END-TERM EXAMINATION
DECEMBER 2006

Exam Series Code: 100353DEC06200382	**Subject: Operating System**
Time: 3 Hours	**Maximum Marks: 75**

Note: Q.1 is compulsory and attempt four from Question No. 2 to 9 selecting one question from each unit

Q. 1.

- (a) What is an interrupt?
- (b) What are the distinctions between internal and external fragmentation?
- (c) List three advantages of user level threads over kernel level threads.
- (d) What is monitor?
- (e) What are the differences among deadlock avoidance, detection and prevention?
- (f) What are the differences between SCAN and C-SCAN disk scheduling algorithms?
- (g) What is a file control block?
- (h) What are different file attributes and file operations in a typical file system.

(8 x 2.5 = 20)

UNIT - I

Q. 2.

- (a) Why are segmentation and paging sometimes combined into one scheme? Compare paging with segmentation with respect to amount of memory translation structures in order to convert virtual addresses to physical addresses. **(6)**

- (b) Consider a simple segmentation system that has the following segment table. **(4)**

Starting Address	Length (bytes)
660	248
1752	422
222	198
996	604

For each of the following logical addresses, determine the physical address or indicate if a segment fault occurs:
- (i) 0, 198
- (i) 2, 156
- (i) 1, 530
- (i) 3, 444

Q. 3.

(a) A process contains eight virtual pages on disk and is assigned a fixed allocation of four page frames in main memory. The following page trace occurs

1,0,2,2,1,7,6,7,0,1,2,0,3,0,4,5,1,5,2,4,5,6,7,6,7,2,4,2,7,3,3,2,3

Show the successive page residing in the four frames using LRU replacement policy. Compare the hit ratio in main memory. **(4)**

(b) Discuss the hardware support required to support demand paging? Why is the principle of locality crucial to the use of virtual memory?

(6)

UNIT-II

Q. 4.

(a) What are the issues related to multithreading environment? **(5)**

(b) Consider the following set of processes. **(5)**

Process Name	Arrival Time	Processing Time
A	0	3
B	1	5
C	3	2
D	9	5
E	12	5

Calculate the average waiting time and average turnaround time for FCFS, Round Robin (Time slice=2) and shortest job first scheduling algorithms.

Q. 5.

(a) What are the conditions generally associated with reader-writer problem? **(5)**

(b) Show that Peterson's solution to critical section problem satisfies all the requirements of critical section solutions. **(5)**

UNIT – III

Q. 6. (a) Explain the methods for deadlock prevention.

(b) Consider the following snapshot of system:

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

Answer the following question using the Banker's algorithm:
- (i) What is the content of Need Matrix?
- (ii) Is system in a safe state?
- (iii) If a request from process P_1 arrives for (0, 4, 2, 0) can the request be granted immediately.

Q. 7. (a) What is the Disk Structure? What are different Disk Management Methods?
(5)

(b) Explain RAID Structure. **(5)**

UNIT - IV

Q. 8. (a) List the advantages and disadvantages of sequential file access method and direct access method (or Relative access method) **(5)**

(b) Compare the different directory structure implementation in a file system.
(5)

Q. 9. (a) Explain the disk allocation methods for a file system giving the efficiencies of each. **(5)**

(b) How free space is managed in a file system. **(5)**

END-TERM EXAMINATION

Third Semester [MCA] - DECEMBER 2005

Paper Code: MCA 201	**Subject: Operating System**

Time: 3 Hours	**Maximum Marks: 60**

Note: Attempt any five questions. All questions carry equal marks.

Q. 1. (a) What are the difference between trap and interrupt?
   (b) What is the purpose of base and limit registers?
   (c) What is the purpose of command interpreter?
   (d) Difference between system calls and system programs.
   (e) What is the difference between user level and kernel level threads?
   (f) Define the difference between pre-emptive and non pre-emptive scheduling?
   (g) Is it possible to have a deadlock involving only one single process? Explain.
   (h) What do you mean by memory fragmentation?

