POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2021
Programme: BE | Full Marks: 100
Course: Operating System | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is an operating System? Discuss the main advantage for an operating system designer for using virtual machine architecture. Give the main advantage for user. 8

   b) Write advantages of threads over processes. How multiprocessor system can be effectively utilized with threads? Explain with example. 7

2. a) What is test and set instruction? Explain producer–consumer problem and algorithm for resolving it using monitor. 8

   b) Consider the deadlock situation that could occur in the dining philosophers' problem when the philosophers obtain the chopstick one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. Discuss how deadlock could be avoided by eliminating any one of the four conditions. 7

3. a) Write advantages of threads over processes. Explain the advantage of multithreading. 8

   b) Given the following information, draw the GANTT charts for processor scheduling for HRRN, Preemptive Shortest Job First and RR (Quantum=2). Also, find the average waiting time, average turnaround time and average response time for all the cases. 7

Process	Arrival Time	Burst Time
P1	0.0	7
P2	3.0	4
P3	5.0	2
P4	6.0	4

4. a) What is thrashing? Consider the following page reference strings: 2,3,3,4,5,6,5,7,1,2,5,8,6,4,1. How many page faults would occur for each of the following page replacement algorithms assuming 3 pages frames? 8

   i. LRU page replacement
   ii. FIFO page replacement
   iii. Optimal page replacement

   b) Define swapping. Explain contiguous and non-contiguous memory allocation scheme with their advantages and disadvantages. 7

5. a) Suppose a disk drive has 2000 cylinders, numbered 0 to 1999. The drive is currently serving a request at cylinder 134 and the previous request was at cylinder 124. The queue of pending requests in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 8

   Starting from the current head position what is the total distance that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?

   i) FCFS ii) SSTF iii) SCAN iv) CSCAN

   b) What is file system implementation? Explain link list and i-node file system implementations. 7

6. a) What is distributed operating system? Explain advantage of distributed system over independent PC. 7

   b) Explain file and disk management in LINUX. 8

7. Write short notes on: (**Any two**) 2×5

   a) Context Switching
   b) Internal vs External Fragmentation
   c) Multilevel feedback queues