

END TERM EXAMINATION

SIXTH SEMESTER [B.TECH] MAY- JUNE 2017

Paper Code: ETCS-304

Subject: Operating Systems
(Batch 2013 onwards)

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q.No1 which is compulsory.
Select one question from each unit.

- Q1 Answer the following short answer questions:- (2.5x10=25)
- (a) What do you mean by context switching?
 - (b) Explain the concept of pre-emption. Where it is needed?
 - (c) Discuss various types of resources.
 - (d) Describe the role of TLB in address translation.
 - (e) What is the utility of cache memory in the system?
 - (f) What is scheduling criteria for CPU scheduler?
 - (g) What do you mean by deadlock? Is it possible to have a deadlock in system involving only single process?
 - (h) Discuss various methods for maintaining free spaces on disk.
 - (i) Why is page size always a power of 2?
 - (j) What is Inode Table? Describe its contents.

UNIT-I

- Q2
- (a) Describe working of paging memory management scheme. Compare paging with segmentation. (6.5)
 - (b) Given memory partitions of 100 K, 500 K and 600 K (in order).Where will the algorithm, namely, best fit, first fit and worst fit place the processes 212K, 417 K, 112K and 426 K (in order) in the memory? Which one algorithm makes the most efficient use of memory? (4)
 - (c) What is the cause of thrashing? What can the system do to eliminate the problem? (2)
- Q3
- (a) 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 following replacement algorithm (Assume three frames): (5)
 - (i) FIFO
 - (ii) LRU
 - (iii) Optimal
 - (b) What do you mean by a page fault? What actions are taken by the operating system when a page fault occurs? (3.5)
 - (c) Differentiate the following:- (4)
 - (i) Networked and Distributed operating system.
 - (ii) Multiprogramming and Multi-Processing operating system

UNIT-II

- Q4 (a) Consider the following set of processes, with the length of the CPU-burst time give in milliseconds: (6.5)

Process	Burst Time	Priority
P1	8	3
P2	1	1
P3	2	3
P4	4	2
P5	5	4

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P/2

The process are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0. Draw the Gantt Chart and find the average turn around time and average waiting time of each process for the following scheduling algorithms:

- (i) FCFS
 - (ii) Priority (Non-preemptive)
 - (iii) RR(quantum of 2ms)
 - (b) Describe Process state diagram. (3)
 - (c) What is the role of Medium term scheduler? (3)
- Q5 (a) What do you mean by Critical Section? What are various methods to handle critical section problem? Write a solution for Dining Philosophers problem using Semaphores. (8.5)
- (b) Discuss Dekker's Algorithm. (4)

UNIT-III

- Q6 (a) Consider the following snapshot of a system.

Process	Allocation			MAX			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer the following questions using Banker's algorithm: (6.5)

- (i) Is the system in a safe state?
 - (ii) If a request from process P1 arrives for (3,3,0) can the request be granted immediately?
 - (b) What is the difference between deadlock avoidance and prevention? (3)
 - (c) How can the no-preemption and circular wait conditions be prevented? (3)
- Q7 (a) Suppose that a disk drive has 200 tracks numbered 0 to 199. The drive is currently serving a request at track number 100. The requested tracks, in order received by the disk scheduler are 55,58,39,18,90,160,38,184. What is the total distance (in tracks) that disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithms? (6.5)
- (i) FCFS
 - (ii) SSTF
 - (iii) SCAN
 - (iv) C-SCAN
 - (v) LOOK
 - (b) What are various parameters for evaluating Disk performance? Discuss. (4)
 - (c) Why rotational latency is usually not considered in disk scheduling? (2)

UNIT-IV

- Q8 (a) Describe various file allocation methods. Compare and contrast index allocation with contiguous file allocation scheme. (4.5)
- (b) Why directory structure is required? Discuss various types of directory structures along with respective merits and demerits. (4)
- (c) How data integrity is maintained? Explain. (4)
- Q9 (a) An operating system only supports a single directory but allows that directory to have arbitrarily many files with arbitrarily long file names. Can an approximate hierarchical file system be simulated? How? (4.5)
- (b) Some systems support many types of structures for file's data, while others simply support a stream of bytes. What are the advantages and disadvantages? (4)
- (c) Describe file access control mechanism. (4)

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