A DMA is initiated to load the page from disk into main memory. (d) The last page that the faulting process was executing is replaced with the newly loaded page. (e) Page table is updated to reflect the change. (f) None of the above

A: d.

Q True or False? While DMA (Direct Memory Access) is taking place, processor is free to do other things. The processor is only involved at the beginning and end of the DMA transfer.

A: True.

Q True or False? DMA uses "cycle stealing" to transfer data on the system bus. Each time cycle stealing is used, CPU is interrupted.

A: False. The only interrupts that occur during DMA transfer is at the beginning and at the end of DMA (no interrupts in between).

Q What is the "largest" program that could execute on a machine with a 24-bit virtual address?

A: 2²⁴ bytes.

Q What the "largest" program that could execute on a machine with a 24-bit physical address?

A: Can't tell. Need to know the size of the virtual (logical) address.

Q The address contained in a TLB entry <PTE> is (physical | logical).

A: physical.

Q List at least 3 flags that are contained in a PTE.

A: Valid bit; Reference bit; Dirty bit.

Q Define hit/miss in a memory management context.

A: In a two-level memory (cache-RAM or RAM-hard disk), the fraction of all memory accesses that are found in the master memory (i.e. the cache).

Q True or False? If a virtual page number X generates a miss in the TLB (Translation Lookaside Buffer), then the corresponding physical page number for X is guaranteed to be found in the Page Table Entry.

A: False. Not necessarily. X may not be resident in RAM (still in secondary memory).

Q True or False? It is possible that page tables are stored in virtual (secondary) memory.

A: True. When multi-level paging schemes are used.

Q True or False? In a virtual memory system with paging, page size must be large enough to offset the high cost of page faults.

A: True.

Q True or False? The Least Recently Used (LRU) page replacement strategy is based on the principle of spatial locality (locality in space) as opposed to temporal locality (locality in time).

A: False. LRU strategy is based on the temporal locality.

Q True or False? Consider "clock policy" for page replacement, a newly arrived page (i.e. just swapped in) will not get replaced before the clock pointer makes two full rotations in the circular buffer of candidate page frames.

A: True. User=1 at arrival, user=0 after the first rotation of the clock pointer. If user=0 remains true after the second rotation, it may get replaced; otherwise, it stays on.

Q True or False? In a virtual memory system with paging, you can run a program whose size is larger than the size of Main Memory.

A: True.

Q Draw a picture which shows the relationship between "Virtual Address (virtual page#, offset)", "Translation Lookaside Buffer", "Page Table", "Real Address (frame#, offset)", "Main Memory", and "Secondary Memory".

A: Slide #18 in CHAP8.ppt

Q Draw the flowchart for paging using TLB, Page Table, and DMA.

A: Slide #19 in CHAP8.ppt

Q How does the kernel 'know' where on disk the desired info for continuity between small fragments. This is called external fragmentation. Compaction is needed to put free blocks into one large memory block.

A: The technique of only loading virtual pages into memory as they are accessed is known as demand paging. If the demand pages are not in memory, a page fault trap happens, and the operation system swaps them in.

Q Describe what demand paging means.

A: Preparing brings in more consecutive pages than needed. If a virtual page X causes a page fault, then virtual page (X+1) is also brought in along with X. It is less overhead to bring in pages that reside continuously on the disk.

Q If a desired page frame is not currently resident in RAM, ____ occurs.

A: A Page Fault

Q Since paging system uses ____ sized pages, ____ fragmentation may occur.

A: fixed size; internal

Q If a memory management system uses dynamic partitioning, ____ fragmentation may occur.

A: External

Q ____ is a form of I/O in which a special module controls the exchange of data between main memory and an I/O device. During this I/O transfer, CPU is free to do other computation.

A: DMA (Direct Memory Access)

Q The least recently used (LRU) page replacement strategy is based on the principle of ____ as opposed to ____.

A: temporal locality; spatial locality

Q The top four levels in the memory hierarchy, starting with the fastest, are: ____, ____, ____, ____.

A: Registers; cache memory; RAM; Disk.

