**CSE321 Lab06**

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**Sec: 07**

Task banker’s algorithm:

import java.util.\*;

import java.io.\*;

public class Bankers\_Algorithm {

public static void main(String[] args) throws Exception{

BufferedReader b = new BufferedReader(new FileReader("input.txt"));

int r = Integer.parseInt(b.readLine());

int c = Integer.parseInt(b.readLine());

String[] process= new String[r];

int [][] max = new int[r][c];

int [][] allocation = new int[r][c];

int [][] need = new int[r][c];

int [][] available = new int[r+1][c];

LinkedList<Integer> track= new LinkedList<Integer>();

String s1 = b.readLine();

StringTokenizer s2 = new StringTokenizer(s1," ");

int n=0;

while(s2.hasMoreTokens()){

process[n]=s2.nextToken();

n++;

}

for(int i=0;i<r;i++){

String s = b.readLine();

StringTokenizer s3 = new StringTokenizer(s," ");

for(int j=0;j<c;j++){

max[i][j]=Integer.parseInt(s3.nextToken());

}

}

for(int i=0;i<r;i++){

String s = b.readLine();

StringTokenizer s3 = new StringTokenizer(s," ");

for(int j=0;j<c;j++){

allocation[i][j]=Integer.parseInt(s3.nextToken());

need[i][j]= max[i][j]-allocation[i][j];

}

}

System.out.print("Need Matrix: ");

for(int i=0;i<r;i++){

System.out.println();

for(int j=0;j<c;j++){

System.out.print(need[i][j] +" ");

}

}

System.out.println();

String s = b.readLine();

StringTokenizer s3 = new StringTokenizer(s," ");

int counter=0;

while(s3.hasMoreTokens()){

available[0][counter]=Integer.parseInt(s3.nextToken());

counter++;

}

counter=0;

for(int i=0;;i++){

i=i%r;

boolean flag= true;

for(int j=0;j<c;j++){

if(need[i][j]<=available[counter][j]){

}

else{

flag=false;

break;

}

if(flag && j==(c-1) && !track.contains(i)){

for(int k=0; k<c;k++){

available[counter+1][k]=available[counter][k]+allocation[i][k];

}

track.addLast(i);

counter++;

}

}

if(track.size()==r){

break;

}

}

System.out.print("Safe sequence: ");

for(int i=0;i<track.size();i++){

System.out.print(process[track.get(i)]+ " ");

}

System.out.println();

System.out.print("Change in available resourse matrix: ");

for(int i=1;i<available.length;i++){

System.out.println();

for(int j=0;j<c;j++){

System.out.print(available[i][j] +" ");

}

}

System.out.println();

}

}