

**B. C. S. E. 3<sup>rd</sup> year 1<sup>st</sup> Semester Supplementary Examination 2017****OPERATING SYSTEM**

Time: 3 hours

Full Marks: 100

Answer Question no.1 and any four from the rest

(All parts of the same question must be answered together)

- 1.
- What is response time?
  - What are the necessary conditions of deadlock?
  - What are the advantages and disadvantages of First Come First Served (FCFS) scheduling strategy?
  - What operations are performed on semaphore?
  - Explain the concept of best fit and worst fit strategies.

3+6+4+3+4

- 2.
- What are the contents of Process Control Block (PCB)?
  - Consider a system with four processes as shown below with corresponding arrival time and execution time:

Process	Arrival time	Execution time
P <sub>0</sub>	0	6
P <sub>1</sub>	2	8
P <sub>2</sub>	4	5
P <sub>3</sub>	6	9

Calculate waiting time and turnaround time of each process using First-Come First-Served (FCFS) scheduling policy. Show the scheduling decisions using Gantt chart.

- How will Round Robin scheduling behave if the CPU time slice is considerably large?
- What are the disadvantages of Shortest Remaining Time Next (SRTN) scheduling?

4+10+3+3

- 3.
- Consider the following page reference during a given time interval for a memory consisting of 3 frames : 1, 8, 2, 0, 14, 2, 8, 8, 2, 14, 0, 14. Using both First-In First-Out (FIFO) and Least Recently Used (LRU) page replacement strategies show the contents of memory each time a page is referenced. Compare the number of page hits for both cases. Do you get a result that you expect? Why or why not?

Q3 contd.

- b. What are the advantages and disadvantages of demand paging? How is Translation Look aside Buffer (TLB) used?

12+8

4.

- a. Compare Indexed File Allocation strategy with Linked File Allocation strategy.  
 b. Consider a file system using inodes for file representation. Disk blocks are 16KB and a pointer to a block requires 8 bytes. The inode contains 16 direct blocks, and a single indirect disk block. What is the maximum size of a file supported by this file system?  
 c. What is bit-vector presentation of free disk space management? What are its problems?  
 d. How is space allocated using Contiguous File Allocation strategy? What problems may arise?

6+4+5+5

5.

- a. What is seek time?  
 b. Disk requests come into the disk driver for cylinders 90, 135, 63, 119, 49, 75, 144, 168, 52, 89 in that order. A seek takes 2 msec per cylinder move. What is the total seek time to access the above requests for First-Come First-Served (FCFS) disk scheduling strategy? Disk arm is initially at cylinder 55.  
 c. Compare Circular SCAN disk scheduling strategy with SCAN disk scheduling strategy.  
 d. Compare the best fit, worst fit and first fit strategies for dynamic memory allocation. What is memory compaction?

3+6+4+7

6.

- a. Consider the following snapshot of 4 resources (R1, R2, R3, R4) in a system with 4 processes; P<sub>0</sub>, P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>.

	Allocated				Maximum Requirement				Available			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P <sub>0</sub>	2	1	0	2	3	2	0	4	6	8	5	7
P <sub>1</sub>	0	2	1	3	2	3	3	5				
P <sub>2</sub>	1	1	2	1	4	3	5	2				
P <sub>3</sub>	2	2	2	2	2	5	4	3				

- (i) What are the further requirements of each of the processes?  
 (ii) Find out whether the system is in *safe* state or not. Show the working of the algorithm/s. What is the safe sequence of processes, if any, in this case?

Q6 contd.

(iii) Suppose there is request from  $P_1$  for 2 more instances of R3. Show whether this request could be granted.

b. Explain the conditions to be satisfied for solutions to mutual exclusion problem. How can *Hold and Wait* condition be prevented?

12+8

7.

a. What information does a thread have? What are the different threading models?

b. Explain the process state transition diagram.

c. Compare and contrast segmentation and paging.

6+7+7

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