Assignment 9
Operating System Lab (CS342)
Department of CSE, IIT Patna

Date:- 3-April-2021   Deadline:- 4-April, 10.00 AM

Instructions:

1. All the assignments should be completed and uploaded before the deadline. Marks will be deducted for the submissions made after the deadline.
2. Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism.
3. Proper indentation & appropriate comments (if necessary) are mandatory. [2+2 marks]
4. You should zip all the required files and name the zip file as roll_no.zip, eg. 1501cs11.zip.
5. Provide a **readme** file with all the execution details (commands to execute) of the codes and outputs/observations (if necessary).
6. Upload your assignment (the zip file) in the following link:
https://www.dropbox.com/request/KXczwRd82Nn7AUy7jaN1

Questions:

1. **WRITE A C PROGRAM TO SIMULATE ALGORITHM FOR DEADLOCK PREVENTION: -**
   ○ Start the program
   ○ Attacking Mutex condition: never grant exclusive access. But this may not be possible for several resources.
   ○ Attacking pre-emption: not something you want to do.
   ○ Attacking hold and wait condition: make a process hold at the most 1 resource at a time. Make all the requests at the beginning. Nothing policy. If you feel, retry.
   ○ Attacking circular wait: Order all the resources. Make sure that the requests are issued in the correct order so that there are no cycles present in the resource graph. Resources numbered 1 ... n. Resources can be requested only in increasing order. i.e. you cannot request a resource whose no is less than any you may be holding.
   ○ Stop the program

- Sample Output

2. WRITE A C PROGRAM TO SIMULATE ALGORITHM FOR DEADLOCK DETECTION: -

1) Let Work and Finish be vectors of length 'm' and 'n' respectively.

Initialize: Work = Available

Finish[i] = false; for i=1, 2, 3, 4….n

2) Find an i such that both

a) Finish[i] = false

b) Needi <= Work

 if no such i exists goto step (4)

3) Work = Work + Allocation[i]

Finish[i] = true

goto step (2)

4) if Finish [i] = true for all i

then the system is in a safe state

 Else Deadlock Detected.

- Sample Output

Enter the no of process: 4
Enter the no of resources: 5

Total Amount of the Resource R1: 2
Total Amount of the Resource R2: 1
Total Amount of the Resource R3: 1
Total Amount of the Resource R4: 2
Total Amount of the Resource R5: 1
Enter the request matrix:
0 1 0 0 1
0 0 1 0 1
0 0 0 0 1
1 0 1 0 1

Enter the allocation matrix:
1 0 1 1 0
1 1 0 0 0
0 0 0 1 0
0 0 0 0 0
Deadlock detected
-

3. WRITE A C PROGRAM TO SIMULATE ALGORITHM FOR DEADLOCK AVOIDANCE (BANKER'S ALGORITHM) AND PRINT ALL POSSIBLE SAFE SEQUENCES.

- **Sample Output**

Enter the no of process: 5

Enter the no of resources: 3

Total Amount of the Resources

R1: 3

Total Amount of the Resource

R2: 3

Total Amount of the Resource

R3: 2

Enter the max matrix:

P_0 7 5 3

P_1 3 2 2

P_2 9 0 2

P_3 2 2 2

P_4 4 3 3

Enter the allocation matrix:

P_0 0 1 0

P_1 2 0 0

P_2 3 0 2

P_3 2 1 1

P_4 0 0 2

Safe sequence 1: P1 -> P3 -> P4 -> P0 -> P2

Safe sequence 2: P1-> P4-> P0-> P2-> P3