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Operating System (OS) Job Interview Preparation Guide.

Question #1

What is the concept of Reentrancy?

Answer:-

It is a useful, memory-saving technique for multi-programmed time sharing systems. A Re-entrant Procedure is one in which multiple users can share a single copy of a program during the same period. Reentrancy has 2 key aspects: The program code cannot modify itself, and the local data for each user process must be stored separately. Thus, the permanent part is the code, and the temporary part is the pointer back to the calling program and local variables used by that program. Each execution instance is called activation. It executes the code in the permanent part, but has its own copy of local variables/parameters. The temporary part associated with each activation is the activation record. Generally, the activation record is kept on the stack.

Read More Answers.

Question # 2

What is Belady's Anomaly?

Answer:-

Also called FIFO anomaly. Usually, on increasing the number of frames allocated to a process virtual memory, the process execution is faster, because fewer page faults occur. Sometimes, the reverse happens, i.e., the execution time increases even when more frames are allocated to the process. This is Belady's Anomaly. This is true for certain page reference patterns.

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Question #3

Do you know what is a binary semaphore? What is its use?

Answer:

A binary semaphore is one, which takes only 0 and 1 as values. They are used to implement mutual exclusion and synchronize concurrent processes.

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Question # 4

Explain thrashing?

Answer:-

It is a phenomenon in virtual memory schemes when the processor spends most of its time swapping pages, rather than executing instructions. This is due to an inordinate number of page faults.

Read More Answers.

Question # 5

Can you list the Coffman's conditions that lead to a deadlock?

Answer:-

- * Mutual Exclusion: Only one process may use a critical resource at a time.
- * Hold & Wait: A process may be allocated some resources while waiting for others.
- * No Pre-emption: No resource can be forcible removed from a process holding it.
- * Circular Wait: A closed chain of processes exist such that each process holds at least one resource needed by another process in the chain.

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Question # 6

What is long term scheduler in Operating System (OS)?

Answer:-

Long term scheduler determines which programs are admitted to the system for processing. It controls the degree of multi programming. Once admitted, a job becomes a process.



Question #7

What is medium term scheduling in Operating System (OS)?

Answer:

Medium term scheduling is part of the swapping function. This relates to processes that are in a blocked or suspended state. They are swapped out of real-memory until they are ready to execute. The swapping-in decision is based on memory-management criteria.

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Question #8

What is short term scheduler in Operating System (OS)?

Answer.

Short term scheduler, also know as a dispatcher executes most frequently, and makes the finest-grained decision of which process should execute next. This scheduler is invoked whenever an event occurs. It may lead to interruption of one process by preemption.

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Question #9

Explain turnaround time and response time?

Answer-

Turnaround time is the interval between the submission of a job and its completion. Response time is the interval between submission of a request, and the first response to that request.

Read More Answers.

Question # 10

Explain the typical elements of a process image?

Answer:-

- * User data: Modifiable part of user space. May include program data, user stack area, and programs that may be modified.
- * User program: The instructions to be executed.
- * System Stack: Each process has one or more LIFO stacks associated with it. Used to store parameters and calling addresses for procedure and system calls.
- * Process control Block (PCB): Info needed by the OS to control processes.

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Question #11

Explain translation lookaside buffer?

Answer:-

In a cached system, the base addresses of the last few referenced pages is maintained in registers called the TLB that aids in faster lookup. TLB contains those page-table entries that have been most recently used. Normally, each virtual memory reference causes 2 physical memory accesses- one to fetch appropriate page-table entry, and one to fetch the desired data. Using TLB in-between, this is reduced to just one physical memory access in cases of TLB-hit.

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Question # 12

Explain the resident set and working set of a process?

Answer:

Resident set is that portion of the process image that is actually in real-memory at a particular instant. Working set is that subset of resident set that is actually needed for execution. Relate this to the variable-window size method for swapping techniques.

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Question # 13

Explain a system in safe state?

Answer:-

The set of dispatch-able processes is in a safe state if there exists at least one temporal order in which all processes can be run to completion without resulting in a deadlock.

Read More Answers

Question # 14

Explain cycle stealing?

Answer:

We encounter cycle stealing in the context of Direct Memory Access (DMA). Either the DMA controller can use the data bus when the CPU does not need it, or it may force the CPU to temporarily suspend operation. The latter technique is called cycle stealing. Note that cycle stealing can be done only at specific break points in an instruction cycle.

Read More Answers.

Question # 15

Explain arm-stickiness?

