BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – B.Tech in Computer Science & Engineering

Course Name – Operating System

Course Code – BCSE302

(Semester – 3)

Time allotted: 3 Hours   **Full Marks: 70**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)   10 x 1 = 10

1. *Choose the correct alternative from the following*

(i)   Translation look aside Buffer is a kind of
   a. interrupt   b. virtual memory
   c. cache   d. I/O device

(ii) A critical section is a program segment
   a. which avoids deadlock
   b. which should run in a certain specified amount of time
   c. which shared resources that are accessed
   d. which must be enclosed by a pair of semaphores operation, *p* and *v*.

(iii) Banker's algorithm solves the problem of
   a. Deadlock avoidance   b. Context switching
   c. Deadlock recovery   d. Mutual exclusive

(iv) Address generated by CPU is generally referred to as
   a. Logical   b. Virtual
   c. Relational   d. Physical

(v)   Time Sharing Operating system has
   a. High throughput   b. Low execution time
   c. Faster I/O   d. None of these

(vi) Paging suffers from

    a. Internal fragmentation   b. Internal fragmentation

    c. Both (a) and (b)   d. Both (a) and (b)

(vii) Main function of linker is

    a. Relocation   b. Linking

    c. Both (a) & (b)   d. Loading

(viii) Part of a program where the shared memory is accessed and which should be executed indivisibly, is called

    a. Semaphores   b. Directory

    c. Critical section   d. Mutual Exclusion

(ix) Which of the following algorithm generally suffers from Belady's anomaly

    a. Optimal   b. Termination

    c. FIFO   d. Interruption

(x) What is the purpose of Resource allocation graph?

    a. To represent deadlock   b. To detect deadlock

    c. To avoid deadlock   d. To prevent deadlock

Group – B

(Short Answer Type Questions)   3 x 5 = 15

Answer any *three* from the following

2. (a) What is Process? [1]

   (b) What are the five major activities of an operating system with regard to process management? [2]

   (c) Describe the differences among short-term, medium-term, and long-term scheduling. [2]

3. (a) What is Operating System? [1]

   (b) Explain the functions of Operating System. [2]

   (c) What is the difference between multi programming and multitasking operating System? [2]

4. (a) What is overlays? [1]

   (b) Consider six memory partitions of size 200KB, 400KB, 600KB, 500KB, 300KB and 250KB. These partitions need to be allocated to 4 processes sizes 375KB, 210KB, 468KB, and 491KB in that order. If the best fit algorithm used which partitions are not allowed in any process? [4]

5. (a) How demand paging increase the degree of multiprogramming? [2]

   (b) If an instruction takes 'i' microsecond and page fault takes additional j microsecond. What is the effective instruction time if the average a page fault occur every 'k' instruction? [3]

6 (a) What is Seek time?   [1]

   (b) What is rotational latency?   [2]

   (c) How bad sector management manage bad sector?   [2]

Group – C

(Long Answer Type Questions)   3 x 15 = 45

Answer any *three* from the following

7. (a) What are the necessary conditions to handle the deadlock in the system?   [4]

   (b) Explain the resource-request algorithm to avoid deadlock from the system.   [4]

   (c) Consider the following snapshot of the system:

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

Answer the following questions using banker's algorithm:

   (i)   What is the content of Need Matrix?   [3]

   (ii) Is the system in safe state?   [4]

8. (a) What is critical section problem?   [2]

   (b) Explain "mutual exclusion" as a solution of the critical section problem.   [3]

   (c) Explain the algorithm of Dining Philosopher problem as a classical problem of
        process synchronization.   [5]

   (d) Consider the following set of process. CPU burst time of them are given in
        milliseconds.

Process	CPU Burst Time
P_1	15
P_2	5
P_3	7
P_4	10

Draw the Gantt chart for FCFS and RR Scheduling where time quantum q = 5
milliseconds. Calculate the average waiting time.   [5]

9.
   (a) Suppose a disk is having 200 cylinders numbered from 0 to 199. The disk is currently servicing at cylinder 53 and previous request was at cylinder 60. The queue of pending request order is 98, 183, 37, 122, 14, 124, 65 and 67. Calculate the total distance that read / write head will traverse using FIFO, SCAN and C-SCAN disk scheduling algorithm.   [5]

   (b) A 1000KB memory is managed using variable partitions but no compaction. It currently has two partitions of size 200KB and 260KB respectively. What is the smallest allocation request in KB that could not be defined?   [5]

   (c) The address sequence generated by tracing a particular program executing in a pure demand paging system with 100 records per page with one free main memory frame is recorded as follow. What is the number of page fault? Address sequences are 0100, 0200, 0430, 0499, 0510, 0530, 0560, 0120, 0220, 0240, 0260, 0320, 0370   [5]

10. (a) A disk has 200 tracks (numbered 0 through 199). At a given time, it was servicing the request of reading data from track 120, and at the previous request, services was the track 90, the pending requests (in order of their arrival) are for track number. 30, 70, 115, 130, 110, 80, 20, 25. How many times will the head change its direction for the disk scheduling policies SSTF and FCFS?   [6]

   (b) Explain the PC Bus Structure with proper diagram.   [4]

   (c) Explain the various types of Address binding with real life example.   [5]

11. Write a short note of any three of the following.   [3x5]

   (a) Semaphore

   (b) Simple Structure vs. Layered Structure of Operating System

   (c) Virtual Machine

   (d) Logical vs. Physical address space

   (e) I-Node