Academic Year: 2023-24 Sem: III

Sub: Operating Systems Laboratory SAP ID: 60003220131

EXPERIMENT NO. 04

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BATCH: 1

```
import java.util.*;
class Exp4Q1.java
{
public
    static void main(String[] args)
    {
        int[][] allocation = {{1, 0, 1}, {2, 1, 2}, {3, 0, 0}, {1, 0, 1}};
        int[][] max = {{2, 1, 1}, {5, 4, 4}, {3, 1, 1}, {1, 1, 1}};
        int[] available = {2, 1, 1};
        int[][] need = new int[4][3];

        for (int i = 0; i < allocation.length; i++)
        {
            for (int j = 0; j < available.length; j++)
            {
                need[i][j] = max[i][j] - allocation[i][j];
            }
        }
        int[] work = available;
        boolean[] finish = new boolean[max.length];
        for (int i = 0; i < work.length; i++)
        {
            finish[i] = false;
        }
        int h = 0;
        int t = 0;
        System.out.println("Sequence");
        while (h <= 4)
        {
            for (int i = 0; i < max.length; i++)
            {
                if (finish[i] == false)
                {
                    if (need[i][0] <= work[0] && need[i][1] <= work[1] &&
need[i][2] <= work[2])
                    {
                        for (int j = 0; j < work.length; j++)
```

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```
                        {
                            work[j] = work[j] + allocation[i][j];
                        }
                        System.out.print("P" + i + " ");
                        finish[i] = true;
                        t++;
                    }
                }
            }
            h++;
        }
        if (t == max.length)
        {
            System.out.println("\nThe process is safe");
        }
        else
        {
            System.out.println("\nnot safe");
        }
    }
}
```

OUTPUT

```
Sequence
P0 P2 P3
not safe
```

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```
import java.util.*;
public
class Exp4Q2
{
public
    static void main(String[] args)
    {
        int[][] allocation = {{0, 1, 1, 0}, {1, 2, 3, 1}, {1, 3, 6, 5}, {0, 6,
3, 2}, {0, 0, 1, 4}};
        int[][] max = {{0, 2, 1, 0}, {1, 6, 5, 2}, {2, 3, 6, 6}, {0, 6, 5, 2},
{0, 6, 5, 6}};
        int[] available = {1, 5, 2, 0};
        int[][] need = new int[5][4];

        for (int i = 0; i < allocation.length; i++)
        {
            for (int j = 0; j < available.length; j++)
            {
                need[i][j] = max[i][j] - allocation[i][j];
            }
        }
        int[] work = available;
        boolean[] finish = new boolean[max.length];
        for (int i = 0; i < max.length; i++)
        {
            finish[i] = false;
        }
        int h = 0;
        int t = 0;
        System.out.println("Sequence");
        while (h <= 5)
        {
            for (int i = 0; i < max.length; i++)
            {
                if (finish[i] == false)
                {
                    if (need[i][0] <= work[0] && need[i][1] <= work[1] &&
need[i][2] <= work[2] && need[i][3] <= work[3])
                    {
                        for (int j = 0; j < work.length; j++)
                        {
                            work[j] = work[j] + allocation[i][j];
                        }
                        System.out.print("P" + i + " ");
                        finish[i] = true;
                        t++;
```

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```
                    }
                }
            }
            h++;
        }
        if (t == max.length)
        {
            System.out.println("\nThe process is safe");
        }
        else
        {
            System.out.println("\n not safe");
        }
    }
```

OUTPUT:

```
Sequence
P0 P3 P4 P1 P2
The process is safe
```