**Processes**

**CPU scheduling algorithms are:**i) First Come First Served scheduling  
ii) Shortest Job First scheduling  
iii) Priority scheduling  
iv) Round Robin scheduling  
v) Multilevel Queue scheduling  
vi) Multilevel Feedback Queue scheduling

**If a process fails**, most operating systems write the error information to a log file. Log file is examined by the debugger, to find out what is the actual cause of that particular problem. Log file is useful for system programmers for correcting errors.  
  
**OS X has a hybrid kernel**. Hybrid kernel is a combination of two different kernels. OS X is developed by Apple and originally it is known as Mac OS X.  
  
The systems which **allow only one process execution at a time**, are called \_\_\_uniprocessing systems  
Those systems which allow more than one process execution at a time, are called multiprocessing systems. Uniprocessing means only one processor.  
  
In Operating Systems, **each process** has its own address space which contains code, data, stack and heap segments or sections. Each process also has a list of files which is opened by the process as well as all pending alarms, signals and various signal handlers.  
  
In UNIX, a new process is created by fork() system call. fork() system call returns a process ID which is generally the process id of the child process created.

What is interprocess communication?  
communication between two process -Interprocess Communication (IPC) is a communication mechanism that allows processes to communicate with each other and synchronise their actions without using the same address space. IPC can be achieved using shared memory and message passing.

A set of processes is deadlock if \_\_\_\_\_\_\_\_\_\_ each process is blocked and will remain so forever- Deadlock is a situation which occurs because process A is waiting for one resource and holds another resource (blocking resource). At the same time another process B demands blocking a resource as it is already held by a process A, process B is waiting state unless and until process A releases occupied resource.

wait() system call is used by the parent process to determine termination of child process. The parent process uses wait() system call and gets the exit status of the child process as well as the pid of the child process which is terminated

 The address of the next instruction to be executed by the current process is provided by the Program Counter. After every instruction is executed, the Program Counter is incremented by 1 i.e. address of the next instruction to be executed. CPU fetches instruction from the address denoted by Program Counter and execute it.

Bootstrap program is a program which runs initially when the system or computer is booted or rebooted.

The state of a process is defined by the current activity of the process. A process state changes when the process executes. The process states are as New, Ready, Running, Wait, Terminated.

The entry of all the PCBs of the current processes is in Process Table. The Process Table has the status of each and every process that is created in OS along with their PIDs.

What is the degree of multiprogramming?  
the number of processes in memory

Multiprogramming means the number of processes are in the ready states. To increase utilization of CPU, Multiprogramming is one of the most important abilities of OS. Generally, a single process cannot use CPU or I/O at all time, whenever CPU or I/O is available another process can use it. By doing this CPU utilization is increased

When the process issues an I/O request it is placed in an I/O queue. I/O is a resource and it should be used effectively and every process should get access to it. There might be multiple processes which requested for I/O. Depending on scheduling algorithm I/O is allocated to any particular process and after completing I/O operation, I/O access is returned to the OS.

A long-term scheduler selects processes which have to be brought into the ready queue. When processes enter the system, they are put in the job queue. Long-term scheduler selects processes from the job queue and puts them in the ready queue. It is also known as Job Scheduler.

 If all processes are I/O bound, the ready queue will almost empty and the short-term scheduler will have a little to do. I/O bound processes spend more time doing I/O than computation

A medium-term scheduler selects which process to remove from memory by swapping. The medium-term scheduler swapped out the process and later swapped in. Swapping helps to free up memory.

A short-term scheduler selects a process which has to be executed next and allocates CPU. Short-term scheduler selects a process from the ready queue. It selects processes frequently.

The primary distinction between the short-term scheduler and the long-term scheduler is the frequency of their execution. The short-term scheduler executes frequently while the long-term scheduler executes much less frequently.

 The only state transition that is initiated by the user process itself is block. Whenever a user process initiates an I/O request it goes into block state unless and until the I/O request is not completed.

In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the running state to the Ready State. In a time-sharing operating system unit time is defined for sharing CPU, it is called a time quantum or time slice. If a process takes less than 1 time quantum, then the process itself releases the CPU.

In a multiprogramming environment more than one process resides in the memory. Whenever a CPU is available, one process amongst all present in memory gets the CPU for execution. Multiprogramming increases CPU utilization.

A special, small, fast-lookup hardware cache is called Translation Look-aside Buffer. TLB used to reduce memory access time.

 Semaphore is a synchronization tool. Semaphore is a mechanism which synchronizes or controls access of threads on critical resources. There are two types of semaphores i) Binary Semaphore ii) Counting Semaphore.

A semaphore is a shared integer variable that can not drop below zero.   
in binary semaphore, if the value of the semaphore variable is zero that means there is a process that uses a critical resource and no other process can access the same critical resource until it is released. In Counting semaphore, if the value of the semaphore variable is zero that means there is no resource available.

If a process is executing in its critical section, then no other processes can be executed in their critical section. This condition is called Mutual Exclusion. Critical section of the process is shared between multiple processes. If this section is executed by more than one or all of them concurrently then the outcome of this is not as per desired outcome. For this reason the critical section of the process should not be executed concurrently.

A monitor is a module that encapsulates shared data structures, procedures that operate on shared data structure, synchronization between concurrent procedure invocation.

To enable a process to wait within the monitor a condition variable must be declared as condition.

 A parent process calling wait system call will be suspended until children processes terminate. A parameter is passed to wait system call which will obtain exit status of child as well as wait system call returns PID of terminated process.

Cascading termination refers to termination of all child processes if the parent process terminates Normally or Abnormally. Some systems don’t allow child processes to exist if the parent process has terminated. Cascading termination is normally initiated by the operating system.

In Unix, each process is identified by its Process Identifier or PID. The PID provides unique value to each process in the system so that each process can be identified uniquely.

The child process completes execution, but the parent keeps executing, then the child process is known as Zombie. When a child process terminates, its resources get deallocated but its entry in the Process Control Block (PCB) remains there until its parent calls wait system call.

 For direct communication, a communication link is associated with exactly two processes. One communication link must exist between a pair of processes.

In the non blocking send, the sending process sends the message and resumes operation. Sending process doesn’t care about reception. It is also known as asynchronous send.

The Zero capacity queue is referred to as a message system with no buffering. Zero capacity queue has maximum capacity of Zero; thus message queue does not have any waiting message in it.

 Bounded capacity and Unbounded capacity queues are referred to as Automatic buffering. Buffer capacity of the Bounded capacity queue is finite length and buffer capacity of the Unbounded queue is infinite