Q Swapping out a piece of a process (i.e. pages of a process) just before that piece is needed is called ____.

A: Thrashing

Q True or False? A UNIX socket is used for communication between processes running on the same machine. On the other hand, an internet socket cannot be used for communication between processes running on the same machine.

A: False. Internet Socket can be used for processes running on the same machine as well as different machines

Q True or False? If clients are connected to a server through "connect()" and "accept()" calls and the server calls "listen(socket)" before "accept()", then at most 2 clients can get connected to the server at any time.

A: False. "listen()" determines the size of the wait queue before the connections take place, not the max number of clients that can get connected.

Q True or False? In RAID (Redundant Array of Independent Disks) Level 1, every disk in the array has a mirror disk that contains the same data.

A: True.

Q True or False? In Client/Server architectures, OS and the platform forms in the client and server machines must be the same.

A: FALSE

Q True or False? In Client/Server applications, there is heavy emphasis on providing a user-friendly Graphical User Interface (GUI) on the client side.

A: True.

Q True or False? In client/server applications, fat client models can wait disadvantage of the desktop power and therefore can only serve a small number of clients.

A: FALSE

Q True or False? First-Come-First-Served (FCFS) process scheduling favors I/O-bound processes.

A: FALSE

Q True or False? Most antivirus software is based on program emulation and virus signature analysis.

A: True.

Q True or False? RAID 2 (Redundant Array of Independent Disks with Level 2) is designed to provide error detection/correction.

A: True.

Q True or False? User Datagram Protocol (UDP) provides unduplicated and reliable packet delivery.

A: FALSE

Q True or False? Two periodic real-time processes A and B have periods T_A=0.2 ms and T_B=0.5 ms respectively. Furthermore, their execution times are C_A=10 micro sec. and C_B=40 micro sec. respectively. If Rate Monotonic scheduling is used A has higher priority than B.

A: True.

Q True or False?

A: The following I/O devices are sorted correctly in decreasing order according to the typical data rates that they can sustain: Gigabit Ethernet, firewire 800, laser printer, hard disk, keyboard, and modem.

A: FALSE

Q True or False? DMA uses "cycle stealing" to transfer data on the system bus. Each time cycle stealing is used, CPU is interrupted.

A: FALSE

Q Which of the following strategies is not used in a Disk Scheduling Algorithm? (a) First in first out (FIFO); (b) Last in first out (LIFO); (c) Shortest service time first (SSTF); (d) Longest service time first (LSTF); (e) Back and forth over disk (SCAN)

A: d.

Q Explain what the following C calls do both when the call is successful and when it is unsuccessful.

A: (1) bbindof (AF_INET, SOCK_STREAM, 0); (2) bbindof (struct sockaddr*)&server_addr, sizeof(server_addr); (3) socket (AF_INET, SOCK_DGRAM, 0); (4) accept (& sock, struct sockaddr*)&client_addr, &client_len)

A: (1) creates an internet stream (TCP) socket and returns the socket descriptor. If the call fails, it returns -1. (2) Binds the definition of a socket (socket descriptor) to a port number. If the call fails, it returns -1. (3) Creates an internet datagram (UDP) socket and returns the socket descriptor. If the call fails, it returns -1. (4) Blocks execution until a client connection is received. When that happens, it returns a descriptor for the connection. If the call fails, it returns -1.

Q Which one of the following is not among the 7-layers defined for ISO Open Systems Interconnect (OSI) model? (a) Application; (b) Routing; (c) Transport; (d) Data Link; (e) Physical

A: b

Q Which of the following are among the direct goals of process scheduling algorithms: (a) improve response time; (b) minimize interrupts; (c) improve throughput; (d) minimize page faults; (e) improve turnaround time for jobs; (f) increase memory efficiency

A: a, c, e

Q When we compare clusters with SMP (Symmetric Multiprocessors), which of the following are true? (a) Clusters are easier to manage and configure; (b) Clusters take up less space and draw less power; (c) Clusters are better for incremental and absolute scalability; (d) Clusters are superior in terms of availability; (e) Clusters have superior price/performance