8 x 2.5 = 20

UNIT - I

Q. 2. (a) What is paging? How it differs from segmentation? Explain a system which uses a combined scheme of segmentation with paging. **6**

   (b) Consider a paging system with the page table stored in memory. If a memory reference takes 200 nano secs and 80 percent of all page table references are found in the associative registers, what is the effective memory reference time? (Assume associative register references time as zero). **4**

Q. 3. (a) Consider the following page reference string:- **6**
        1, 5, 2, 3, 2, 1, 4, 2, 3, 5, 1, 2, 5, 4, 3, 2, 4, 1, 2
     How many page faults will occur assuming three frames for
        (i)   LRV
        (ii) FIFO and
        (iii) Optimal Replacement

   (b) Describe the steps how a page fault is handled by the operating system. **4**

UNIT – II

Q. 4. (a) What are the necessary conditions for a deadlock to occur? Explain. **5**
   (b) Explain Banker's algorithm for deadlock avoidance. **5**

Q. 5. (a) What are semaphores? How these are implemented? **4**

(b) Explain with examples the following scheduling algorithm.   **6**
   (i)   FCFS
   (ii) SJF
   (iii) Round Robin

UNIT - III

Q. 6. Suppose a disk queue with requests for I/O to blocks on cylinders:-   **10**
   100, 175, 50, 120, 120, 20, 150, 75, 200

   If the disk head is currently at 60, find out the total disk head movement for the following algorithm:-
   (a) FCFS
   (b) SSTP
   (c) SCAN
   (d) LOOK
   (e) C-SCAN

Q. 7. (a) How swap space is managed by the Operating system? Explain.   **5**

   (b) What are interrupt? How interrupt are handled by the operating system?   **5**

UNIT - IV

Q. 8. Explain the contiguous, linked and indexed file allocation techniques with suitable example. What technique is used in Unix Operating System?   **10**

Q. 9. (a) What are the different file access methods?   **5**
   (b) Explain the different directory structure?   **5**

END-TERM EXAMINATION

Third Semester [MCA] - DECEMBER 2004

Paper Code: MCA 201	Subject: Operating System
Time: 3 Hours	**Maximum Marks: 60**

Note: Attempt any five questions. All questions carry equal marks.

Q. 1. (a) What are the different functionalities of an operating system? Explain. **6**

   (b) How protection is provided by the operating system at the file system level? Explain different protection mechanism. **6**

Q. 2. (a) What is a process? How it differs from a program? Differentiate between a multiprocessing system and a multiprocessor system. **6**

   (b) Explain the purpose of schedulers. With a neat diagram explain different types of schedulers. **6**

Q. 3. (a) What is a directory? Explain different directory structure. **6**

   (b)Explain the linked and indexed memory allocation technique for secondary storage management. How file space is allocated in Unix Operating system?
6

Q. 4. (a) Differentiate between buffering and spooling. **4**

   (b) Explain pages segmentation memory management technique. What special hardware are required for such a system? **8**

Q. 5. (a) What is deadlock? Explain four necessary conditions for a deadlock to occur. **6**

   (b) What is thrashing? Why is it required? **6**

Q. 6. (a) What do you mean by fragmentation? How the fragmentation problem can be solved? **6**

   (b) What is device controller? State some advantages of placing functionality in a device controller rather than in the kernel. **6**

Q. 7. (a) What are the various algorithms for process scheduling? Explain each of them. **8**

   (b) What are concurrent and cooperating processes? Explain. **4**

Q. 8. Write short notes on each of the following :-   **12**
      (a) Segmentation
      (b) Page Fault
      (c) Virtual Memory

END-TERM EXAMINATION

Third Semester [MCA] - DECEMBER 2003

Paper Code: MCA 201	**Subject: Operating System**

Time: 3 Hours	**Maximum Marks: 60**

Note: Attempt any five questions.

Q. 1. (a) Define the essential properties of the following types of Operating Systems:-
6

       (i) Batch   (ii) Interactive
       (iii) Time Sharing   (iv) Real Time
       (v) Network   (vi) Distributed

(b) What are the differences between a trap and an interrupt? What is the use of each function? **6**

Q. 2. (a) Describe the actions taken by a thread library to context switch between user-level threads. **6**

(b) Describe the differences among short-term, medium-term and long-term scheduling. **6**

Q. 3. Consider the following set of process, with the length of the CPU burst   time given in milliseconds **12**

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The process are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0.

(a) Draw four Gantt charts that illustrate the execution of these processes using FCFS, SJF, A non preemptive priority and RR (quantum=1) scheduling.

(b) What is the turnaround time of each process for each of the scheduling algorithm in part (a)?

(c) What is the waiting time of each process for each of the scheduling algorithm in part (a)?

(d) Which of the schedules in part (a) results in the minimal average waiting time (over all process)?

