# MCA (Revised)

## Term-End Examination

## June, 2013

12714

## MCS-041 : OPERATING SYSTEMS

*Time : 3 hours*                                    *Maximum Marks : 100*

*Weightage : 75%*

Note :    *Question No. 1 is* **compulsory**. *Answer any three questions from the rest.*

1.  (a)   Using semaphore, write an algorithm that     **10**
          solves the producer/consumers problem
          with a bounded buffer. How is it different
          from the unbounded buffer algorithm ?
          Explain.

    (b)   Compare the merits and demerits of various    **10**
          disk scheduling algorithms.

    (c)   Consider the following set of processes, with  **10**
          the length of the CPU burst time given in
          milliseconds.

          | Process | Burst time |
          |---------|------------|
          | P1      | 12         |
          | P2      | 5          |
          | P3      | 27         |
          | P4      | 3          |
          | P5      | 15         |

All five processes arrive at time 0, in the order given. Draw Gantt charts illustrating the execution of the processes using FCFS, SJF and RR (quantum = 1) scheduling. What is the turn around time of each process for each of the scheduling algorithms ? Also find the average waiting time for each algorithm.

(d) Explain take-grant model for security of OS. **10** Also explain three techniques of authentication.

2. (a) Explain the hardware support for paging. **10** Briefly explain the three page address translation technique.

(b) Illustrate a 3-dimensional hypercube system **5** and describe its features.

(c) What is meant by context switch ? Explain **5** the overhead incurred due to context switching on process and thread.

3. (a) Illustrate and discuss interprocess **5** communication features in windows 2000 operating system.

(b) Mention the advantages and limitations of **5** Multi-User Operating Systems.

(c)  What is the difference between security   **10**
     policy and security model ? Explain the
     access matrix model.

4.  (a)  The following is the sequence of page   **10**
         requests :

         1, 3, 2, 5, 4, 2, 1, 5, 3, 2, 4, 3

         Assume that there are three frames. How
         many page faults will occur if the following
         algorithms are used to replace the pages :

         (i)   FCFS

         (ii)  LRU

         (iii) OPT

    (b)  List and explain the four necessary   **10**
         conditions that must hold simultaneously
         for a deadlock to occur. Explain different
         ways to avoid deadlock.

5.  (a)  Explain the following in brief :   **10**

         (i)   Remote Procedure Call (RPC)

         (ii)  Thrashing

         (iii) Segmentation

         (iv)  Lock synchronization mechanism

    (b)  What are different kinds of file systems in   **10**
         Unix ? Explain in brief.

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