Answer:-



If one or a few processes have a high access rate to data on one track of a storage disk, then they may monopolize the device by repeated requests to that track. This generally happens with most common device scheduling algorithms (LIFO, SSTF, C-SCAN, etc). High-density multi-surface disks are more likely to be affected by this than low density ones.

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Question # 16

Explain the stipulations of C2 level security?

Answer-

C2 level security provides for:

- * Discretionary Access Control
- * Identification and Authentication
- * Auditing
- * Resource reuse

Read More Answers.

Question # 17

Explain busy waiting in Operating System (OS)?

Answar-

The repeated execution of a loop of code while waiting for an event to occur is called busy-waiting. The CPU is not engaged in any real productive activity during this period, and the process does not progress toward completion.

Read More Answers.

Question # 18

What is load Sharing in Operating System (OS)?

Answer:

Processes are not assigned to a particular processor. A global queue of threads is maintained. Each processor, when idle, selects a thread from this queue. Note that load balancing refers to a scheme where work is allocated to processors on a more permanent basis.

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Question # 19

What is gang scheduling in Operating System (OS)?

Answer:

A set of related threads is scheduled to run on a set of processors at the same time, on a 1-to-1 basis. Closely related threads / processes may be scheduled this way to reduce synchronization blocking, and minimize process switching. Group scheduling predated this strategy.

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Question # 20

What is dedicated processor assignment in Operating System (OS)?

Answer:

Provides implicit scheduling defined by assignment of threads to processors. For the duration of program execution, each program is allocated a set of processors equal in number to the number of threads in the program. Processors are chosen from the available pool.

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Question # 21

What is dynamic scheduling in Operating System (OS)?

Anewor.

The number of thread in a program can be altered during the course of execution.

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Question # 22

Tell me when does the condition 'rendezvous' arise?

Answer:

In message passing, it is the condition in which, both, the sender and receiver are blocked until the message is delivered.

Read More Answers.

Question # 23

Can you please explain the difference between trap and trapdoor?

Answer:

Trapdoor is a secret undocumented entry point into a program used to grant access without normal methods of access authentication. A trap is a software interrupt, usually the result of an error condition.

Read More Answers.

Question # 24



Explain about local and global page replacements?

Answer:

Local replacement means that an incoming page is brought in only to the relevant process address space. Global replacement policy allows any page frame from any process to be replaced. The latter is applicable to variable partitions model only.

Read More Answers.

Question # 25

Explain latency, transfer and seek time with respect to disk I/O.?

Answer-

Seek time is the time required to move the disk arm to the required track. Rotational delay or latency is the time it takes for the beginning of the required sector to reach the head. Sum of seek time (if any) and latency is the access time. Time taken to actually transfer a span of data is transfer time.

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Question # 26

What is the Buddy system of memory allocation in Operating System (OS)?

Answer:-

Free memory is maintained in linked lists, each of equal sized blocks. Any such block is of size 2^k. When some memory is required by a process, the block size of next higher order is chosen, and broken into two. Note that the two such pieces differ in address only in their kth bit. Such pieces are called buddies. When any used block is freed, the OS checks to see if its buddy is also free. If so, it is rejoined, and put into the original free-block linked-list.

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Question # 27

Explain time-stamping?

Answer:-

It is a technique proposed by Lam-port, used to order events in a distributed system without the use of clocks. This scheme is intended to order events consisting of the transmission of messages. Each system 'i' in the network maintains a counter Ci. Every time a system transmits a message, it increments its counter by 1 and attaches the time-stamp Ti to the message. When a message is received, the receiving system 'j' sets its counter Cj to 1 more than the maximum of its current value and the incoming time-stamp Ti. At each site, the ordering of messages is determined by the following rules: For messages x from site i and y from site j, x precedes y if one of the following conditions holds....(a) if Ti<Tj or (b) if Ti=Tj and i<j.

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Question # 28

Tell me if you know how are the wait/signal operations for monitor different from those for semaphores?

Answer:

If a process in a monitor signal and no task is waiting on the condition variable, the signal is lost. So this allows easier program design. Whereas in semaphores, every operation affects the value of the semaphore, so the wait and signal operations should be perfectly balanced in the program.

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Question # 29

What are placement and replacement algorithms In the context of memory management?

Answer:

Placement algorithms determine where in available real-memory to load a program. Common methods are first-fit, next-fit, best-fit. Replacement algorithms are used when memory is full, and one process (or part of a process) needs to be swapped out to accommodate a new program. The replacement algorithm determines which are the partitions to be swapped out.

