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SET - 1

III B. Tech I Semester Regular Examinations, October/November - 2018
OPERATING SYSTEMS
(**Common to** Computer Science 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

1.	a)	List out the services provided by an operating system.	[2M]
	b)	List Fields of Process Control Block.	[2M]
	c)	What is Virtual Address Space?	[2M]
	d)	What is Resource-Allocation-Graph.	[3M]
	e)	What are the two ways of accessing disk storage?	[3M]
	f)	What is an Activity Stack in Android?	[2M]

PART -B

2.		With a neat sketch, Explain in detail about the interrelation between various services provided by the operating system.	[14M]
3.	a)	Explain in detail, the sequence of actions taken by the operating system to context switch between processes.	[6M]
	b)	Assume the following workload in a system. All jobs arrive at time 0 in the order given.	[8M]

Process	Burst Time	Priority
P1	30	High
P2	28	High
P3	04	Low
P4	16	Medium

Draw a Gantt chart illustrating the execution of these jobs using Priority CPU scheduling algorithm and also Calculate the average waiting time and average turnaround time.

4.	a)	What is a page fault? Explain the steps involved in handling a page fault with a neat sketch.	[7M]
	b)	Explain the process of converting virtual addresses to physical addresses with a neat diagram.	[7M]
5.	a)	What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy.	[7M]
	b)	What is a deadlock? How deadlocks are detected?	[7M]
6.	a)	Briefly explain about single-level, two-level and Tree-Structured directories.	[6M]
	b)	Consider a disk queue with following requests for I/O to blocks on cylinders 30,70,115,130.110,80,20,25　(Assume disk head is at 90) Draw FCFS and SSTF scheduling and also determine how many times the disk head changes its direction for each of the above mentioned scheduling techniques.	[8M]
7.	a)	Discuss the advantages and several disadvantages of open-source Operating systems.	[6M]
	b)	Discuss in detail about Android Runtime Application Development.	[8M]

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PART –A

1.	a)	List out the types of System calls.	[3M]
	b)	What is Multi-Threading?	[2M]
	c)	What is the Cause of Thrashing?	[2M]
	d)	What is Process Synchronization?	[3M]
	e)	What is a device driver	[2M]
	f)	What is the Dalvik Virtual machine in Android?	[2M]

PART -B

2.	a)	Discuss various operating system services that are very much helpful to the user.	[7M]
	b)	What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices?	[7M]
3.	a)	With a neat diagram, explain the process state diagram.	[6M]
	b)	What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain.	[8M]
4.	a)	How demand paging affects the performance of a computer system? Give explanation.	[7M]
	b)	How does the system detect Thrashing? What can the system do to eliminate this problem? Explain.	[7M]
5.	a)	What happens if the wait() and signal() semaphore operations are not executed atomically? Give explanation.	[7M]
	b)	What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.	[7M]
6.	a)	Discuss various file access methods in detail.	[7M]
	b)	Explain about various issues involved in selecting appropriate disk scheduling algorithm.	[7M]
7.		Explain each and every component of the Android architecture with a neat sketch.	[14M]

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PART –A

1.	a)	Define Operating System.	[2M]
	b)	What is Process control block?	[3M]
	c)	Differentiate between Logical and Physical address space.	[3M]
	d)	State the Critical Section problem.	[2M]
	e)	What are the most common attributes that are associated with an opened file?	[2M]
	f)	What is aninode in LINUX?	[2M]

PART -B

2. a) Explain the objectives and functions of Operating system.   [7M]
    b) Explain in detail about the functions of System Call Interface.   [7M]

3. a) Explain the process scheduling with a neat queuing diagram.   [7M]
    b) Assume the following workload in a system. All jobs arrive at time 0 in the order   [7M]
       given.

Process	Burst Time	Order
P1	4	1
P2	5	2
P3	3	3

    Draw a Gantt chart illustrating the execution of these jobs using Round Robin CPU
    scheduling algorithm (Assume time quantum= 1 unit) and also Calculate the
    average waiting time and average turnaround time.

4. a) Explain the difference between External fragmentation and Internal fragmentation.   [7M]
       How to solve the fragmentation problem using paging.
    b) Consider the following page reference string: [7M]
       1,2,4,7,3,5,6,3,6,1,4,2,3,6,5,2
       How many page faults would occur for the optimal page replacement algorithm,
       assuming four frames and all frames are initially empty.

5. a) Discuss Mutual-exclusion implementation with Test And Set () instruction.   [7M]
    b) Discuss various techniques to recover from the deadlock.   [7M]

6. a) Explain in detail about various ways of accessing disk storage.   [4M]
    b) Explain the various methods for free-space management.   [10M]

7. a) How Interrupts and Exceptions are handled in LINUX? Explain.   [7M]
    b) Explain about the process lifecycle in Android.   [7M]

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PART –A

1.	a)	Draw the Layered structure of Operating system.	[2M]
	b)	When a process creates a new process, what is shared between parent process and child process?	[2M]
	c)	List the disadvantages of single contiguous memory allocation.	[2M]
	d)	What is Counting semaphore.	[3M]
	e)	Write about Master File Directory in two-level directory structure.	[2M]
	f)	What are Synchronous and Asynchronous interrupts in LINUX.	[3M]

PART -B

2.	a)	Discuss various challenges and issues that are to be considered while designing an operating system.	[5M]
	b)	Why Real time operating systems are needed? Give some examples.	[4M]
	c)	Write the difference between the function and system call. Briefly explain the six major categories of system calls.	[5M]
3.	a)	Explain in detail the two popular inter-process communication mechanisms.	[7M]
	b)	What are the criteria for evaluating the CPU scheduling algorithms? Why do we need it?	[7M]
4.	a)	Discuss various issued related to the allocation of frames to processes.	[7M]
	b)	Consider the following page reference string: 1,2,4,7,3,5,6,3,6,1,4,2,3,6,5,2 How many page faults would occur for the LRU page replacement algorithm, assuming four frames and all frames are initially empty.	[7M]
5.	a)	How does the signal() operation associated with monitors differ from the corresponding operation defined for semaphores.	[7M]
	b)	Explain the various ways of aborting a process in order to eliminate deadlocks.	[7M]
6.	a)	Explain the Indexed allocation of disk space.	[7M]
	b)	Compare the SCAN and C-SCAN disk scheduling algorithms with an example.	[7M]
7.	a)	Explain about the key Components of a LINUX system.	[7M]
	b)	What is Android? Is Android Open-Source? Discuss the features of Android.	[7M]

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