SNS COLLEGE OF TECHNOLOGY

COIMBATORE – 35

DEPARTMENT OF COMPUTER SIENCE AND ENGINEERING (UG & PG)

Second Year, 4th Semester

2 Marks Question and Answer

Subject Code & Name: 19CSB201- OPERATING SYSTEMS

1) What is long term and short term schedulers?

CPU is called as a Short term scheduler. Whenever the CPU becomes idle, the operating system must select one of the processes in the ready queue to be executed. The selection process is carried out by the short-term scheduler or CPU scheduler.

Long term sc duler or job scheduler selects the process in job queue and put into the ready queue for CPU execution.

2) Define the shortest remaining time first scheduling.

Preemptive SJF scheduling is sometimes called Shortest-remaining-time-first scheduling. The choice arises when a new process arrives at the ready queue while a previous process is executing. The new process may have a shorter next CPU burst than what is left of currently executing process. A preemptive SJF algorithm will preempt the currently executing process.

3) Differentiate between preemptive and non-preemptive?

Preemptive Scheduling: 1. when process switches from running State to ready state.
2. When a process switches from waiting state to ready state.

Non preemptive scheduling: once the CPU has been allocated to a process, the processkeeps the CPU until it releases the CPU either by a process switches from running state to waiting state or the process terminates.

4) Define dispatcher and dispatch latency.

The dispatcher is the module that gives control of the CPU to the process selected by short term scheduler. The function involves:

- Switching context
- Switching to user mode
- Jumping to the proper location in the user program to restart that program.

Dispatch latency: Time taken by the dispatcher to stop one process and start another process for running is known as the dispatch latency.

5) Define throughput and response time?

Throughput refers to the no of process completed per time unit. Higher the throughput higher amount of work can be done by the CPU.

Response time refers to the measure the amount of time taken from submission of the request till the first response is found.

6) Define turnaround time and waiting time.

Turnaround time is the interval from the time of submission of a process to the time of completion. Turnaround time is the sum of periods spent waiting to get into the ready queue, executing on the CPU and doing I/O.

Waiting time is the average period of time a process spends waiting in the ready queue.

7) What is starvation or indefinite blocking?

The process that is ready to run but lacking the CPU can be considered as starvation or indefinite blocking.

8) Define aging.

A solution to the problem of the indefinite blocking or starvation is aging. Aging is a technique of gradually increasing the priority of processes that wait in the system for a long time.

9) Define priority inversion.

The situation in which the higher priority process would be waiting for the lower priority process to complete is called as priority inversion. This can solved via priority–inheritance protocol.

10) What is critical section and race condition?

Critical section is a segment of code in which the process may be changing common variables, updating table, writing a file etc. When one process is executing in critical section no other process is allowed to be executed in its critical section.

A situation in which several processes access and manipulate the same data concurrently and the outcome of the execution depends upon on the particular order of the execution is called as race condition.

11) What are requirements to be satisfied by the critical section problem?

The 3 conditions to be satisfied are

- Mutual exclusion
- Progress
- Bounded waiting

12) Define bakery algorithm.

Bakery algorithm is used to solve the critical section problem for n process. The bakery algorithm was developed for a distributed environment, which permits processes to enter into the critical section in the order of the token numbers.

13) Define semaphore?

Semaphore is used to solve critical section problem. A semaphore is a synchronization tool. Semaphore is a variable that has an integer value upon which the following operations are defined:

1) Wait
2) Signal

There are two types of semaphore 1. Counting semaphore 2. Binary semaphore.

14) What is busy waiting and spin lock?

While a process is in its critical section, any process that tries to enter its critical section must loop continuously in the entry code. This continual looping is called busy waiting. Busy waiting wastes CPU cycles that some other process might be able to use productively. This type of semaphore is also called a spinlock.

15) D

efine binary semaphore

Binary semaphore is a semaphore with an integer value that can range only between 0 and 1.

16) What is real time scheduling? What are its types?

A real-time system is used when rigid time requirements have been placed on the operation of a processor or the flow of data. There are two types of real time scheduling

- Hard real time systems are required to complete a critical task within a guaranteed amount of time.
- Soft real time system, where a critical real-time task gets priority over other tasks, and retains that priority until it completes.

17) Define preemption points.

Preemption points are one of the ways to keep the dispatch latency low. Preemption points are usually used to see whether a high priority process needs to be run.

18) What is the use of queueing model?

Queueing analysis can be useful in comparing scheduling algorithms, but it also has limitations. If the system is in ready state, then the number of process leaving the queue must be equal to number of process that arrive, thus

$$ή=λ*w$$

The above equation is called little's formula.

19) What are the various operation used in semaphores?

The two operations that are used in semaphores are

- Wait
- Signal

20) Define monitors.

Monitor is a programming language construct that provides equivalent functionality to that of the semaphores but it is easier to control. A monitor is characterized by a set of programmer-defined operators. Monitors are a high level data abstraction tool combining three features:

Shared data
Operation on data
Synchronization, scheduling

21) Define sleeping barber problem?

A barbershop consisting of a waiting room with n chairs and the barber room containing the barber chair. If there are no customers to be served, the barber goes to sleep. If a customer enters the barbershop and all chair are occupied, then the customer leaves the shop. If the barber is busy but chairs are available, then the customers sits in one of the free chairs. If the barber is a sleep, the customer wakes up the barber.

22) Define cigarette-smokers problem.

There are three smoker process and one agent process. Each smoker continuously rolls a cigarette and then smokes it. But to roll and smoke a cigarette, the smoker needs three ingredients: tobacco, paper and matches. One of the smoker processes has paper, another has tobacco and the third has matches. The agent places two of the ingredients on the table. The smoker who has the remaining ingredients then makes and smokes a cigarette, signaling the agent on completion. The agent then puts out of the three ingredients and the cycle repeats. This is called cigarette-smokers problem.

23) What is the necessary condition for deadlock?

A deadlock situation can arise if the following four conditions hold simultaneously in system:

- Mutual exclusion
- Hold and wait
- No preemption
- Circular wait

24) What is resource allocation graph?

Dead locks can be described more precisely in terms of directed graph called a system resource-allocation graph. This graph consists of set of vertices V and set of edges E. Refer fig 8.1 (pg no 247)

25) What are the data structures required for the bankers algorithms?

The data structures used for bankers algorithm are

- Available
- Max
- Allocation
- Need

26) How do you recover the system from deadlock?

There are generally two methods to recover from deadlock

- **Process termination**
- **Resource preemption**

27) How do you select a victim for resource preemption?

- We must determine the order of preemption to minimize the cost
- We must consider the cost parameters such as
    - No of resources a dead lock process is holding.
    - Amount of time consumed by the deadlock process during its execution

28) What are the methods for handling the deadlock?

- **Deadlock Prevention**
- **Deadlock Detection & recovery**
- **Deadlock avoidance**

29) How do you avoid deadlock?

System must always in safe state.

Resource allocation graph should not consist of cycle.

System must satisfy the safety and resource-request algorithm.

- Don to start the process if demands might lead to deadlock
- Do not grant an increment resources request to a process if this allocation might lead to deadlock