(Please write your Exam Roll No.)   Exam Roll No.........................

END TERM EXAMINATION

FOURTH SEMESTER [BCA] MAY-JUNE 2012

Paper Code: BCA208	**Subject: Operating System**
Time: 3 Hours	**Maximum Marks :75**

Note: Section-A is compulsory Attempt one question from remaining each section

SECTION-A

Q1.   Explain in brief the following: -   **(3×5=15)**
(a) List the differences between short term and long term scheduling.
(b) List the differences between process and program.
(c) List the differences between page and segment.
(d) List the differences between Batch processing and multiprocessing
systems.
(e) List the differences between deadlock and starvation.

SECTION-B

Q2.   (a) Discuss Demand Page memory management technique in detail.   **(8)**
(b) Consider the page trace- 3,1,2,5,4,1,2,5,2, 1,3. Find the failure frequency
for "FIFO and Least recent used" replacement policy.   **(7)**

Q3.   Why an operating system is known as "Resource manager"? Explain its
function in detail.   **(15)**

SECTION-C

Q4.   Explain 'Critical Section Problem' and discuss the various algorithms to
solve synchronization problem. List the advantages and disadvantage of
each algorithm.   **(15)**

Q5.   What do you understand about process scheduling? Why is it important?
Explain the various process scheduling techniques with the help of
examples.

SECTION-D

Q6.   Discuss Banker's algorithm in detail. Also provide an example for Banker's
algorithm.   **(15)**

Q7.   (a) Explain the following terms used in Device management.   **(9)**
(i) Dedicated device   (ii) Channel   (iii) Control unit
(b) Discuss the following Disk Scheduling technique with an example: -   **(6)**
(i) SCAN   (ii) LOOK

P.T.O.

SECTION-E

Q8. Discuss the general model of a file system. Also, explain the steps to map a logical address to its physical address.
(15)

Q9. List the advantages and disadvantages of the following File-Allocation methods: - **(5x3=15)**
(a) Continuous file allocation method
(b) Indexed file allocation method.
(c) Heirarical file allocation method.

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END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER-2014

Paper Code: BCA301	**Subject: Operating System**
Time: 3 Hours	**Maximum Marks :75**

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1.   (a) Explain multi programming and multi tasking systems.
(b) Explain logical versus physical address space.
(c) List the differences between pre-emptive and non-pre-emptive scheduling.
(d) Explain bit-interleaved parity organization and block-interleaved parity organization.
(e) Explain logical and physical file system.   **(5x5=25)**

UNIT-I

Q2.   (a) Discuss various types of fragmentation and memory allocation Strategies.   **(7.5)**
(b) Explain the concept of thrashing.   **(5)**

Q3.   (a) What is Page Replacement? What is its importance? Explain Least Recently Used Replacement Algorithm.
(7.5)
(b) The following reference string (access sequence) is given: -   **(5)**
(0,7,1,4,3,8, 1,4,3,9,1,4,3,2,7,5,6)
Find the number of page faults for a main memory subsystem that has 4 frames and uses LRU page replacement policy for on demand paging.

UNIT-II

Q4.   (a) Consider the following set of processes with length of CPU burst times (given in milliseconds) and arrival times as specified: -

Process	Arrival Time	Burst Time
P1	0	7
P2	1	4
P3	2	8
P4	3	5

Draw Gantt Chart illustrating the execution of these processes using pre-emptive SJF scheduling algorithm. Also, calculate the average waiting time.**(5)**
(b) Discuss Round Robin Scheduling Algorithm and Priority Scheduling Algorithm.   **(7.5)**

Q5. (a) What is a Semaphore? Describe the Readers-Writers problem.   **(7.5)**
(b) What is the critical section problem? What are the three requirement that must be satisfied by a good solution to the critical section problem?   **(5)**

UNIT-III

Q6. (a) Discuss Banker's Algorithm in detail.   **(7.5)**
     (b) Discussion Resource Allocation Graph Algorithm in detail.   **(5)**

Q7. (a) Discuss various types of disk scheduling techniques.   **(7.5)**
     (b) Explain the concept of buffering.   **(5)**

UNIT-IV

Q8. (a) Explain directory structure of file system.   **(7.5**)
     (b)Discuss general model of file system.   **(5)**

Q9. (a) What are the different approaches to user authentication?   **(5)**
     (b) Explain the various types of threats to system security.   **(7.5)**

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(Please write your Exam Roll No.)   Exam Roll No.........................