Q. 4. (a) Describe the following allocation algorithms:- **6**
        (i) First Fit   (ii) Best Fit
        (iii) Worst Fit

(b) Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames. **6**
      i. How many bits are there in the logical address?
     ii. How many bits are there in the physical address?

Q. 5. Consider the following page reference string:- **12**
        1, 2, 3, 4, 2, 1, 5, 6, 1, 2, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

How many page faults would occur for the following replacement algorithm, assuming one, two, three, four, six, or seven frames?
        (a) LRU Replacement   (b) FIFO Replacement
        (c) Optimal Replacement

Q. 6. (a) Explain the purpose of the open and close operation. **6**

(b) What problem could occur if a system allowed a file system to be mounted simultaneously at more than one location? **6**

Q. 7. Write short notes on any two :- **12**
      (a) PCB
      (b) Segmentation
      (c) Disk Structure

END-TERM EXAMINATION

Third Semester [MCA] - DECEMBER 2002

Paper Code: MCA 201	Subject: Operating System
Time: 3 Hours	Maximum Marks: 60

Note: Attempt any five questions.

Q. 1. (a) Distinguish between multiprogramming and multiprocessing. What are the key motivation for the development of each?   **6**

(b) Define, compare and contrast each of the following terms :
   Online, Real Time, Time Sharing and Interactive Compiling.   **6**

Q. 2. (a) What is spooling? How would an input spooling system designed to read punched cards from a card reader to operate.   **6**

(b) Describe the actions taken by a kernel to context switch between processes.
                                                                   6

Q. 3. Consider the following set of process, with the length of the CPU burst time given in milliseconds: **12**

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The process are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0.
(a) Draw four Gantt charts that illustrate the execution of these processes using FCFS, SJF, A non preemptive priority (A smaller number implies a higher priority) and RR (quantum) scheduling.

(b) What is the turnaround time of each process for each of the scheduling algorithm in part (a)?

(c) What is the waiting time of each process for each of the scheduling algorithm in part (a)?

Q. 4. (a) Write the difference between logical and physical address.

(b) Describe the following allocation algorithms.
   (i) First Fit   (ii) Best Fit   (iii) Worst Fit

Q. 5. (a) Why are segmentation and paging sometimes combined into one scheme? **6**

(b) When virtual memory is implemented in a computing system it carries certain cost and certain benefits. List those costs and the benefits. Explain what measures you can take to ensure that this imbalance does not occur.   **6**

Q. 6. (a) What are the advantages and the disadvantages of recording the name of creating program with the file attribute?   **6**

(b) How do caches help improve performance? Why do systems not use more or large caches?   **6**

Q. 7. (a) State three advantages of placing functionality in a device controller, rather than in the Kernel. State three disadvantages.   **6**

(b) How does DMA increase system concurrency? How does it complicate the hardware design?   **6**

Q. 8. Write short notes on the following :-   **12**
      (a) Demand Paging
      (b) Process control block

END-TERM EXAMINATION

Third Semester [MCA] - DECEMBER 2000

Paper Code: MCA 201	**Subject: Operating System**

Time: 3 Hours	**Maximum Marks: 70**

Note: Attempt any seven questions. All Question carry equal marks.

Q. 1. (a) Define User, Job and process. Explain the relation between user, job process and address space.

(b) List benefit of spooling. Give one sentence explaining of each. Is spooling feasible for all types of I/O devices?

Q. 2.   Define following terms (Any four)
   (a) Multiprogramming   (b) Protection Hardware   (c) Job Scheduler
   (d) Interrupt hardware   (e) Process Scheduler   (f) Virtual Memory
   (g) Primary Memory

Q. 3.   What are functions of memory management in operating system? List techniques used for memory management.

Q. 4.   Describe multiprogramming with the help of example. Give list of memory management technique used for programming.

Q. 5.   Explain the role of operating system as resource manger.

Q. 6.   Describe single contiguous allocation method. List advantages and disadvantages of this method.

Q. 7.   Describe Demand page memory management technique along with advantages and disadvantages.

Q. 8.   What are various page removal technique used for memory management? Explain any two techniques.

Q. 9.   (a) Explain Job Scheduling and list function of job scheduler.
    (b) Explain process scheduling and list functions of process scheduler.

Q. 10. Describe the need of device management. Explain techniques used for managing and allocating devices.

Q. 11. What are Direct Access Storage Devices? Give example and explain one of them with diagram.