**Tribhuvan University**

**Institute of Science and Technology**

**2078**

Bachelor Level / fourth-semester / Science

Computer Science and Information Technology( CSC259 )

Operating System

Full Marks: 60 + 20 + 20

Pass Marks: 24 + 8 + 8

Time: 3 Hours

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

The figures in the margin indicate full marks.

**Long Answer Questions**

**Attempts any two Questions (2 x 10 = 20)**

1

What kind of problem arises with sleep and wakeup mechanism of achieving mutual exclusion? Explain with suitable code snippet.

2

Why OPR is best but not practically feasible page replacement algorithm? Calculate the number of page faults for OPR, LRU and Clock page replacement algorithm for the reference string: 1, 3, 4, 2, 3, 5, 4, 3, 1, 2, 4, 6, 3, 2, 1, 4, 2. Assume the memory size is 3.

3

How unsafe state differs from deadlocked state? Consider follows initial state and identify whether requested is and granted or denies for the given cases.

|  |  |  |
| --- | --- | --- |
| Process | Has | Max |
| A | 2 | 6 |
| B | 1 | 5 |
| C | 2 | 3 |
| D | 3 | 8 |

*Free = 2*

* What will happen if process D request 1 resource?
* What will happen if process A request 1 resource?

**Short Answer Questions**

**Attempts any eight questions (8 x 5 = 40)**

4

What is system call? Discuss process of handling system calls briefly.

What is lock variable? Discuss its working and problems associated with it in detail.

Differentiate between internal and external fragmentation? Suppose that we have memory of 100 KB with 5 partitions of size 150 KB, 200 KB, 250 KB, 100 KB, and 300 KB. Where the processes A and B of size 175 KB and 125 KB will be loaded, if we used Best-Fit, and Worst-Fit Strategy?

7

What is meant by file attributes? Discuss any one technique of implementing directories in detail.8

Why the concept of disk interleaving is important? Explain with suitable example.

What is resource allocation graph? Explain the process of detecting deadlocks when there is single instance of each resources with suitable example

Discuss the concept of SJF and SRTN scheduling algorithms with suitable example.

What approaches are using for managing free disk spaces? Explain linked list approaches with example.12

Write short notes on:

1. IPC in Linux
2. Disk access