2013

Time: 3 hours

Full Marks: 80

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

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Objective Type Questions)

Answer all questions of the following:

1. Choose the correct answer of the following: 2×10 = 20
   (a) Which is a non-pre-emptive scheduling?
       (i) FCFS
       (ii) SJF
       (iii) Round Robin
       (iv) Last-In-First-Out

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(Turn over)
(b) The main program is loaded into memory any is executed. This type of loading is called:
   (i) Dynamic loading
   (ii) Dynamic linking
   (iii) Over lays
   (iv) Static loading

(c) What is a shell?
   (i) It is a hardware component
   (ii) It is a command interpreter
   (iii) It is part in compiler
   (iv) It is a tool in CPU scheduling

(d) A thread:
   (i) is a lightweight process where the context switching is low
   (ii) is a lightweight process where the context switching is high
   (iii) is used to speed up paging
   (iv) none of the above
(e) A page fault occurs:
   (i) when the page is not in the memory
   (ii) when the page is in the memory
   (iii) when the process enters the blocked state
   (iv) when the process is in the ready state

(f) The first-fit, best-fit and worst-fit can be used for:
   (i) Linked allocation of memory
   (ii) Contiguous allocation of memory
   (iii) Indexed allocation of memory
   (iv) All of these

(g) Operating system manages:
   (i) I/O devices
   (ii) Processor
   (iii) Memory
   (iv) All of these

(h) What should be the first step while OS upgrading?
   (i) Format Hard Disk
   (ii) Backup Critical Data
(iii) Backup old Operating System
(iv) Delete old Operating System
(i) The file system NTFS stands for:
   (i) New Technology File System
   (ii) Non Terminated File System
   (iii) Never Terminated File System
   (iv) New Type File System
(j) In which one of the following page replacement policies, Belady’s anomaly may occur?
   (i) FIFO
   (ii) Optimal
   (iii) LRU
   (iv) MRU

Group – B

(Long-answer Type Questions)

Answer any four questions of the following:

15 \times 4 = 60

2. Explain various types of Operating System. Define process. Diagrammatically explain the life cycle of a process.
3. Define turnaround time. Response time and waiting time. Consider the following set of processes with arrival time and the CPU burst time given in millisecond. What is the average turnaround time for these processes with First Come First Served and Shortest Jobs first algorithm (pre-emptive) and Shortest Jobs first (non-pre-emptive) algorithm? Which algorithm gives least average waiting time?

<table>
<thead>
<tr>
<th>Process</th>
<th>Arrival</th>
<th>Burst</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>7</td>
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<tr>
<td>2</td>
<td>1</td>
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<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

4. What is the difference between virtual and physical address? Explain the segmentation scheme for memory management with the help of a diagram.
5. Define Deadlock. Explain the necessary and sufficient conditions for deadlocks. How deadlock avoidance is different from deadlock prevention?


7. Describe the following method for allocating disk space:
   (a) Linked allocation
   (b) Indexed allocation
   (c) Contiguous allocation

8. What is Paging? Explain paging technique with the help of a diagram. What actions are taken during a page fault in paging?

9. Explain what is meant by Belady's anomaly? 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 the following page replacement algorithm, assuming 3-frames? Assume all the frames are initially empty (i) FIFO; (ii) OPT; (iii) LRU.