A: c, d, e

Q Which of the following malicious software does not host program to operate? (a) Logic Bomb; (b) Worm; (c) Zombie (bots); (d) Trojan Horse; (e) Virus

A: a, d, e

Q Which of the following scheduling policies may cause feedback for certain jobs? (a) First Come First Serve (FCFS); (b) Feed-back; (c) Round Robin; (d) Shortest Process Next (SPN); (e) Shortest Remaining Time Next (SRT)

A: b, d, e

Q Which of the following features are specific to Real-time OS? (a) Small size; (b) Fast context switch; (c) Less user control; (d) Nondeterministic delays; (e) Fail-safe operation

A: c

Q What does an Internet Protocol do?

A: (1) Provides a naming scheme which uses a uniform format for host addresses; (2) Provides a delivery mechanism by defining a standard packet format.

Q True or False? Sockets are bidirectional communication ports in UNIX. Once a socket is created, it can be bound to an internet port using "socket()" call.

A: False. First statement is true but the 2nd statement is false. Sockets can be bound to an internet port using "bind()" call.

Q True or False? There is only one internet port in each networked host.

A: False. There are many internet ports in each host; some are reserved by the OS.

Q True or False? The UNIX call "listen(socket,N)" allows only N clients to be connected to a socket at any time.

A: False. N specifies the length of the wait queue for the clients who are waiting to be connected.

Q True or False? The two lowest layers in the 7-layer ISO Open Systems Interconnect (OSI) model are Physical and Data Link layers and their primary function is to implement the TCP/IP protocol.

A: False.

A: False. First part of the statement is true but the second part is false. Because Transport layer (which is the 4. layer from the bottom) implements TCP/IP.

Q What are the possible goals that any scheduling policy might try to accomplish (list at least three)?

A: To improve: response time, Turnaround time (TAT), Throughput, Processor Efficiency

Q True or False? Long-term scheduler controls the degree of multiprogramming

A: True

Q True or False? Among the three scheduling disciplines (long-term, medium-term, and short-term), long-term scheduler executes most frequently.

A: False. Short-term scheduler (dispatcher) executes most frequently.

Q True or False? Among the short-term scheduling policies, feedback policy penalizes jobs that have been running longer.

A: True

Q Which decisions are made by Long-term, Medium-term, and Short-term scheduling? Be brief.

A: Long-term scheduling: Determines which programs are admitted to the system for processing. Controls the degree of multiprogramming. Medium-term scheduling: Determines which programs will be resident. Part of the swapping function. Swapping-in decision is based on the need to manage the degree of multiprogramming. Short-term scheduling: Determines which program will be executed on CPU next. Known as the dispatcher. Executes most frequently.

Q Name 3 things that are essential to launch a "bots" attack: (a) 1) attack software, (2) a large number of vulnerable machines, (3) locating these machines (scanning or fingerprinting)

A: The two lowest layers in the 7-layer ISO Open Systems Interconnect (OSI) model are ____ and ____ layers and their primary function is to provide ____ and ____.

A: Physical; Data Link; signaling technology; frame management.

Q Two transport protocols, ____ and ____ are defined and handled at the Transport Layer.

A: Transmission Control Protocol (TCP); User Datagram Protocol (UDP)

(1) ____ and ____ are generally credited with the invention of C/Unix?

A: Dennis Ritchie, Ken Thompson

(2) ____ and ____ started Microsoft in 19 ____.

A: Bill Gates, Paul Allen, 1975.

Q What corporation/laboratory may fairly take credit for inventions like the mouse, windows, pull-down menus etc?

A: Xerox/PARC

(4) ____ and ____ co-founded Apple. ____ then started NeXT, and is now the CEO of Pixar?

A: Steve Jobs, Steve Wozniak, Steve Jobs

(5) MS/DOS was 90% derived from a predecessor product named ____, which was written by ____, and owned by ____ which in turn had been cloned from ____ written by ____.

A: QDOS, Tim Patterson, CL Computer Products, CPM, Gary Kildall.

