QUESTION BANK

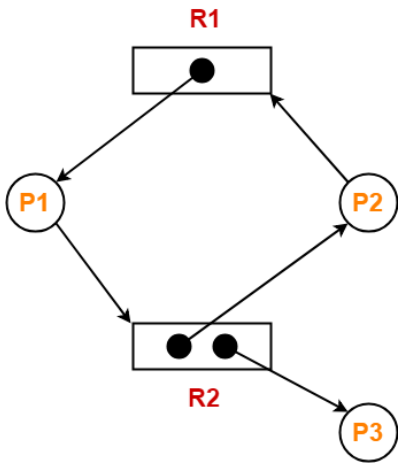
OPERATING SYSTEMS (CSE210)

MODULE 3

Text Book

"Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012".

S. No	Questions	Text Book Page No.	Bloom's Level
1	**Describe** the Race Condition with an appropriate example	**205**	Knowledge
2	Define critical section problem? **Explain** the requirements that are a solution to the critical section problem must satisfy?	**206**	Comprehension
3	**Explain** Peterson's solution for achieving mutual exclusion.	**207**	Comprehension
4	What is semaphore? **Explain** how semaphores can be used to solve the Bounded-buffer problem with code for producer and consumer process.	**213, 219**	Comprehension
5	**Explain** readers & writers problem? Give its solution using semaphores.	**220**	Comprehension
6	**Explain** dining philosopher's problem.	**222**	Comprehension
7	What is a Monitor? Describe the solution to Dining Philosophers problem using monitor	**223**	Comprehension
8	List and explain the four conditions which causes deadlock.	**319**	Comprehension
9	What is resource allocation graph? Make a resource allocation graph with deadlock.	**319**	Knowledge
10	Consider a system with four processes P1, P2, P3, and P4, and two resources, R1, and R2, respectively. Each resource has two instances. Furthermore: - P1 allocates an instance of R2, and requests an instance of R1; - P2 allocates an instance of R1, and doesn't need any other resource; - P3 allocates an instance of R1 and requires an instance of R2; - P4 allocates an instance of R2, and doesn't need any other resource. (a) Draw the resource allocation graph. (b) Is there a cycle in the graph? If yes name it.	**320-321**	Application

<table>
<tr><td></td><td>(c) Is the system in deadlock? If yes, explain why. If not, give a possible sequence of executions after which every process completes.</td><td></td><td></td></tr>
<tr><td>11</td><td>Consider the resource allocation graph in the figure-
 

Find if the system is in a deadlock state otherwise find a safe sequence.</td><td>320-321</td><td>Application</td></tr>
<tr><td>12</td><td>Explain how Banker’s algorithm can be used for deadlock avoidance.</td><td>330</td><td>Comprehension</td></tr>
<tr><td>13</td><td>A system has 5 processes and 4 resource types. The current allocation and maximum demand are as follows-
<table>
<tr><td>Process</td><td>Max</td><td>Allocation</td><td>Available</td></tr>
<tr><td>Resources</td><td>A, B, C, D</td><td>A, B, C, D</td><td>A, B, C, D</td></tr>
<tr><td>P0</td><td>6 0 1 2</td><td>4 0 0 1</td><td>3 2 1 1</td></tr>
<tr><td>P1</td><td>2 7 5 0</td><td>1 1 0 0</td><td></td></tr>
<tr><td>P2</td><td>2 3 5 6</td><td>1 2 5 4</td><td></td></tr>
<tr><td>P3</td><td>1 6 5 3</td><td>0 6 3 3</td><td></td></tr>
<tr><td>P4</td><td>1 6 5 6</td><td>0 2 1 2</td><td></td></tr>
</table></td><td>330</td><td>Application</td></tr>
</table>

<table>
<tr><td></td><td>Using Banker’s algorithm, answer the following questions:-

i) How many resources of type A, B, C, D are there?

ii) What are the contents of need matrix?

iii) Find if the system is in safe state? If it is, find the safe sequence.</td><td></td><td></td></tr>
<tr><td>14</td><td>Consider the following snapshot of the system.
<table>
<tr><td>Process</td><td>Allocation</td><td>Max</td><td>Available</td></tr>
<tr><td>Resources</td><td>A, B, C, D</td><td>A, B, C, D</td><td>A, B, C, D</td></tr>
<tr><td>P0</td><td>2 0 0 1</td><td>4 2 1 2</td><td>3 3 2 1</td></tr>
<tr><td>P1</td><td>3 1 2 1</td><td>5 2 5 2</td><td></td></tr>
<tr><td>P2</td><td>2 1 0 3</td><td>2 3 1 6</td><td></td></tr>
<tr><td>P3</td><td>1 3 1 2</td><td>1 4 2 4</td><td></td></tr>
<tr><td>P4</td><td>1 4 3 2</td><td>3 6 6 5</td><td></td></tr>
</table>
Answer the following questions using Banker’s algorithm.

a. Determine the need matrix.
b. Illustrate that the system in a safe state by demonstrating the order in which the processes may complete
c. If a request from process P1 arrives for (1,1,0,0), can the request be granted immediately
d. If a request from process P1 arrives for (0,0,2,0), can the request be granted immediately.</td><td>330</td><td>Comprehension</td></tr>
<tr><td>15</td><td>Explain the methods to recover from deadlock.</td><td>337</td><td>Comprehension</td></tr>
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