

POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2017
 Programme: BE Full Marks: 100
 Course: Applied 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) Define time sharing system. Describe various services provided by an operating system. Describe the actions taken by a Kernel to switch context between processes? 7
- b) How is a thread different from a process? Describe in detail about the different state transition model of a process. 8
2. a) Let five processes; A, B, C, D and E be on queue in a scheduler. They arrived in the queue at the instance; 0ms, 3ms, 3ms, 6ms, and 9ms respectively. The time they require to complete is 2 ms, 5ms, 10ms, 4ms, and 4ms respectively. Using FCFS, STRF and RR (quantum=2ms), evaluate the given scenario. On the basis of average wait time, average response time and average turnaround time, which algorithm is suitable? Describe. 8
- b) What is a race condition? Give an example of a race condition that could possibly occur when buying airplane tickets for two people to go on a trip together. 7
3. a) Consider the deadlock situation that could occur in the dining-philosophers' problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. Discuss how deadlocks could be avoided by eliminating any one of the four conditions. 7
- b) Explain the different File Access Methods? Describe the different issues associated with contiguous file allocation. 8
4. a) What are page replacement algorithms? Find out how many page faults occur in the following sequence of the reference string using FIFO, OPR, MRU page replacement algorithms using 4 frames. 7,0,3,6,8,1,2,3,7,5,0,2, 3,7,1,3,1,4, 6, 4, 7,0,5,3,1,7. 8

- b) What is preemptive and non-preemptive scheduling algorithm? Explain Multi level queue and multi-level feedback queue scheduling with appropriate example. 7
5. a) Disk request come to the disk driver for cylinder 26, 18, 10, 66, 92, 38, 74 and 31 in that order. A seek take 2 micro sec per cylinder move. How much seek time is needed using: (Assume no. of cylinders: 100) 8
 - i. FCFS
 - ii. Closest Cylinder Next (SSTF)
 - iii. C-Scan (Initially moving upward)
 - iv. Look (Initially moving downward)
- b) What are tertiary storage devices? Explain about any two such devices. 7
6. a) Describe Coalescing and compaction. Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use memory. 8
- b) Explain directory structure and its types. Explain about access control list (ACL). 7
7. Write short notes on: (Any two) 2×5
 - a) System call
 - b) DMA and Polling
 - c) Demand Paging