(6) What did Steve Jobs see while visiting PARC that inspired him to build a different kind of computer?

A: GUI

What did he see that he completely ignored?

A: object oriented programming and E-mail

What was the 1st computer that he built based on this inspiration that flopped?

A: Lisa

What was the 2nd one that didn't flop?

A: Macintosh

(7) What 'product' got Microsoft into the microcomputer software business?

A: BASIC language interpreter

(8) What lucky event got Microsoft into the operating system market?

A: Gary Kildall didn't eagerly pursue IBM when they requested a new OS. His wife and attorney would not sign a nondisclosure agreement. Bill Gates of Microsoft saw this as an opportunity and jumped in.

(9) What company purchased NeXT and their OS NeXTStep? What year?

A: Apple, in 1996

(10) What is a 'killer application'?

A: Software that's so useful that people will buy computers just to run it.

(11) What was the killer app for the Apple II?

A: VisiCalc

(12) What was the killer app for the IBM PC?

A: Lotus 1-2-3

(13) What was the killer app for the Apple Macintosh?

A: WYSIWYG - What you see is what you get ----> Desktop Publishing

(14) Why didn't IBM create their own OS for their 1st PC?

A: wanted to manufacture and market it very fast, within one year "...Once IBM decided to do a personal computer and to do it in a year - they couldn't really design anything, they just had to slap it together, so that's what they did..."

(15) Who 'should have' sold IBM their operating system for the 1st IBM PC?

A: Gary Kildall of Digital Research

(16) What was the one part of the 1st IBM PC that was proprietary (that Compaq had to later reverse engineer)?

A: ROM-BIOS

(17) Why did IBM decide to build the PC using 'open architecture'?

A: To save time, instead of building a computer from scratch, IBM initially decided to buy PC components off the shelf and assemble them - in IBM terms, this was called an 'open architecture'. IBM made some changes to this initial decision.

What was the almost immediate result of IBM having made that decision?

A: IBM had to buy the OS and other software from other companies as well.

(18) What was IBM's motivation for designing/building PS-2/OS/2?

A: IBM planned to steal the market from Gates with a brand new OS called OS/2.

(19) What person ____ what company ____ built the 1st commercially available personal computer in 1975?

A: Ed Roberts; MITS

(20) Gordon Moore is one of the founders.

A: Intel

(21) World's first personal computer, ____ was designed by ____ and was introduced in 19 ____.

A: Altair 8800; Ed Roberts; 1975

(22) The first mass market PC company is ____.

A: Apple

Base Address - an address that is used as the origin in the calculation of addresses in the execution of a computer program

Dynamic Relocation - a process that assigns new absolute addresses to a computer program during execution so that the program may be executed from a different area of main storage

Indexed Access - pertaining to the organization and accessing of the records of a storage structure through a separate index to the locations of the stored records

Indirect Sequential Access - pertaining to the organization and accessing of the records of a storage structure through an index of the keys that are stored in arbitrarily partitioned sequential files

Last In First Out (LIFO) - a queuing technique in which the next item to be retrieved is the item most recently placed in the queue

Logical Address - a reference to a memory location independent of the current address of the main memory. A translation must be made to a physical address before the memory access can be achieved

Ordered Partitioned Access - a mode of storage structure in which the records of a storage structure are divided into partitions, each of which is assigned a key

Page - in virtual storage, a fixed length block that has a virtual address and that is transferred as a unit between main memory and secondary memory

Page Fault - occurs when the page containing a referenced word is not in main memory. This causes an interrupt and requires that the proper page be brought into main memory

Paging - the transfer of pages between main memory and secondary memory

Physical Address - the absolute location of a unit of data in memory (e.g., word or byte) in main memory block on secondary memory

Real-Time System - an operating system that must schedule and manage real-time tasks

Sequential Access - the capability to enter data into a storage device or a medium in the same sequence as the data are ordered or to obtain data in the same order as they were entered

Sequential File - a file in which records are ordered according to the values of one or more key fields and processed in the same sequence from the beginning of the file

