INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
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COMPUTER SCIENCE AND ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**OPERATING SYSTEMS**
Course Code	:	**AITB04**
Program	:	**B.Tech**
Semester	:	**IV**
Branch	:	**Computer science and engineering**
Section	:	**A, B, C, D**
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COURSE OBJECTIVES:

The course should enable the students to:	
I	Understand the fundamental principles of the operating system, its services and Functionalities.
II	Illustrate the concepts of processes, inter-process communication, synchronization and scheduling.
III	Understand different types of memory management viz. virtual memory, paging and segmentation.
IV	Identify the reasons for deadlock and understand the techniques for deadlock detection, prevention and recovery.
V	Understand the need of protection and security mechanisms in computer systems.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S. No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	Define system call?	In computing, a system call is the programmatic way in which a computer program requests a service from the kernel of the operating system it is executed on. System calls provide an essential interface between a process and the operating system.	Remember	CO 1	CLO04	AITB04.04
2	Define Real Time Systems?	A real time system is a time bound system which has well defined fixed time constraints. Processing must be done within the defined constraints or the system will	Remember	CO 1	CLO 03	AITB04.03

		fail. They either are event driven or timesharing				
3	Define job scheduling?	The allocation of system resources to various tasks, known as job scheduling, is a major assignment of the operating system.	Remember	CO 1	CLO08	AITB04.08
4	State user mode and kernel mode?	Kernel mode is generally reserved for the lowest-level, most trusted functions of the operating system. Crashes in kernel mode are catastrophic; they will halt the entire PC. In User mode, the executing code has no ability to directly access hardware or reference memory	Understand	CO 1	CLO04	AITB04.04
5	What is resource allocator?	When multiple users or multiple jobs running concurrently, resources must	Remember	CO 1	CLO04	AITB04.04
6	What is spooling?	Spooling is a process in which data is temporarily held to be used and executed by a device, program or the system.	Remember	CO 1	CLO03	AITB04.03
7	List out the functions that comes in file management?	Create, delete, copy, rename, print, dump, list, and generally manipulate files and directories	Remember	CO 1	CLO04	AITB04.04
8	Define multi programming?	A multiprogramming is a parallel processing in which the multiple programs can run simultaneously. Multiprogramming allows using the CPU effectively by allowing various users to use the CPU and I/O devices effectively.	Remember	CO 1	CLO03	AITB04.03
9	What is time sharing	Time-sharing is a technique which enables many people, located at various terminals, to use a particular computer system at the same time.	Remember	CO 1	CLO03	AITB04.03
10	Define Hard real – Time System.	A Hard Real-Time System guarantees that critical tasks complete on time	Remember	CO 1	CLO 03	AITB04.03
11	Define GUI?	The graphical user interface is a form of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation, instead of text-based user interfaces, typed command labels or text navigation.	Remember	CO 1	CLO03	AITB04.03
12	Define batch operating system?	In batch operating system user do not interact with the computer directly. Each user prepares his job on an off-line device like punch cards and submits it to the computer operator. To speed up processing, jobs with similar needs are batched together and run as a group.	Remember	CO 1	CLO03	AITB04.03

13	Define CLI	Command line interface (CLI) is a text-based interface that is used to operate software and operating systems while allowing the user to respond to visual prompts by typing single commands into the interface and receiving a reply in the same way	Remember	CO 1	CLO03	AITB04.03
14	What is protection and security	The owners of information stored in a multiuser or networked computer system may want to control use of that information, concurrent processes should not interfere with each other	Remember	CO 1	CLO05	AITB04.05
15	Define operating system	An operating system is system software that manages computer hardware and software resources and provides common services for computer programs.	Remember	CO 1	CLO 01	AITB04.01
MODULE-II						
1	Define Time Slice?	time slice. A short interval of time allotted to each user or program in a multitasking or timesharing system. Time slices are typically in milliseconds.	Remember	CO 2	CLO 07	AITB04.07
2	Define Scheduling Queue?	The OS maintains all PCBs in Process Scheduling Queues.ueue − This queue keeps all the processes in the system. Ready queue − This queue keeps a set of all processes residing in main memory, ready and waiting to execute.	Remember	CO 2	CLO 08	AITB04.08
3	Define preemptive scheduling?	A scheduling discipline is preemptive if, once a process has been given the CPU can taken away. The strategy of allowing processes that are logically runnable to be temporarily suspended is called Preemptive Scheduling and it is contrast to the "run to completion" method.	Remember	CO 2	CLO 08	AITB04.08
4	Define thread?	The implementation of threads and processes differs between operating systems, but in most cases a thread is a component of a process. Multiple threads can exist within one process, executing concurrently and sharing resources such as memory, while different	Remember	CO 2	CLO 04	AITB04.04

