Short questions

1. **What is operating system and what is it used for? What is kernel?**
   An OS is a program that manages the computer hardware. It provides the basis for application programs and acts as an interface between computer user and hardware. The os control and coordinates the use of hardware among various applications programs for various users. The kernel provides the most basic interface between the computer itself and the rest of the operating system. The kernel is responsible for the management of the central processor.
2. **Explain the difference between internal and external fragmentation?** repeated
3. **What is the page fault?**
   page fault occurs when a process references an address on a page that is not in memory. If there are no free frames in memory, then a page of some active
   process from the memory must be evicted so that the page that was faulted for can be brought in.
4. **What is system call?**
   system call provides an interface between a user program and operating system. The system calls expose the services offered by the operating system to user.
5. **Explain semaphores and write a short note on it?**
   semaphores provide a more organized way of controlling the interaction of multiple processes than simple variable. A semaphore is an integer variable used by processes to send signals to other processes.
6. **What is scheduling? What criteria affect the schedular performance?**
7. **What is process and process control block?**
   A process is a program in execution. A process has a starting and ending point. PCB is a data structure. It contains all information for a process to be used for controlling its execution.
8. **What is context switch?**
   switching the cup to another process requires saving state of old process and loading the saved state for the new process.
9. **Explain the tree types of schedulers?**
   (1) short-term schedular (2) long-term schedular (3) medium-term schedular.
10. **What is critical section?** Repeated
11. **Differentiate between "many-to-many" and "one-to-one" multithreading models?**
    in many-to-many model, many user level threads are mapped to one kernel thread. It is efficient because it is implemented in user space.
    in one-to-one model, each user thread is mapped to kernel thread. It provides more concurrency because it allows another thread to execute if a thread makes a blocking system call.
12. **What is demand paging?**
13. **What do you know about os? And its types?**
    An operating system is a program that manages computer hardware.it provides basis for application program and acts as an interface between computer and hardware. Types are windows, iOS.
14. **What is difference between internal and external fragmentation?** repeat
15. **Name two differences between logical and physical addressee?**
    A logical address is a reference to a memory location independent of the current assignment of data to memory. A physical address or absolute address is an actual location in main memory.
16. **Define multilevel feedback queue?**
    Processes move from one queue to another depending on changes in its conditions.
17. **What is the advantage of using pager?**
    No need to find a contiguous space of the right size. Makes sharing of memory easier. Can allocate any free page.
18. **What benefits we gain from multiprocessor system?**
    Multiprocessors refers to a system with two or more processors or ups.multiprocessing refers to a system that can process one or more tasks at a time.
19. **How process differs from thread?**

A process is heavyweight but a thread is lightweight.thread is a part of a processs and process must have at least one thread.

20. Write down the name of primary thread libraries?

there are three main thread libraries in use today. (1) posix pthreads (2) win32 threads (3) java threads.

21. Which of the following scheduling algorithm could result in starvation?

a) first come, first out b) round robin

b) shortest job first(sjf) d) priority

22. What is critical section?

A section of code that involves shared resources that we must protect with mutual exclusion so that only one thread at a time can execute that section of code.

23. Explain the difference between preemptive and non-preemptive?

In a preemptive scheme, a running process may be forced to yield CPU by an external event instead of its own section. After each interrupt, control passes back to the process that was running when it occurred this is called a non-preemptive approach.

24. What is demand paging?

Virtual memory can be implemented by a technique called demanding paging.it is a technique in which a page is brought into memory when it is needed.

25. What is PCB?

PCB stand for process control block is a data structure. It contains all information for a process to be used for controlling its execution. Every process has its own PCB.

26. Describe system call with example?

System call provide an interface between user program and operating system. Most system calls are written in assembly language and are machine language.

Example: process control is a type of system calls that are used to control the process, end,abort,load,execute.

27. What are the advantages of multiprogramming?

When a process is blocked, multiprogramming system can run another process in the meantime. Multiprogramming is more efficient. It makes better use of CPU.

28. Write down the name of schedulers?

1) Multiple processor Scheduling

2) Realtime scheduling

29. What is the "dispatcher"?

It is a program that gives control of the CPU to the process selected by short-term schedular.

30. What is spin lock? What are its disadvantages?

31. What is difference between parallelism and concurrency?

Multiprocessor architecture allows the facility of parallel processing. It is most efficient way of programming. Multithreading on a multi-processor system

increase concurrency. Different part of multi-threaded process can be executed simultaneously on different processors.

32. What are the four conditions of deadlock?

1) Mutual exclusion (2) Hold & Wait (3) No preemption (4) Circular wait.

33. Why threads are called lightweight process?

Because it is a sequence of instructions within a process. A thread behaves like a process within a process but it does not have its own PCB.

34. What is swapping?

Swapping is a memory management technique that swaps a process into main memory to execute it and then swaps it out to the backing storage when required.

35. Differentiate between a page and a frame?

(PAGING): Splitting program into a group of equal sized partitions to allow the parts to be noncontiguous.

(FRAME): Frame is a fixed sized block of physical memory. Each block is of same size as page.

36. **Differentiate between internal and external fragmentation?**

Internal fragmentation is the area occupied by a process but cannot be used by the process. External fragmentation exists when total free memory is enough for new process but it's not contiguous and can't satisfy the request. **(long questions)**

Q #2: consider a user program of logical address of size 6 pages and page size is 4 bytes. The physical address contains 300 frames. The user program consists of 22
instructions a, b, c, ...u, v, each instruction takes 1 byte. Assume at that time the first frames are 7,26,52,20,55,6,18,21,70, and 90. find the following?
a) draw the physical and logical maps and page tables?
b) allocate each page in the corresponding frame?
c) find the physical addresses for the instructions m, d, v, r? (page 111,112)
Q #3: a) write a detailed note on process? What is pcb? (page 23,24)
b) define deadlock? Explain multithreading models? (page 41,87) s
Q #4: a) write in detail the critical section problem? (page 67)
b) what is semaphore and its use? (page 72)
Q #5: consider the following page referencesrting:1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3, 6.how many page faults would occur for the following replacement algorithms,
assuming one, two, three, four, five, six, and seven frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.
1) lru replacement
2) fifo replacement
3) optical replacement (page 127,128)
Q #6:
Q. 2: write down the advantages of operating system? Explain uniprocessor and multiprocessor system as well.
Q. 3: explain segmentation and paging. Compare both with advantage and disadvantages?
Q. 4: what is banker's algorithm of deadlock avoidance? Explain
Q. 5:
Q. 6: what could be the possible conditions which can sure that deadlock will not occur? Explain?
b) write a short note on the following.
1)semaphores2) time sharing system
Q #2: a) What are different types of schedulers? Explain. (Page 50)
b) Define threads? Explain multithreading models? (Page 38,41)
Q #3: a) Write a detail note on process? What is PCB? (Page 23,24)
b) What is critical section problem? What conditions should be fulfilled by a solution of critical section problem? Also describes the names of various
solutions of critical section problem. (Page 67)
Q #4:
Q #5: a) What is Deadlock? Explain Deadlock prevention in detail. (Page 87,91)
b) What is Page Map Table? In how many ways it can be structured? Where Page Map Table it is kept. (Page 113)
Q #6: Considers the following page reference string: 1,2,3,4,2,1,5,6,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the following replacement algorithms,
assuming one, two, three, four, five, six, and seven Frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.
1)LRU replacement (128)
2)FIFO replacement (Page 127)
3)Optimal replacement (Page 128)