END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER 2015

Paper Code: BCA301	**Subject: Operating System**
	(Batch: 2011 onwards)

Time: 3 Hours   **Maximum Marks :75**

Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one question from each Unit.

Q.1   Answer the following: -   **(5*5=25)**
(a) Define race condition with an example.
(b) What is dead-lock? List the necessary conditions for a deadlock to occur.
(c) Define starvation in a deadlock situation with an example.
(d) Briefly how starvation is avoided in the operating system.
(e) Give four general examples of the use of threads in a single-user multiprocessing system.

UNIT-I

Q.2   (a) What are deadlock prevention techniques? What do you mean by deadlock avoidance?   **(5)**
(b) What is dining philosopher problem? Provide solution to solve the dining philosopher problem.   **(7.5)**

Q.3   (a) What is semaphore? Describe how semaphore can be used for block wake up synchronization between processes.
(5)
(b) Given a total of 10 units of a resource type, and given the sage state shown below, should process 2 be granted a request of 2 additional resources? Justify your answer whether the new state is safe or unsafe state.   **(7.5)**

Process	Used	Max
P1	2	5
P2	1	6
P3	2	6
P4	1	2
P5	1	4

UNIT-II

Q4.   (a) What is Critical-Section problem? What are the requirements that critical section problem must satisfy for its solution?   **(5)**

(b) Describe the need for Device management. Explain techniques used for managing and allocating device. **(7.5)**

P.T.O.

Q5. (a) What is an operating system? Discuss the main services of operating system and also discuss the purpose of system calls in operating system. **(5)**
(b) What is the goal of multiprogramming? Differentiate between a time-sharing system time. **(7.5)**

UNIT-III

Q6. (a) What is process control block (PCB)? Explain various states of a process with suitable diagram. **(5)**
(b) What are cooperating processes? Explain message passing method for achieving inter-process communication (IC) with suitable diagram. **(7.5)**

Q7. (a) What are multiprocessor systems? List their advantages and explain different types of multiprocessor system. **(5)**
(b) What resources are typically shared by all the threads of a process? List reasons why a mode switch between threads may be cheaper than a mode switch between processors. And also, differentiates between user level threads and kernel level threads. **(7.5)**

UNIT-IV

Q8. Consider that the pages are referenced in the following sequence **(12.5)**
0,9,0,1,8,1,8,7,8,7,1,2,8,2,7,8,2,3,8,3.

How many pages fault would occur for the following page replacement algorithm with three page frames?
(a) FIFO
(b) Optimal
(c) LRU

Q9. Write a short note on: **(6.25x2=12.5)**
(a) Swap space management
(b) Risk reliability

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END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER 2016

Paper Code: BCA301	Subject: Operating System
Time: 3 Hours	Maximum Marks :75

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1   Attempt the following
(2.5x10=25)
    (a) What are the main functions of operating system?
    (b) Is it possible to have a deadlock involving only one process? Explain.
    (c) Explain the various states of a process.
    (d) Differentiate between logical and physical address.
    (e) Explain thrashing.
    (f) What is Belady's anomaly?
    (g) Explain Race condition.
    (h) Explain RAID.
    (i) What are the various types of devices? Explain
    (j) Differentiate between starvation and deadlock.

Unit-I

Q2.   (a) Define operating systems. Discuss in detail how the operating system can be classified into different categories?   **(8.5)**
    (b) Given memory partitions of 100 KB, 500 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?   **(4)**

Q3.   (a) Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs.   **(4.5)**
    (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. (If 3 frames are there in the memory then how many page faults will be there using FIFO, Optimal and LRU page replacement algorithms?   **(8)**

Unit-II

Q4.   Consider the following set of processes, with the length of the CPU-burst time given in nanoseconds:

Process	Arrival Time	Burst Time	Priority
P1	0	10	3
P2	1	1	1
P3	3	2	3
P4	4	1	4
P5	6	5	2