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Question # 30

Can you please explain the difference between load-time dynamic linking and run-time dynamic linking?

Answer:-

For load-time dynamic linking: Load module to be loaded is read into memory. Any reference to a target external module causes that module to be loaded and the references are updated to a relative address from the start base address of the application module.

With run-time dynamic loading: Some of the linking is postponed until actual reference during execution. Then the correct module is loaded and linked.

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Question # 31

Can you please explain the difference between demand-paging and pre-paging?

Anewor.

With demand paging, a page is brought into memory only when a location on that page is actually referenced during execution. With pre-paging, pages other than the one demanded by a page fault are brought in. The selection of such pages is done based on common access patterns, especially for secondary memory devices.

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Question # 32

Explain page cannibalizing?



Answer:-

Page swapping or page replacements are called page cannibalizing.

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Question #33

Tell me what has triggered the need for multitasking in PCs?

Answer-

- * Increased speed and memory capacity of microprocessors together with the support fir virtual memory
- * Growth of client server computing

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Question #34

What are the four layers that windows NT have in order to achieve independence?

Answer:-

- * Hardware abstraction layer
- * Kernel
- * Subsystems
- * System Services.

Read More Answers.

Question #35

Explain SMP?

Answer:-

To achieve maximum efficiency and reliability a mode of operation known as symmetric multiprocessing is used. In essence, with SMP any process or threads can be assigned to any processor.

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Question #36

Explain the key object oriented concepts used by Windows NT?

Answer:-

Encapsulation, Object class and instance.

Read More Answers.

Question # 37

Tell me is Windows NT a full blown object oriented operating system? Give reasons?

Answer:-

No Windows NT is not so, because its not implemented in object oriented language and the data structures reside within one executive component and are not represented as objects and it does not support object oriented capabilities.

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Question # 38

Explain a drawback of MVT?

Answer:-

It does not have the features like:

- * Ability to support multiple processors
- * Virtual storage
- * Source level debugging

Read More Answers.

Question # 39

Explain process spawning?

Answer:-

When the OS at the explicit request of another process creates a process, this action is called process spawning.

Read More Answers.

Question # 40

Explain the reasons for process suspension?

Answer:-

- * Swapping
- * Interactive user request
- * Timing
- * Parent process request



Question # 41

Explain migration process?

It is the transfer of sufficient amount of the state of process from one machine to the target machine.

Read More Answers.

Question # 42

Explain mutant in Operating System (OS)?

In Windows NT a mutant provides kernel mode or user mode mutual exclusion with the notion of ownership.

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Question # 43

Explain an idle thread?

Answer:-

The special thread a dispatcher will execute when no ready thread is found.

Read More Answers.

Question # 44

Explain FtDisk in Operating System (OS)?

Answer:-

It is a fault tolerance disk driver for Windows NT.

Read More Answers.

Question # 45

List the possible threads a thread can have?

Answer:-

- * Ready
- * Standby
- * Running
- * Waiting * Transition
- * Terminated

Read More Answers.

Question # 46

What is drawback of MVT?

Answer:-

It does not have the features like:

- * Ability to support multiple processors * Virtual storage
- * Source level debugging

Read More Answers.

Question # 47

Tell me What are the rings in Windows NT?

Windows NT uses protection mechanism called rings provides by the process to implement separation between the user mode and kernel mode.

Read More Answers.

Question # 48

On what level of security does Windows NT meets?

Answer:-

C2 level security.

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Question #49

Explain DDks?

DDks are device driver kits, which are equivalent to SDKs for writing device drivers. Windows NT includes DDks.



Question # 50

Tell me What is executive in Windows NT?

Answer:

In Windows NT, executive refers to the operating system code that runs in kernel mode.

Read More Answers.

Question #51

List the sub-components of I/O manager in Windows NT?

Answer-

- * Network re-director/ Server
- * Cache manager.
- * File systems
- * Network driver
- * Device driver

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Question # 52

What are the reasons for process termination?

Answer:-

- * Normal completion
- * Time limit exceeded
- * Memory unavailable
- * Bounds violation
- * Protection error
- * Arithmetic error
- * Time overrun
- * I/O failure
- * Invalid instruction
- * Privileged instruction
- * Data misuse
- * Operator or OS intervention
- * Parent termination.

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Question # 53

What is the OPERATING SYSTEM?

