Code No: R1631055 **R16** SET - 1

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2019

OPERATING SYSTEMS

(**Common to** Computer Science and Engineering, Information Technology)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A (14 Marks)

1. a) Explain the importance of Real-Time Embedded systems. [2M]
   b) Define Cooperating process? What is the environment need in Cooperating processes? [3M]
   c) What is Critical Section Problem? [2M]
   d) Write the difference between internal and external fragmentation. [2M]
   e) Define the Safe, unsafe, and deadlock state spaces. [3M]
   f) List the components of LINUX? [2M]

PART –B (56 Marks)

2. a) What is meant by interleaving and overlapping with respect to multi programming and multi processing? Explain. (Assume system have two user processes). [8M]
   b) Explain the Time-shared operating system. [6M]

3. For the processes listed below, evaluate Average Waiting Time and Average Turnaround Time for: i) FCFS ii) SJF iii) SRT iv) Non-Preemptive Priority v) Preemptive Priority vi) RR(Q=2). [14M]

Processes	A.T	B.T	Priority
A	0.0000	5	4
B	2.0001	4	2
C	2.0001	2	6
D	4.0001	4	3

4. a) What is paging? Explain its structure for 32 -byte memory with 4-byte pages. [6M]
   b) What is effective access time? Compute it for 70% hit ratio, 20 ns to search TLB and 100 ns to access memory. Observe the difference when it is changed to 90% hit ratio. [8M]

5. a) Explain the usage and structure of monitors with an example. [6M]
   b) Explain Banker's deadlock-avoidance algorithm with an illustration. [8M]

6. a) List out the various methods for free-space management and explain them. [6M]
   b) Give a brief note on Disk scheduling algorithms. [8M]

7. a) Explain Android Process Management. [7M]
   b) Explain IPC mechanism in LINUX. [7M]

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Time: 3 hours Max. Marks: 70

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PART –A (14 Marks)

1. a) What are Operating-System Services? [2M]
   b) Identify the situations for Preemption of a process. [2M]
   c) Define Busy Waiting? How to overcome busy waiting using Semaphore operations. [3M]
   d) What is Deadlock? [2M]
   e) Write short note on demand paging. [3M]
   f) What are the various attributes that are associated with an opened file? [2M]

PART –B (56 Marks)

2. a) Explain different categories of System calls with suitable examples. [7M]
   b) Explain briefly Layered Operating system structure with neat sketch. [7M]

3. a) What are the differences between user-level threads and kernel-level threads? [7M]
   b) Consider the following four processes represented as (Process, Arrival Time, Burst Time) with the length of CPU burst in milliseconds. [7M]
   { (P1, 0, 10), (P2, 1, 7), (P3, 2, 13), (P4, 3, 11) }. Using preemptive SJF scheduling: i) Draw Gantt chart. ii) Calculate average waiting time.

4. a) Given memory partitions of 500 KB, 100 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Which algorithm makes the most efficient use of memory? [7M]
   b) Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames. Trace FIFO, optimal, and LRU page replacement algorithms. [7M]

5. a) Write about Characterization of deadlock by resource allocation graph. [7M]
   b) What is semaphore? Why it is important? Suggest the solution for bounded buffer problem with semaphores. [7M]

6. a) Discuss in detail about different file access methods. [6M]
   b) Differentiate SCAN, C-SCAN and LOOK, C-LOOK disk scheduling algorithms with an example. [8M]

7. a) Explain process synchronization in **Linux**? [7M]
   b) Explain Dalvik virtual machine in Android? [7M]

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Code No: R1631055 **R16** SET - 3

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2019

OPERATING SYSTEMS

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Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A (14 Marks)

1. a) Define Operating System. [2M]
   b) Define System Call? List out any four Process Control System Calls. [3M]
   c) What are the functions of mutex semaphore? [2M]
   d) Discuss the usage of wait-for graph method. [3M]
   e) What is meant by hit ratio? Explain. [2M]
   f) Define boot block. How it initiated from disk? [2M]

PART –B (56 Marks)

2. a) Distinguish between client-server and peer-to-peer models of distributed systems. [7M]
   b) Explain the Dual-Mode operation of an operating system. [7M]

3. a) What is IPC? Explain in detail the inter process communication models. [7M]
   b) Perform Non-Preemptive CPU scheduling algorithms on the given snapshot and analyze their performance: [7M]

Process	Arrival Time	Burst Time
1	0	3
2	2	6
3	4	4
4	6	5
5	8	2

4. a) What is a page fault? Explain the steps involved in handling a page fault with a neat sketch. [7M]
   b) Explain the concept of segmentation in detail. [7M]

5. a) Consider the following and find out the possible resource allocation sequence with the help of deadlock detection algorithm processes: p0, p1, p2, p3, p4, Resources A, B, C Allocation [0 1 0, 2 0 0 , 3 0 3, 2 1 1, 0 0 2] Max[0 0 0, 2 0 2, 0 0 0, 1 0 0, 0 0 2] Available[0 0 0]. [8M]
   b) What is critical section problem? Explain about requirements that must satisfy for a solution to the critical-section problem. [6M]

6. a) Briefly explain about single-level, two-level and Tree-Structured directories. [7M]
   b) Explain and compare the FCFS and SSTF disk scheduling algorithms. [7M]

7. a) Discuss the LINUX components system. [7M]
   b) Explain the architecture of Android OS. [7M]

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Code No: R1631055 **R16** SET - 4

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OPERATING SYSTEMS

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Time: 3 hours Max. Marks: 70

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3. Answer any **FOUR** Questions from **Part-B**

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PART –A (14 Marks)

1.	a)	Explain how multiprogramming increases the utilization of CPU?	[2M]
	b)	Define short-term, medium-term, and long-term scheduling.	[3M]
	c)	Distinguish between counting and binary semaphores.	[2M]
	d)	Define dead locks with example.	[3M]
	e)	Explain the bit vector representation of free space management.	[2M]
	f)	What is Android Software?	[2M]

PART –B (56 Marks)

2.	a)	List and briefly describe types of operating systems.	[7M]
	b)	Write about monolithic kernel, layered kernel, and micro kernel structures of operating systems.	[7M]
3.	a)	Explain different process states with neat sketch.	[7M]
	b)	Explain the Round Robin scheduling algorithm with a suitable example.	[7M]
4.	a)	What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?	[7M]
	b)	Consider the following page reference string: 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 the optimal page replacement algorithm, assuming three frames and all frames are initially empty.	[7M]
5.	a)	Explain about software-based Peterson's solution to the critical-section problem.	[7M]
	b)	What are the necessary conditions for a Deadlock? Discuss.	[7M]
6.	a)	Explain the following concepts with respect to file: i) File operations ii) File Structures iii) File Types.	[7M]
	b)	Discuss in detail the file allocation techniques: Sequential, Indexed and Linked.	[7M]
7.	a)	Explain life cycle of android application.	[7M]
	b)	Discus about interrupt mechanism in LINUX.	[7M]

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