Time Quantum = 2ns.
Calculate the average waiting time and average turnaround time using FIFO, SJF (Preemptive and Non-Preemptive), RR, Priority Algorithm.   **(12.5)**

Q5. (a) Explain PCB   **(8.5)**
     (b) Explain Dining Philosophers Problem in detail.   **(4)**

Unit-III

Q6. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 147, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all FIFO, SSTF, SCAN, LOOK, C-SCAN, C-LOOK.   **(12.5)**

Q7. (a) Consider the following snap shot of a system:

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

Answer the following questions using the banker's algorithm: **(8.5)**
(i) What is the content of Need matrix?
(ii) Is the system in safe state?
(iii) If a request from process pi arrives for (0, 4, 2, 0). Can be request be granted immediately.

(b) What are the various ways for deadlock prevention? Explain.   **(4)**

Unit-IV

Q8. (a) How will you protect files of a user from other user in a computer? Discuss.   **(6)**
     (b) Describe directory structure of a file system.   **(6.5)**

Q9. List the advantages and disadvantages of the following File-Allocation methods: **(12.5)**
     (a) Contiguous Memory allocation
     (b) Linked Allocation
     (c) Indexed Allocation

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END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER 2018

Paper Code: BCA301	Subject: Operating Systems
Time: 3 Hours	Maximum Marks :75

Note: Attempt five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1.   Answer the following: -   **(2.5x10=25)**
(a) Write a short note on Batch System.
(b) Explain semaphores. What happens when the value of semophose is negative?
(c) What is Thrashing? What are possible solutions for this problem?
(d) Mention various CPU scheduling criterias.
(e) What is boot block?
(f) Write a short note on buffering.
(g) Discuss some operations that could be performed on a directory.
(h) Explain Denial of service.
(i) Discuss Swap space management.
(j) What are the necessary conditions deadlock to occur?

UNIT-I

Q2.   (a) What is fragmentation? What are the various measures 'to avoid fragmentation?   **(4)**
(b) Explain the concept of paging and demand paging.   **(6)**
(c) Discuss in detail the process of segmentation.   **(2.5)**

Q3.   (a) Explain in detail the concept of swapping.   **(3.5)**
(b) Consider the reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3.
If 3 frames are there in memory then how many page faults will be there using following page replacement algorithms.   **(9)**
(i) FIFO
(ii) Optimal
(iii) LRU

UNIT-II

Q4.   (a) What is critical section? Discuss the requirements that must be satisfied as a solution to critical section problem.   (4)
(b) Explain Readers-Writers problem in detail.   (4)
(c) Define process. Explain various states that process undergoes with the help of process state diagram.   (4.5)

Q5   (a) What are the various operations that could be carried out on a process?   (3)
(b) Consider the following set of processes, with the length of CPU-burst time given in nanoseconds:

P.T.O.

Process	Arrival	Burst Time	Priority
P1	0	21	2
P2	1	3	1
P3	2	6	4
P4	3	2	3

Time Quantum = 2ns.

Prepare a GANTT chart and calculate the average time using FIFO, Round Robin, Priority Scheduling algorithms.

UNIT-III

Q6.   Suppose a disk has 201 cylinders, numbered from 0 to 200. The drive is currently serving a request at cylinder 100, and there is queue of disk access requests for cylinders 30, 85, 90, 100, 105, 110, 135, 145.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all FIFO, SSTF, SCAN, LOOK, C-SACN, 'C-LOOK algorithms. **(12.5)**

Q8.   (a) What are the various ways to recover from deadlock? Explain. **(4.5)**

(b) Write a short note on following: - **(8)**
    (i) Dedicated Devices
    (ii) Virtual Devices
    (iii) Shared Devices
    (iv) Storage Devices

UNIT-IV

Q8.   (a) Explain various access methods available for accessing a file. **(4.5)**

(b) Write a short note on user authentication. **(8)**

Q9.   (a) Explain some basic operations that could be carried on a file. Also specify what information are associated with an open file. **(4)**

(c) Write a short, note on various program threats and system threats. **(8.5)**

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END TERM EXAMINATION

FIFTH SEMESTER [BCA] JANUARY-FEBRUARY 2023

Paper Code: BCA301   Subject: Operating System

Time: 3 Hours   Maximum Marks: 75

Note: Attempt five questions in all including Q.No.1 which is compulsory. Select one question from each unit.

