8/6/14

Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

End Semester Examination

April/May 2018

Max. Marks: 100 — Duration: 3 Hours

Class: S.E. — Semester: IV

Course Code: CE43/IT44 — Branch:Computer/IT

Name of the Course: Operating Systems

Instruction:

(1) All questions are compulsory

(2) Draw neat diagrams

(3) Assume suitable data if necessary

Q No.		Max. Marks	CO
Q.1 (a)	Explain multiprogramming operating system with neat diagram.	05	CO1
Q.1 (b)	Write any four advantages and one disadvantage of layered architecture of operating system.	05	CO1
Q.2 (a)	For the process parameters in the table below, find average waiting time and average turnaround time for FCFS and preemptive SJF scheduling algorithms.	10	CO2

Process	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	8

OR

Assume the following processes arrive for execution at the time indicated and the length of CPU burst time given in ms.

Job	Burst Time	Priority	Arrival Time
P1	19	3	0
P2	10	2	2
P3	7	1	4

For the process parameters in the table above, find average waiting time and average turnaround time for non-preemptive and preemptive priority scheduling scheduling algorithms for time slice 5. Lower number indicates higher priority.

Q.2 (b)	Differentiate between user level thread and kernel level thread for 5 different points.	05	CO2
Q.2 (c)	Explain multilevel feedback queue scheduling with neat diagram.	05	CO2

<table>
<tr><td>Q.3 (a)</td><td>Consider the following state of a system and answer the following questions:
<table><tr><th>Process</th><th>Max</th><th>Allocation</th><th>Available</th></tr><tr><td></td><td>A B C D</td><td>A B C D</td><td>A B C D</td></tr><tr><td>P0</td><td>6 0 1 2</td><td>4 0 0 1</td><td>3 2 1 1</td></tr><tr><td>P1</td><td>2 7 5 0</td><td>1 1 0 0</td><td></td></tr><tr><td>P2</td><td>2 3 5 6</td><td>1 2 5 4</td><td></td></tr><tr><td>P3</td><td>1 6 5 3</td><td>0 6 3 3</td><td></td></tr><tr><td>P4</td><td>1 6 5 6</td><td>0 2 1 2</td><td></td></tr></table>Using Banker's algorithm, answer the following questions:-
i) How many total instances of the resource types A, B, C, D are there?
ii) What are the contents of need matrix?
iii) Find if the system is in safe state? If it is, find the safe sequence.</td><td>10</td><td>CO3</td></tr>
<tr><td>Q.3 (b)</td><td>Describe deadlock prevention by breaking circular wait condition.

OR

Explain test and set construct to solve critical section problem with example(pseudo code).</td><td>05</td><td>CO3</td></tr>
<tr><td>Q.3 (d)</td><td>State dining philosopher's problem. Solve by writing pseudo code and explain the dining philosopher's problem solution using Monitors.

OR

State sleeping barber problem. Solve it by writing pseudo code using Semaphores and explain the same.</td><td>10</td><td>CO3</td></tr>
<tr><td>Q.4 (a)</td><td>A paging system has the following parameters: 2^{31} bytes of physical memory; page size of 2^{10} bytes; 2^{16} pages of logical address space.
1. How many bits are in a logical address?
2. How many bytes are in a frame?
3. How many bits are in the physical address specifying the frame number?
4. How many entries in the page table?
5. How many bits in each page table entry? Assume each page table entry contains valid/invalid bit.

OR

If cost of accessing main memory is 100 ns and TLB hit ratio is 90%. What is the cost of accessing the TLB if the effective memory access time is 119ms.</td><td>05</td><td>CO4</td></tr>
<tr><td>Q.4 (b)</td><td>Explain memory allocation techniques with neat diagram and example.</td><td>10</td><td>CO4</td></tr>
</table>

Q.4 (c)	Given page reference string : 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Calculate total number of page faults using optimal page replacement policy using 4 frames.	5	CO4
Q.5 (a)	Given the following queue: 95, 180, 34, 119, 11, 123, 62, 64 with the read-write head initially at the track 50 and the tail track being at 199. Calculate total head movement and average seek length using FCFS and C-SCAN disk scheduling algorithm when head is moving towards decreasing track number.	10	CO5
Q.5 (b)	Compare sequential and index sequential file organization method with neat diagram. **OR** What is record blocking? Explain three methods of record blocking with neat diagram.	10	CO6
Q.5 (c)	Explain any five objectives of file management system.	05	CO6