

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Operating System

Semester: Spring

Year : 2014
Full Marks: 100
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 are time sharing, parallel and real-time operating systems? 8
Discuss their characteristics.
- b) Do you think a process can exist without any state? Justify your view 7
with the help of process state transition diagram and PCB.
2. a) A barber has N chairs in its waiting room and the hair-cutting cabin has 8
just one chair to serve one customer at a time. If there are no customers in the shop, the barber goes to sleep. When a customer arrives, the following happens:
 - If there is other customer and the barber is sleeping, the customer wakes up the barber
 - If the barber is busy with other customer and at least one chair is vacant in the waiting room, the customer occupies one chair in the waiting room and waits for its turn
 - If the barber is busy and no chair is vacant in the waiting room, the customer goes away, without getting service. Write an algorithm to coordinate the barber and the customer.
- b) What is cooperative process threading? How does process differ with 7
thread? Discuss at least one multithreading model with its advantages and disadvantages
3. a) What is memory management? Explain memory hierarchy. 5
- b) Consider following set of processes along with their burst time, arrival 10
time and priorities. Calculate average waiting time and average turnaround time using following scheduling algorithms.
 - i. FCFS
 - ii. SJF

iii. Priority (Preemptive)

iv. HRRN

| Process | Arrival Time | Burst Time | Priority |
|---------|--------------|------------|----------|
| A | 0 | 3 | 5 |
| B | 2 | 6 | 4 |
| C | 4 | 4 | 1 |
| D | 6 | 5 | 3 |
| E | 8 | 2 | 2 |
| F | 3 | 4 | 1 |

- a) Differentiate virtual page and a page frame. What is the difference between LRU and NRU page replacement algorithms? 7
- b) Suppose a disk drive has 5500 cylinders, numbered 0 to 5499. The drive is currently serving a request at cylinder 2243 and the previous request was at cylinder 1125. The queue of pending requests in FIFO order is 586, 1470, 1913, 1774, 5348, 1509, 5022, 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. Closest Cylinder Next

iii. C-Scan (Initially moving upward)

iv. Scan (Initially moving downward)

5. a) What is distributed operating system? Explain advantages and disadvantages of distributed operating system. 8
- b) What is the difference between absolute and relative path name of a file? What criteria should be used to decide which strategy? (Contiguous, linked, indexed, allocation) is best utilized for a particular file? 7
6. a) Describe the process management scheme in either Linux or Microsoft-Windows OS. 7
- b) Discuss the working principles and advantages of Direct Memory Access 8
7. Write short notes on: (Any two) 2x5
- a) File access methods
- b) The Shell
- c) Types of Kernel.