Answer:-

An Operating System, or OS, is a software program that enables the computer hardware to communicate and operate with the computer software. Without a computer Operating System, a computer would be useless.

Read More Answers.

Question # 54

What are the OPERATING SYSTEM TYPES?

Answer:-

As computers have progressed and developed so have the types of operating systems. Below is a basic list of the different types of operating systems and a few examples of Operating Systems that fall into each of the categories. Many computer Operating Systems will fall into more than one of the below categories. GUI - Short for Graphical User Interface, a GUI Operating System contains graphics and icons and is commonly navigated by using a computer mouse. See our GUI dictionary definition for a complete definition. Below are some examples of GUI Operating Systems.

System 7.x

Windows 98

Windows CE

Multi-user - A multi-user Operating System allows for multiple users to use the same computer at the same time and/or different times. See our multi-user dictionary definition for a complete definition for a complete definition. Below are some examples of multi-user Operating Systems.

Linux

Unix Windows 2

Windows 2000 Windows XP

Mac OS X

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Question # 55

What are the basic functions of an operating system?

Answer:

Operating system controls and coordinates the use of the hardware among the various applications programs for various uses. Operating system acts as resource allocator and manager. Since there are many possibly conflicting requests for resources the operating system must decide which requests are allocated resources to operating the computer system efficiently and fairly. Also operating system is control program which controls the user programs to prevent errors and improper use of the computer. It is especially concerned with the operation and control of I/O devices.



Question # 56

Why paging is used in OS?

Answer:

Paging is solution to external fragmentation problem which is to permit the logical address space of a process to be noncontiguous, thus allowing a process to be allocating physical memory wherever the latter is available.

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Question # 57

While running DOS on a PC, which command would be used to duplicate the entire diskette?

Answer:-

This command will be use to duplicate the entire diskette diskcopy

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Question # 58

What resources are used when a thread created? How do they differ from those when a process is created?

Answer-

When a thread is created the threads does not require any new resources to execute the thread shares the resources like memory of the process to which they belong to. The benefit of code sharing is that it allows an application to have several different threads of activity all within the same address space. Whereas if a new process creation is very heavyweight because it always requires new address space to be created and even if they share the memory then the inter process communication is expensive when compared to the communication between the threads.

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Question #59

What is the virtual memory?

Answer:-

Virtual memory is hardware technique where the system appears to have more memory that it actually does. This is done by time-sharing, the physical memory and storage parts of the memory one disk when they are not actively being used.

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Question # 60

What is Throughput, Turnaround time, waiting time and Response time?

Answer:

Throughput $\hat{a} \in \mathbb{T}$ number of processes that complete their execution per time unit. Turnaround time $\hat{a} \in \mathbb{T}$ amount of time to execute a particular process. Waiting time $\hat{a} \in \mathbb{T}$ amount of time a process has been waiting in the ready queue. Response time $\hat{a} \in \mathbb{T}$ amount of time it takes from when a request was submitted until the first response is produced, not output (for time-sharing environment).

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Question # 61

What is the state of the processor, when a process is waiting for some event to occur?

Answer:-

The state of the processor is: Waiting state

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Question # 62

What is the important aspect of a real-time system or Mission Critical Systems?

Answer:-

A real time operating system has well defined fixed time constraints. Process must be done within the defined constraints or the system will fail. An example is the operating system for a flight control computer or an advanced jet airplane. Often used as a control device in a dedicated application such as controlling scientific experiments, medical imaging systems, industrial control systems, and some display systems. Real-Time systems may be either hard or soft real-time. Hard real-time: Secondary storage limited or absent, data stored in short term memory, or read-only memory (ROM), Conflicts with time-sharing systems, not supported by general-purpose operating systems. Soft real-time: Limited utility in industrial control of robotics, Useful in applications (multimedia, virtual reality) requiring advanced operating-system features.

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Question # 63

What is the difference between Hard and Soft real-time systems?

Answer:

A hard real-time system guarantees that critical tasks complete on time. This goal requires that all delays in the system be bounded from the retrieval of the stored data to the time that it takes the operating system to finish any request made of it. A soft real time system where a critical real-time task gets priority over other tasks and retains that priority until it completes. As in hard real time systems kernel delays need to be bounded



Question # 64

What is the cause of thrashing? How does the system detect thrashing?

Answer-

Once it detects thrashing, what can the system do to eliminate this problem? - Thrashing is caused by under allocation of the minimum number of pages required by a process, forcing it to continuously page fault. The system can detect thrashing by evaluating the level of CPU utilization as compared to the level of multiprogramming. It can be eliminated by reducing the level of multiprogramming.

