

(2)

(b) Explain the concept of implementing inter-process communication through message passing mechanism using suitable example. 6+8

4. (a) Differentiate between preemptive and non-preemptive scheduling.

(b) Consider the following set of processes with the length of CPU burst time given in micro seconds:

Process	Arrival Time	Burst Time
P1	0	4
P2	1	8
P3	2	9
P4	3	4
P5	4	2

Find the Avg. Waiting Time and Avg. Turnaround time using RR scheduling algorithm assuming a time quantum of 3 micro seconds. 4+10

5. (a) Explain the concept of critical section with suitable example. Explain the different conditions required for implementing critical section.

(Continued)

(3)

(b) Explain the importance of Semaphores. 9.5

✓ 6. (a) Explain the importance of Resource Allocation Graph. 6+8

(b) Explain Banker's Algorithm. 5+9

7. (a) Explain the various ways in which binding of data to memory addresses may be done.

(b) What do you understand by demand paging? Explain the steps in handling a page fault. 6+8

✓ 8. (a) Differentiate between Acyclic Graph directory and General Graph directory structure. 1

(b) Explain the working of SSTF Disk Scheduling. 8+6

UL (5)/Operating System

B.Tech 5th Semester 2009

Full Marks : 70

Time : 3 hours

Answer any five questions

The figures in the right-hand margin indicate marks

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

- ✓ 1. (a) What are the main functions of Operating System ? Discuss the evolution of OS.
- (b) How is Distributed OS different from Parallel OS ? | 7+7
2. (a) What is the purpose of the command interpreter ? Why is it separate from the kernel ?
- (b) What is the main advantage for an Operating System designer of using a virtual machine architecture ? | 7+7
- ✓ 3. (a) Justify the statement 'Context Switch time is a pure overhead' ?

(Turn Over)

3. (a) Distinguish between software verification and validation. 7
 (b) Explain top-down and bottom-up testing approaches. 7
4. (a) What do you mean by 'integration testing'? Which types of defects are uncovered during integration testing? 7
 (b) What is stress testing? Why is stress testing applicable to only certain types of system? 7
5. (a) What is meant by code walk-through? List the important types of errors checked during code walk-through. 7
 (b) How is an code walk-through different from a code inspection? 7
6. (a) What do you mean by work breakdown structure? 7
 (b) Briefly describe Gantt charts. 7

7. (a) Write the names of different types of testing with definition. 7
 (b) Discuss the different units of unit testing. 7
8. Write short-notes on any three of the following : 14
 (a) Black-box testing
 (b) Gantt Charts
 (c) Perfective Maintenance
 (d) Incremental model of software development
 (e) Alpha testing and beta testing

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2016 (A)

UL (5)-O.S

Full Marks : 70

Time : 3 hours

Answer any five questions.

The figures in the right-hand margin indicate marks.

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

1. (a) What are the main purposes of an operating system ? In a multiprogramming and time-sharing environment several users share the system simultaneously. This situation can result in various security problems. Explain any two such problems. 7
- (b) Give two reasons why caches are useful, what problems do they solve ? What problems do they cause ? If a cache can be made as large as the device for which it is caching (for instance, a cache as large as a disk), why not make it that large and eliminate the device ? 7
2. (a) Why do some systems keep track of the file, while others leave it to the users or simply do not implement multiple file types ? What are the various responsibilities of a file system ? 7

(Turn Over)

(2)

- (b) Compare index file allocation to noncontiguous file allocation in terms of storage and retrieval. 7
3. (a) What advantage is there in having different time quantum sizes on different levels of a multilevel queuing system? Suppose that a scheduling algorithm, (at the level of short-term CPU scheduling) favours those processes that have used the least processor time in the recent past. Why will this algorithm favour I/O bound programs and yet not permanently starve CPU-bound programs. 7
- (b) A job running in a system, with variable time quantum per queue, needs 30 milliseconds to run to completion. If the first queue has a time quantum of 5 milliseconds and each queue thereafter has a time quantum that is twice as large as the previous one, how many times will the job be interrupted and on which queue will it finish its execution? 7
4. (a) Explain the difference between internal and external fragmentation. Describe a mechanism by which one segment could belong to the address space of two different processes. 7
- (b) Why segmentation and paging sometimes combined into one scheme? Describe segmented paging model of memory. 7

