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Register Number:………….

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Third Semester

COMPUTER SCIENCE AND ENGINEERING

U13CST303: Operating Systems

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Operating system _____
   a) links a program with the subroutines it references
   b) provides a layered, user-friendly interface
   c) enables the programmer to draw a flowchart
   d) all of the above

2. _____ is the name of the technique in which the operating system of a computer executes several programs concurrently by switching back and forth between them.

3. A critical section of a program segment _____
   a) should run in a certain specified amount of time
   b) avoids deadlocks
   c) must be enclosed by the pair of semaphore operations , P and V
   d) where the shared resources are accessed

4. The strategy of allowing processes that are logically runnable to be temporarily suspended is called _____

5. The term "the principle of locality" is used in _____
   a) Memory management
   b) Process management
   c) Device management
   d) File management

6. If the system can allocate resources to each process in some order and still avoid a deadlock, then the system is said to be in _____

7. Which if the following statement is not correct?
   a) Compaction is also known as garbage collection
   b) The techniques of storage compaction involves moving all occupied areas of storage to one end or other of main storage

c) Compaction does not involve relocation of programs	d) The system must stop everything while it performs the compaction	

8. _____never swaps a page into memory unless that page will be needed.

9. The _____ is the time for the disk arm to move the heads to the cylinder containing the desired sector.

a) Seek time	b) Turn around time
c) Waiting time	d) Rotational latency time

10. Devices are added to file system by using _____

PART B (10 x 2 = 20 Marks)
(Not more than 40 words)

11. With an example, Illustrate how system calls are used?

12. List the activities of operating system that is responsible in connection with disk management.

13. What are the techniques used to handle Critical Section problem?

14. A scheduling mechanism should consider various scheduling criteria to realize the scheduling objectives. List atleast three criteria?

15. Assume that a system consists of four resources of same type, they are shared by three processes, each of which needs almost two resources. Show that the system is deadlock free.

16. What is the purpose of page table in paging?

17. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames. How many bits are there in the logical address and physical address?

18. Specify any two types of file access methods?

19. In what way free-space is managed using bit vector implementation?

20. Differentiate constant linear velocity and constant angular velocity in disk structure.

PART C (5 x 14 = 70 Marks)
(Not more than 400 words)

Q.No. 21 is Compulsory

21. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P_1	10	3
P_2	7	1

P₃	2	3
P₄	1	4
P₅	5	2

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0.

    a. Draw four Gantt charts illustrating the execution of these processes using First Come First Served, Shortest Remaining Time First, a non-preemptive priority (a smaller priority number implies a higher priority), and Round Robin (quantum = 2) scheduling.

    b. What is the turnaround time of each process for each of the scheduling algorithms?

    c. What is the waiting time of each process for each of the scheduling algorithms?

    d. Which of the schedules result in the minimal average waiting time (over all processes)?

22. a) (i) State and explain the different mechanism for Inter process communication. (10)

    (ii) Define the essential properties of the Distributed operating system. (4)

(OR)

b) (i) Discuss in detail the services provided by the operating system. (10)

    (ii) Outline the approaches available for users to interface with the operating system. (4)

23. a) (i) Explain about the Banker's algorithm for deadlock avoidance. (7)

    (ii) What are the four necessary conditions to prevent deadlock? Elaborate an approach to prevent the occurrence of a deadlock by examining each of the conditions separately. (7)

(OR)

b) (i) What is paging? Describe the basic method of paging. Explain the structure of page table and its types in detail. (8)

    (ii) Why are segmentation and paging sometimes combined into one scheme? Justify your answer. (6)

24. a) (i) Briefly explain about the single and two level directory structures. (10)

    (ii) Write about the protection strategies provided for files. (4)

(OR)

b) (i) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? (5)

    (ii) Consider the following page reference string (9)

6, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 6, 0, 1

How many page faults would occur for the following replacement algorithms:

LRU, FIFO, and Optimal assuming three frames that all frames are initially empty.

25. a) (i) Describe various disk scheduling algorithms. Is disk scheduling, other than (8) FCFS scheduling, useful in a single-user environment? Explain your answer.

   (ii) How linked allocation of disk space is different from indexed file allocation. (6) Illustrate with example how indexed allocation method utilizes the disk space effectively.

(OR)

   b) (i) Why rotational latency is usually not considered in disk scheduling? (4)

   (ii) What is swap space management? Mention the importance of swap-space (10) management.

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