Server - (1) a station that responds to request from clients via messages, (2) In a network, a data station that provides facilities to other stations; for example, a file server, a print server, a mail server

Spooling - the use of secondary memory as buffer storage to reduce processing delays when transferring data between peripheral equipment and the processors of a computer

Trojan Horse - a secret undocumented routine embedded within a useful program. Execution of the program results in execution of the secret routine

Trusted System - a computer and operating system that can be verified to implement a given security policy

Virtual Address - the address of a storage location in virtual storage

Virtual Storage - a secret undocumented routine embedded within a useful program. Execution of the program results in execution of the secret routine

Address Space - The range of addresses available to a computer program

Address Translator - A functional unit that transforms virtual addresses to real addresses

Application Programming Interface (API) - A standardized library of programming tools used by software developers to write applications that are compatible with a specific operating system or graphic user interface.

Asynchronous Operation - An operation that occurs without a regular or predictable time relationship to a specified event, for example, the calling of an error diagnostic routine that may receive control at any time during the execution of a computer program

Batch Processing - pertaining to the technique of executing a set of computer programs such that each is completed before the next program of the set is started

Block - (1) a collection of contiguous records that are recorded as a unit; the units are separated by interblock gaps. (2) a group of bits that are transmitted as a unit.

Busy waiting - the repeated execution of a loop of code while waiting for an event to occur

Cache Memory - a memory that is smaller and faster than main memory and that is interspersed between the processor and main memory. The cache acts as a buffer for client user memory requests

Client - a process that requires services by sending messages to a server processes

Cluster - a group of interconnected, whole computers working together as a unified computing resource that can create the illusion of being one machine. The term whole computer means a system that can run on its own, apart from the cluster.

Concurrent - pertaining to processes or threads that take place within a common interval of time during which they may have to alternately share common resources

Critical Section - in an asynchronous procedure a computer process a part that cannot be executed simultaneously with an associated critical section of another asynchronous procedure

Deadline - (1) an impenance that occurs when multiple processes are waiting for the availability of a resource that will not become available because it is being held by another process that is in a similar wait state

Device Driver - an operating system module (usually in the kernel) that deals directly with a device or I/O module

Direct Memory Access (DMA) - a form of I/O in which a special module, called a DMA module, controls the exchange of data between main memory and an I/O device. The processor sends a request for the transfer block of data to the DMA module and is interrupted only after the entire block has been transferred.

Disabled Interrupt - a condition, usually created by the operating system, during which the processor will ignore interrupt request signals of a specified class

Disk Cache - a buffer, usually kept in main memory, that functions as a cache of disk blocks between disk memory and the rest of main memory

Distributed Operating System - a common operating system shared by a network of computers. The distributed operating system provides support for interprocess communication, process migration, mutual exclusion, and the prevention or detection of deadlock

Enabled Interrupt - a condition, usually created by the operating system, during which the processor will respond to interrupt request signals of a specified class

Encryption - the conversion of plain text or data into unintelligible form by means of a reversible mathematical computation

Execution Context - same as process state

File - a set of related records treated as a unit

File Allocation Table (FAT) - a table that indicates the physical location on secondary storage of the space allocated to a file. There is one file allocation table for each file.

File Management System - a set of system software that provides services to users and applications in the use of files, including file access, directory maintenance and access control

First In First Out (FIFO) - a queuing technique in which the next item to be retrieved is the item that has been in the line the longest

Hash File - a file in which records are accessed according to the values of a key field. Hashing is used to locate a record on the basis of its key value

Heaving - the selection of a storage location for an item of data by calculating the address as a function of the contents of the data. This technique complicates the storage allocation function but results in rapid random retrieval

Hot Spot - in a two-level memory, the location of all memory accesses that are found in a the master memory (i.e. the cache)

Interrupt - a suspension of a process, such as the execution of a computer program, caused by an even external to that process and performed in such a way that the process can be resumed

Interrupt Handler - a routine, generally part of the operating system. When an interrupt occurs, control is transferred to the corresponding interrupt handler, which takes some action in response to the condition that caused the interrupt

