POKHARA UNIVERSITY

Level: Bachelor Semester:Fall Year : 2020
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) What is an Operating System and how can it be used as a user interface? Explain with suitable diagram. Define multiprogramming, spooling in operating system. 8

   b) What is the critical section? What are the minimum requirements that should be satisfied by a solution to critical section problem? 7

2. a) What are semaphores? Explain solution to producer-consumer problem using semaphores. 7

   b) From the following set of informations, Compare the average waiting time and average turn-around time using FCFS, SJF(preemptive and non-preemptive), RR(quantum=2). 8

Process	Arrival Time	Burst Time
P1	0	10
P2	1	6
P3	2	12
P4	3	15

3. a) Define IPC. What are different methods used for logical implementations of message passing systems. 7

   b) Explain the algorithm of Resource Allocation Graph. Consider a system with three processes (P0-P2) and four allocable resources (A, B, C, D). The total four resources types in the amount as E= (4,2,3,1). The current allocation matrix and request matrix are as follows. 8

   Using Banker's algorithm find:

   i) What will be the context of need matrix?

   ii) Is the system in safe state? If yes, then what is the safe state sequence?

Current Allocation Matrix					Allocation Request Matrix				
Process	A	B	C	D	Process	A	B	C	D
P0	0	0	1	0	P0	0	1	2	1
P1	2	0	0	1	P1	0	0	1	0
P2	0	1	2	0	P2	1	0	2	0

4. a) Define page fault. How many page fault occur for the following reference string for four page frame using Optimal page replacement and LRU algorithms? reference string : 1,3,1,5,7,7,3,7,4,9,8,1,6,3,4,2,5,8 7

   b) Explain about Fixed partition and Variable partition. Consider a swapping system in which memory space is as: 8
   400, 700, 1200,250,300 bytes.
   File sizes are as: 900, 25, 600, 200, 300 bytes
   Find the total fragmentation using
   (i) First Fit (ii) Next fit (iii) Best fit (iv) Worst fit

5. a) Suppose the following request queue (in order): 74, 168, 23, 109, 10, 122, 59, 62 with the head initially at track 48 and the trail track being at 174. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms? 8

   i. FCFS
   ii. SSTF
   iii. SCAN (initially moving downward)
   iv. C-SCAN (initially moving upward

   b) Differentiate between Paging and Segmentation. Explain inverted page table. 7

6. a) What are the three different ways to do input- output? Explain all. 8
   b) What are the different methods used for accessing a file? Compare and contrast all the methods and explain which method is best in term of fast execution of the file. 7

7. Write short notes on: (**Any two**) 2×5
   a) RAID
   b) Direct Memory Access
   c) PCB
   d) Interrupt handling