

# CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Fourth Semester of B. Tech (CE) Examination

Apr-May 2018

CE248/CE221.01/ CE221 Operating System

Date: 07.05.2018, Monday

Time: 10.00 a.m. To 01.00 p.m.

Maximum Marks: 70

**Instructions:**

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make and Mention suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

## SECTION – I

**Q - 1 Do as Directed.**

- (a) Draw and explain process state-transition diagram with suspended state. [04]
- (b) List basic services of an Operating System. [02]
- (c) In a Linux system, if the process has been terminated but, for some reason, still must have its task structure in the process table is in the \_\_\_\_\_ state. [01]

**Q - 2 Answer the following questions. (Attempt Any Three)** [12]

- (a)
  - 1) Is the process before and after the swap are the same? Give reason.
  - 2) Explain monolithic kernel architecture with proper diagram.
  - 3) Shows address translation in a segmentation system using virtual memory? Explain with a proper diagram.
  - 4) Why is it necessary to have at least two modes of operation i.e. user mode and kernel mode in a computer system?
  - 5) Differentiate between Internal and External memory fragmentation.
- (b) Give comparison of non-preemptive and preemptive scheduling. [02]

**Q – 3 Answer the following questions.**

- (a) Consider the following page reference string: [06]

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

How many page faults would occur for LRU and FIFO page replacement algorithms, assuming 4 frames? (Pure Demand Paging)

- (b) What is critical section? What three conditions must be satisfied in order to solve the critical section problem? Explain each in detail. [04]
- (c) Consider two programmers who are working on a joint project and want to store related file in a directory for easy search. Briefly explain the suitable directory structure. [04]

**OR**

- (b) Explain working flow of producer-consumer problem using semaphore. [04]
- (c) What are the benefits of multithreaded programming? Also explain about TCB (Thread Control Block). [04]

## SECTION – II

**Q - 4 Answer the following questions.**

- (a) What is file and file system with respect to Operating system? Enumerate different types of the files in operating system. [04]
- (b) Give the difference between multiprogramming and multiprocessing. [03]

**Q - 5 Answer the following questions.**

- (a) Consider the following snapshot of a system: [08]

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
<b>P0</b>	0	0	1	2	0	0	1	2	1	5	2	0
<b>P1</b>	1	0	0	0	1	7	5	0				
<b>P2</b>	1	3	5	4	2	3	5	6				
<b>P3</b>	0	6	3	2	0	6	5	2				
<b>P4</b>	0	0	1	4	0	6	5	6				

Using Banker's algorithm,

- Determine whether the system is in a safe state or not.
  - Decide whether a request from process P1 for resources A B C D (0, 4, 2, 0) should be granted immediately or not.
- (b) What is deadlock? What are the conditions for deadlock to occur? [04]
- (c) What is the difference between system call and system program? [02]

**OR**

- (b) Compare I/O based on polling with interrupt-driven I/O. In what situation any one technique is preferable over the other? [04]
- (c) Lists file allocation methods. Explain any one in brief. [02]

**Q - 6 Answer the following questions.**

- (a) Consider the following set of process in order P1, P2, P3, P4, P5 and P6 with the length of the CPU burst time given in milliseconds. Draw Gantt Chart and calculate turn round time using following scheduling algorithms. [06]

(1) Round Robin(TQ=2ms)

(2) SRTF

Process	Arrival Time	Burst Time
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

- (b) Suppose a disk has 5000 cylinders, numbered 0 to 4999. [06]

The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending request in FIFO order is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750 and 130.

Find total head movement using FCFS, SSTF and SCAN disk scheduling algorithm.

- (c) What is thrashing? When does it occur in system? [02]

**OR**

- (c) Define i-nodes (Index Node). [02]

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