(Continued)

(3)

5. (a) In a system that supports virtual memory, under what circumstances do page faults occur? Consider a process experiencing large number of page faults. Describe the effect, if any, of increasing this process's scheduling priority. 7
- (b) Consider the following page-reference string:
1, 2, 3, 4, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
How many page faults would occur with 4 available frames for the following replacement algorithms? Remember that all these frames are initially empty, so your first unique pages will all cost one fault each.
- (i) LRU replacement 7
- (ii) FIFO replacement 7
6. (a) What are the major differences between deadlock and starvation? Explain various deadlock recovery schemes. 7
- (b) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free. 7

(Turn Over)

UL (5) O.S

UL (5) O.S

(4)

7. (a) What is race condition ? Explain, how semaphores are helpful in solving critical-section problem ? 7
- (b) Explain the concept of transaction atomicity. 7
8. Write short notes on any two : 7 × 2
- (a) Convoy effect in CPU scheduling
- (b) Balady's anomaly
- (c) Thrashing.

All questions carry equal marks

Attempt any four questions

1. What is Operating System? Explain various types of Operating System.
2. Define Process. Explain using diagram, the life cycle of a process.
3. What is a thread? Explain the benefits of using thread.
4. Consider five set of process with the length of CPU time in ms.

Process	CPU Time(ms)
P1	10
P2	7
P3	1
P4	3
P5	5

Calculate turnaround time and average waiting time using FCFS, SJF (both preemptive and non preemptive) and RR (time slice=1ms) respectively.

5. What are Semaphores? What is the usage of Semaphore?
6. What do you understand by Deadlock? Describe the required conditions for deadlock to happen in an OS.

2017

Full Marks : 70

Time : 3 hours

Answer any five questions.

The figures in the right-hand margin indicate marks.

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

1. (a) Explain what is thrashing ? What is its effect on the operating system ? 7

(b) Why are page sizes always powers of 2 ? What is the difference between logical and physical addresses ? 7

✓ 2. What is 'response time' ? With the help of a state transition diagram, explain various states of a process. What is a zombie process and how it may manifest itself ? 14

✓ 3. (a) What is deadlock ? Explain necessary and sufficient conditions to occur deadlock. What is the difference between Deadlock avoidance and prevention ? 7

(Turn Over)

(2)

- (b) Consider a system with five processes P0 to P5 and three resource type A, B and C. Resource type A has seven instance, resource type B has resource type C has six instances suppose at time T0 we have the following allocation. Is the system in safe state? 7

	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	0	0	0	0	0	0
P1	2	0	0	2	0	2			
P2	3	0	3	0	0	0			
P3	2	1	1	1	0	0			
P4	0	2	2	0	0	0			

4. (a) What is Operating System ? Explain different functions and objectives of operating system. 7

- (b) Mention one characteristic each of Time Sharing System and Batch Processing System. What are the advantages and disadvantages of having unequal size partitions in fixed partitioning scheme? 7

5. (a) Explain the hardware support for paging. 7

UL(5)-O.S

(Continued)

(3)

- (b) Consider the following set of processes with CPU burst time :

Process	Burst time	Arrival time
P1	8	0
P2	4	1
P3	9	2
P4	5	3

Draw Gantt chart for FCFS, SJF pre-emptive and Round Robin (Quantum 02). Calculate average waiting time and average turnaround time. 7

6. (a) Explain LRU, FIFO, OPTIMAL page replacement policy for given sequence :

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
Which page replacement algorithm has minimum number of page faults? 7

- (b) What is mutual exclusion ? Give software approaches for mutual exclusion. 7

7. The requested tracks in the order received are 98, 183, 37, 122, 14, 124, 65, 67. Apply the following disk scheduling algorithm starting track at 90. Suppose a disk drive has 200 cylinders, numbered 0 to 199.

(i) FCFS (ii) SSTF (iii) C-SCAN. 4+5+5

UL(5)-O.S

(Turn Over)