Q1. Answer the following (Do **any ten** parts):   (2.5x10=25)
- a) Explain context switching. How can context switching time be reduced?
- b) What is Throughput, Turnaround time, waiting time and Response time?
- c) What are the tradeoffs in handheld systems?
- d) Explain multithreading models.
- e) Why do we say that the operating is a resource manager?
- f) What is an address space? Differentiate between memory address space and I/O address space.
- g) What is a lightweight process, and why is it called so?
- h) What is the difference between *starvation* and *deadlock*? Does one necessarily imply the other?
- i) Differentiate between SCAN and C-SCAN disk scheduling algorithm.
- j) What is the need of virtual memory?
- k) What is the principle of page replacement policy?
- l) Explain general model of file system.
- m) What are the contents of Process Control Block?

UNIT–I

Q2   i) Define the properties of the following operating systems.   (8)
- a) Batch
- b) Time sharing
- c) Real time systems
- d) Parallel systems

ii) What is the difference between paging and Segmentation?   (4.5)

Q3   Consider the following reference string: (12.5)
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
How many page faults will occur for a. FIFO b. LRU and c. OPT page replacement algorithms?
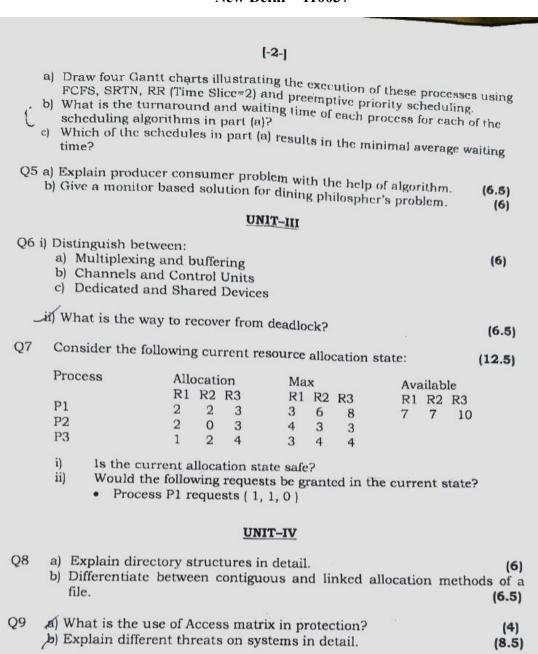Assuming four and five frames. (All frames are initially empty).

UNIT-II

Q4   Consider the following set of processes, with their CPU-burst time and arrival time given in milliseconds: (12.5)

Process	Arrival Time	Burst Time	Priority
P1	0	4	4
P2	3	6	2
P3	5	5	1
P4	8	6	3

P.T.O.

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[-2-]

a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SRTN, RR (Time Slice=2) and preemptive priority scheduling.
b) What is the turnaround and waiting time of each process for each of the scheduling algorithms in part (a)?
c) Which of the schedules in part (a) results in the minimal average waiting time?

Q5 a) Explain producer consumer problem with the help of algorithm. **(6.5)**
b) Give a monitor based solution for dining philospher's problem. **(6)**

UNIT-III

Q6 i) Distinguish between:
a) Multiplexing and buffering **(6)**
b) Channels and Control Units
c) Dedicated and Shared Devices

ii) What is the way to recover from deadlock? **(6.5)**

Q7 Consider the following current resource allocation state: **(12.5)**

Process	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8	7	7	10
P2	2	0	3	4	3	3			
P3	1	2	4	3	4	4			

i) Is the current allocation state safe?
ii) Would the following requests be granted in the current state?
• Process P1 requests (1, 1, 0)

UNIT-IV

Q8 a) Explain directory structures in detail. **(6)**
b) Differentiate between contiguous and linked allocation methods of a file. **(6.5)**

Q9 a) What is the use of Access matrix in protection? **(4)**
b) Explain different threats on systems in detail. **(8.5)**

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