		processes do not share these resources				
5	Define Peterson's algorithm?	Peterson's algorithm (or Peterson's solution) is a concurrent programming algorithm for mutual exclusion that allows two or more processes to share a single-use resource without conflict, using only shared memory for communication.	Remember	CO 2	CLO 08	AITB04.08
6	What is context switching?	Context switch is a procedure that a computer's CPU (central processing unit) follows to change from one task (or process) to another while ensuring that the tasks do not conflict. Effective context switching is critical if a computer is to provide user-friendly multitasking	Remember	CO 2	CLO 08	AITB04.08
7	What is semaphores	Semaphore is a synchronization mechanism. so synchronization allows two or more processes or threads to communicate in a useful way. specifically a semaphore consists of an integer variables.	Remember	CO 2	CLO 10	AITB04.10
8	Define PCB	Process Control Block (PCB, also called Task Controlling Block, Entry of the Process Table, Task struct, or Switch Frame) is a data structure in the operating system kernel containing the information needed to manage the scheduling of a particular process.	Remember	CO 2	CLO 09	AITB04.09
9	Define CPU scheduler	CPU Scheduler Whenever the CPU becomes idle, it is the job of the CPU Scheduler to select another process from the ready queue to run next.	Remember	CO 2	CLO 08	AITB04.08
10	What is process scheduling?	Process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy. Process scheduling is an essential part of a Multiprogramming operating systems	Remember	CO 2	CLO 09	AITB04.09
11	Define scheduling?	Scheduling is the method by which work specified by some means is assigned to resources that complete the work. The work may be virtual computation elements such as threads, processes or data flows, which are	Remember	CO 2	CLO 08	AITB04.08

		in turn scheduled onto hardware resources such as processors, network links or expansion cards.				
12	What is multi processor scheduling?	multiple CPUs are available and hence Load Sharing becomes possible. However multiple processor scheduling is more complex as compared to single processor scheduling.	Remember	CO 2	CLO 10	AITB04.10
13	Define real time scheduling system?	Real-time scheduling System is composed of the scheduler, clock and the processing hardware elements. In a real-time system, a process or task has schedulability; tasks are accepted by a real-time system and completed as specified by the task deadline depending on the characteristic of the scheduling algorithm.	Remember	CO 2	CLO 08	AITB04.08
14	What is critical section?	Critical section is a code segment that accesses shared variables and has to be executed as an atomic action. The critical section problem refers to the problem of how to ensure that at most one process is executing its critical section at a given time.	Remember	CO 2	CLO 07	AITB04.07
15	Define process?	Process is the instance of a computer program that is being executed. It contains the program code and its activity. Depending on the operating system (OS), a process may be made up of multiple threads of execution that execute instructions concurrently. Each CPU (core) executes a single task at a time	Remember	CO 2	CLO 09	AITB04.09
MODULE-III						
1	Define frames?	A frame refers to a storage frame or central storage frame. In terms of physical memory, it is a fixed sized block in physical memory space, or a block of central storage. In computer architecture, frames are analogous to logical address space pages.	Remember	CO 3	CLO 13	AITB04.13

