M.Tech 1st Semester Examination
Jan.2014
Subject – Concepts of Distributed Systems
Subject Code – CSL-505

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Question No. 1 is Compulsory and attempt any two questions from each section. All questions carry equal marks.

1(a) Define distributed system and differentiate with parallel system.
(b) What do you mean by flat and nested transaction?
(c) What do you mean by remote method invocation and differentiate between RMI and RPC.
(d) What are various limitations of distributed system?
(e) What do you mean by clock synchronization? (5*4=20)

SECTION – A
2(a) Explain the entities and communication paradigm used in the distributed system. (10)
(b) Explain real time ordering of events in fundamental model. (10)
3(a) How does RMI work and what is the use of RMI registry. (10)
(b) Explain various security techniques. What is the use of digital signature in real world? (10)
4(a) What do you mean by logical lock and casual ordering of messages? (10)
(b) Explain goals of distributed system. (10)

Allocate Max Available
<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>PI</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>P2</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>P3</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>P4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Answer the following questions using the banker’s algorithm:
a. What is the content of the matrix \( \text{Need} \)?
b. Is the system in a safe state?
c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately? (2+3+5)

(b) How the deadlock is detected and system is recovered from deadlock. (10)

SECTION – B
5(a) What are the various methods of concurrency control? Explain shared lock and exclusive lock. (10)
(b) Explain the interleaving of two transactions with an example and issues related to the problem of interleaving. (10)
6(a) How the process is allocated and scheduled on distributed system? (10)
(b) Explain real time distributed system. (10)
7(a) Consider the following snapshot of a system:

Allocate Max Available
<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>PI</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>P2</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>P3</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>P4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Answer the following questions using the banker’s algorithm:
a. What is the content of the matrix \( \text{Need} \)?
b. Is the system in a safe state?
c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately? (2+3+5)

(b) How the deadlock is detected and system is recovered from deadlock. (10)