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Question #65

What is multi tasking, multi programming and multi threading?

Answer:-

Multi programming: Multiprogramming is the technique of running several programs at a time using timesharing. It allows a computer to do several things at the same time. Multiprogramming creates logical parallelism. The concept of multiprogramming is that the operating system keeps several jobs in memory simultaneously. The operating system selects a job from the job pool and starts executing a job, when that job needs to wait for any i/o operations the CPU is switched to another job. So the main idea here is that the CPU is never idle. Multi tasking: Multitasking is the logical extension of multiprogramming. The concept of multitasking is quite similar tomultiprogramming but difference is that the switching between jobs occurs so frequently that the users can interact with each program while it is running. This concept is also known as time-sharing systems. A time-shared operating system uses CPU scheduling and multiprogramming to provide each user with a small portion of time-shared system. Multi threading: An application typically is implemented as a separate process with several threads of control. In some situations a single application may be required to perform several similar tasks for example a web server accepts client requests for web pages, images, sound, and so forth.

Read More Answers.

Question # 66

What is hard disk and what is its purpose?

Answer:-

Hard disk is the secondary storage device, which holds the data in bulk, and it holds the data on the magnetic medium of the disk. Hard disks have a hard platter that holds the magnetic medium, the magnetic medium can be easily erased and rewritten, and a typical desktop machine will have a hard disk with a capacity of between 10 and 40 gigabytes. Data is stored onto the disk in the form of files.

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Question # 67

What is fragmentation? Different types of fragmentation?

Answer:-

Fragmentation occurs in a dynamic memory allocation system when many of the free blocks are too small to satisfy any request. External Fragmentation: External Fragmentation happens when a dynamic memory allocation algorithm allocates some memory and a small piece is left over that cannot be effectively used. If too much external fragmentation occurs, the amount of usable memory is drastically reduced. Total memory space exists to satisfy a request, but it is not contiguous. Internal Fragmentation: Internal fragmentation is the space wasted inside of allocated memory blocks because of restriction on the allowed sizes of allocated blocks. Allocated memory may be slightly larger than requested memory; this size difference is memory internal to a partition, but not being used

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Question # 68

What is DRAM? In which form does it store data?

Answer:-

DRAM is not the best, but it's cheap, does the job, and is available almost everywhere you look. DRAM data resides in a cell made of a capacitor and a transistor. The capacitor tends to lose data unless it's recharged every couple of milliseconds, and this recharging tends to slow down the performance of DRAM compared to speedier RAM types.

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Question # 69

What is the Dispatcher?

Answer:-

Dispatcher module gives control of the CPU to the process selected by the short-term scheduler; this involves: Switching context, Switching to user mode, Jumping to the proper location in the user program to restart that program, dispatch latency $\hat{a} \in \mathbb{C}$ time it takes for the dispatcher to stop one process and start another running.

Read More Answers.

Question # 70

What is the CPU Scheduler?

Answer:-

Selects from among the processes in memory that are ready to execute, and allocates the CPU to one of them. CPU scheduling decisions may take place when a process: 1.Switches from running to waiting state. 2.Switches from running to ready state. 3.Switches from waiting to ready. 4.Terminates. Scheduling under 1 and 4 is non-preemptive. All other scheduling is preemptive.

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Question # 71

What is the Context Switch?



Answer:-

Switching the CPU to another process requires saving the state of the old process and loading the saved state for the new process. This task is known as a context switch. Context-switch time is pure overhead, because the system does no useful work while switching. Its speed varies from machine to machine, depending on the memory speed, the number of registers which must be copied, the existed of special instructions(such as a single instruction to load or store all registers).

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Question #72

What is the cache memory?

Answer:-

Cache memory is random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. As the microprocessor processes data, it looks first in the cache memory and if it finds the data there (from a previous reading of data), it does not have to do the more time-consuming reading of data from larger memory.

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Question #73

What is a Safe State and what is its use in deadlock avoidance?

Answer:-

When a process requests an available resource, system must decide if immediate allocation leaves the system in a safe state. System is in safe state if there exists a safe sequence of all processes. Deadlock Avoidance: ensure that a system will never enter an unsafe state.

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Question #74

What is the Real-Time System?

Answer:

A real time process is a process that must respond to the events within a certain time period. A real time operating system is an operating system that can run real time processes successfully

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