Job - a set of computational steps packaged to run as a unit

Job Control Language (JCL) - a problem-oriented language that is designed to express statements in a job that are used to identify the job that is to be executed to requirements to an operating system

Kernel - a portion of the operating system that includes the most heavily used portions of software. Generally, the kernel is maintained permanently in main memory. The kernel runs in a privileged mode and responds to calls from processes and interrupts from devices

Lightweight Process - a thread

Macrokernel - a large operating system core that provides a wide range of services

Main Memory - memory that is internal to the computer system, is program addressable, and can be loaded into registers for subsequent execution of processing

Message - a block of information that may be exchanged between processes as a means of communication

Microkernel - a small privileged operating system core that provides process scheduling, memory management, and communication services and relies on other processes to perform some of the functions traditionally associated with the operating system kernel

Mode Switch - a hardware operation that occurs that causes the processor to execute in a different mode (kernel or process). When the mode switches from process to kernel, the program counter, processor status word, and other registers are saved. When the mode switches from kernel to process, this information is restored

Monolithic Kernel - a large kernel containing virtually the complete operating system, including scheduling, life system, device drivers, and memory management. All the functional components of the kernel have access to all of its internal data structures and routines. Typically, a monolithic kernel is implemented as a single process, with all elements sharing the same address space

Multiprocessing - a mode of operation that provides for parallel processing by two or more processors of a multiprocessor system

Multiprocessor - a computer that has two or more processors that have common access to a main storage

Multiprogramming - a mode of operation that provides for the interleaved execution of two or more computer programs by a single processor. The same as multitasking, using different terminology

Multitasking - a mode of operation that provides for the concurrent performance or interleaved execution of two or more computer tasks. The same as multiprocessing, using different terminology

Mutual Exclusion - a condition in which there is a set of processes, only one of which is able to access a given resource or perform a given function at any time. See critical section.

Network Operating System - the software, supplemental to the operating system, that provides support for the use of common server systems in a network of computers.

Nonprivileged State - an execution context that does not allow sensitive hardware instructions to be executed, such as the 'interrupt disable' and I/O instructions

Operating System - software that controls the execution of programs and that provides services such as resource allocation, scheduling, input/output control, and data management

Preemption - reclaiming a resource from a process before the process has finished using it

Privileged Instruction - an instruction that can be executed only in a specific mode, usually by a supervisory program

Process - a program in execution. A process is controlled and scheduled by the operating system. Same as task.

Process Control Block - the manifestation of a process in an operating system. It is a data structure containing information about the characteristics and state of the process

Process Descriptor - same as process control block

Process Image - all of the ingredients of a process, including program, data, stack, and process control block

Process State - all of the information that the operating system needs to manage a process and that the processor needs to properly execute the process. The process state includes the contents of the various processor registers, such as the program counter and data registers; it also includes information of use to the operating system, such as the priority of the process, and whether the process is waiting for the completion of a particular I/O event. Same as execution context.

Process Switch - an operation that switches the processor from one process to another by saving all the process control block, registers, and other information for the first and replacing them with the process information for the second

Round Robin - a scheduling algorithm in which processes are activated in a fixed cyclic order. Those which cannot proceed because they are waiting for some event (e.g. termination of a child process or an input/output operation) simply return to the scheduler.

Secondary Memory - memory located outside the computer system itself, including disk and tape

Shell - the portion of the operating system that interprets interactive user commands and job control language commands. It functions as an interface between the user and the operating system.

Stack - a list that is constructed and maintained so that the next data item to be retrieved is the most recently stored item in the list. This method is characterized as last-in-first-out

Starvation - a condition in which a process in indefinitely delayed because other processes are always given preference

Symmetric Multiprocessing (SMP) - a form of multiprocessing that allows the operating system to execute on any available processor or on several available processors simultaneously

Synchronization - situation in which two or more processes coordinate their activities based on a condition

Task - same as process

Thread - an execution context that is independently scheduled but shares a single address space with other threads

Time Sharing - the concurrent use of a device by a number of users

Time Slicing - a mode of operation in which two or more processes are assigned quanta of time on the same processor