2	What is hashed page tables	The virtual page number is hashed into a page table This page table contains a chain of elements hashing to the same location Virtual page numbers are compared in this chain searching for a match If a match is found, the corresponding physical frame is extracted	Remember	CO 3	CLO 14	AITB04.14
3	Define segmentation?	Segmentation is one of the most common ways to achieve memory protection. In a computer system using segmentation, an instruction operand that refers to a memory location includes a value that identifies a segment and an offset within that segment.	Remember	CO 3	CLO 11	AITB04.11
4	What is page replacement?	Page replacement In a computer operating system that uses paging for virtual memory management, page replacement algorithms decide which memory pages to page out, sometimes called swap out, or write to disk, when a page of memory needs to be allocated	Remember	CO 3	CLO 13	AITB04.13
5	Define page table?	Page Table is a data structure used by the virtual memory system to store the mapping between logical addresses and physical addresses. Logical addresses are generated by the CPU for the pages of the processes therefore they are generally used by the processes.	Remember	CO 3	CLO 13	AITB04.13
6	What is physical address?	Physical address is a location that exists in the memory unit. The set of all logical addresses generated by CPU for a program is called Logical Address Space. However, the set of all physical address mapped to corresponding logical addresses is referred as Physical Address Space.	Remember	CO 3	CLO11	AITB04.11
7	Define Swapping?	Swapping is mechanisms in which a process can be swapped temporarily out of main memory (or move) to secondary storage (disk) and make that memory available to other processes.	Remember	CO 3	CLO 14	AITB04.14
8	Define demand paging?	Demand paging is way of using virtual memory to give processes the illusion of infinite available memoryOnce a page is brought from disk into memory, the OS updates the page table and the valid bit. time	Remember	CO 3	CLO 13	AITB04.13

9	What is hierarchical page table	Break up the logical address space into multiple page tables A simple technique is a two-level page table	Remember	CO 3	CLO11	AITB04.11
10	What is allocation of frames?	Allocation of frames. An important aspect of operating systems, virtual memory is implemented using demand paging Frame allocation algorithms are used if you have multiple processes; it helps decide how many frames to allocate to each process.	Remember	CO 3	CLO14	AITB04.14
11	Define trashing?	Trashing In a virtual storage system (an operating system that manages its logical storage or memory in units called pages), thrashing is a condition in which excessive paging operations are taking place. A system that is thrashing can be perceived as either a very slow system or one that has come to a halt.	Remember	CO 3	CLO 13	AITB04.13
12	What is memory protection?	Memory protection implemented by associating protection bit with each frame Valid- invalid bit attached to each entry in the page table	Remember	CO 3	CLO11	AITB04.11
13	Define contiguous memory allocation?	Contiguous memory allocation is one of the oldest memory allocation schemes. When a process needs to execute, memory is requested by the process. The size of the process is compared with the amount of contiguous main memory available to execute the process.	Remember	CO 3	CLO 11	AITB04.11
14	What is paging?	Paging is a memory management scheme that eliminates the need for contiguous allocation of physical memory. This scheme permits the physical address space of a process to be non – contiguous.	Remember	CO 3	CLO 14	AITB04.14
15	Define virtual memory?	Virtual memory is a memory management capability of an operating system (OS) that uses hardware and software to allow a computer to compensate for physical memory shortages by temporarily transferring data from random access memory (RAM) to disk storage	Remember	CO 3	CLO 11	AITB04.11
MODULE-IV						

1	Define scan?	The disk arm starts at one end of the disk, and moves toward the other end, servicing requests until it gets to the other end of the disk	Remember	CO 4	CLO 15	AITB04.15
2	Define C LOOK	Version of C-SCAN Arm only goes as far as the last request in each direction, then reverses direction immediately, without first going all the way to the end of the disk	Remember	CO 4	CLO 15	AITB04.15
3	Define swap?	Space Management Swap-space — Virtual memory uses disk space as an extension of main memory	Remember	CO 4	CLO 15	AITB04.15
4	Define stream?	a full-duplex communication channel between a user-level process and a device in Unix System V and beyond	Remember	CO 4	CLO 12	AITB04.12
5	List out the access methods?	The access methods are sequential access and direct access	Remember	CO 4	CLO 13	AITB04.13
6	Define file attributes?	File attributes are settings associated with computer files that grant or deny certain rights to how a user or the operating system can access that file. For example, IBM compatible computers running MS-DOS or Microsoft Windows have capabilities of having read, archive, system, and hidden attributes.	Remember	CO 4	CLO 19	AITB04.19
7	Define disk structure?	The actual physical details of a modern hard disk may be quite complicated. Simply, there are one or more surfaces, each of which contains several tracks, each of which is divided into sectors. There is one read/write head for every surface of the disk.	Remember	CO 4	CLO15	AITB04.15
8	Define directory structure?	A directory is a container that is used to contain folders and file. It organizes files and folders into hierarchical manner	Remember	CO 4	CLO 12	AITB04.12
9	List out the file operations?	File Operations File is an abstract data type Create ,Write , Read , Reposition within file, Delete	Remember	CO 4	CLO 19	AITB04.19
10	Define attachment host?	attached storage accessed through I/O ports talking to I/O busses	Remember	CO 4	CLO 13	AITB04.13
11	Define Hierarchical Storage Management	A hierarchical storage system extends the storage hierarchy beyond primary memory and secondary storage to incorporate tertiary storage	Remember	CO 4	CLO 19	AITB04.19
12	Define sequential access	It is built on top of Sequential access. It uses an Index to control the pointer while accessing files.	Remember	CO 4	CLO 15	AITB04.15

13	Define c scan?	Provides a more uniform wait time than SCAN The head moves from one end of the disk to the other, servicing requests as it goes	Remember	CO 4	CLO 13	AITB04.13
14	Define SSTF	Shortest seek first (or shortest seek time first) is a secondary storage scheduling algorithm to determine the motion of the disk's arm and head in servicing read and write requests.	Remember	CO 4	CLO 13	AITB04.13
15	Define file?	A file is a named collection of related information that is recorded on secondary storage such as magnetic disks, magnetic tapes and optical disks.	Remember	CO 4	CLO 19	AITB04.19
MODULE-V						
1	Define access matrix?	the model of protection that we have been discussing can be viewed as an access matrix, in which columns represent different system resources and rows represent different protection domains. Entries within the matrix indicate what access that domain has to that resource.	Remember	CO 5	CLO 20	AITB04.21
2	What is mutual exclusion?	A mutual exclusion (mutex) is a program object that prevents simultaneous access to a shared resource. This concept is used in concurrent programming with a critical section, a piece of code in which processes or threads access a shared resource.	Remember	CO 5	CLO 20	AITB04.24
3	Define access control?	Access control is a way of limiting access to a system or to physical or virtual resources. In computing, access control is a process by which users are granted access and certain privileges to systems, resources or information	Remember	CO 5	CLO 20	AITB04.21
4	What is Non preemption?	a resource can be released only voluntarily by the process holding it, after that process has completed its task	Remember	CO 5	CLO 20	AITB04.24
5	Define circular wait?	a total ordering of all resource types, and require that each process requests resources in an increasing order of enumeration	Remember	CO 5	CLO 20	AITB04.24
6	What is safe state?	When a process requests an available resource, system must decide if immediate allocation leaves the system in a safe state	Remember	CO 5	CLO 20	AITB04.21
7	Define hold and wait?	a process holding at least one resource is waiting to acquire additional resources held by other processes	Remember	CO 5	CLO20	AITB04.21

8	Define dead lock detection?	Temporarily prevent resources from deadlocked processes. Back off a process to some check point allowing preemption of a needed resource and restarting the process at the checkpoint later. Successively kill processes until the system is deadlock free	Remember	CO 5	CLO 20	AITB04.21
9	Define clocks and timer?	Provide current time, elapsed time, timer Programmable interval timer used for timings, periodic interruptsnioctl() (on UNIX) covers odd aspects of I/O such as clocks and timers	Remember	CO 5	CLO 19	AITB04.21
10	Define stream	A full-duplex communication channel between a user-level process and a device in Unix System V and beyond	Remember	CO 5	CLO 20	AITB04.22
11	Define banker's algorithm?	Multiple instances Each process must a priori claim maximum use When a process requests a resource it may have to wait When a process gets all its resources it must return them in a finite amount of time	Remember	CO 5	CLO 20	AITB04.21
12	Define DMA?	Used to avoid programmed I/O for large data movement Requires DMA controller Bypasses CPU to transfer data directly between I/O device and memory	Remember	CO 5	CLO 19	AITB04.23
13	Define deadlock?	A deadlock is a situation in which two computer programs sharing the same resource are effectively preventing each other from accessing the resource, resulting in both programs ceasing to function	Remember	CO 5	CLO 20	AITB04.21
14	What is error handling?	Error Handling OS can recover from disk read, device unavailable, transient write failures Most return an error number or code when I/O request fails System error logs hold problem reports	Remember	CO 5	CLO 20	AITB04.23
15	Define dead lock detection	Temporarily prevent resources from deadlocked processes. Back off a process to some check point allowing preemption of a needed resource and restarting the process at the checkpoint later.	Remember	CO 5	CLO 13	AITB04.13

Signature of the Faculty **HOD, CSE**