```
SAI KHAM SHENG 5717607
package BankerAlgorithm;

import java.util.Scanner;
public class banker {

	//processes=pro, resources=re.
	private int need[][], allocate[][], max[][], avail[][], pro, re;

	private void input(){
		Scanner sn = new Scanner (System.in);
		System.out.print("no. of processes: ");
		pro = sn.nextInt();
		System.out.print("no. of resources: ");
		re = sn.nextInt();

		need = new int [pro][re];
		allocate = new int [pro][re];
		max = new int [pro][re];
		avail = new int [1][re];

		System.out.println("Enter allocation number");
		for (int i=0;i<pro;i++)
			for (int j=0;j<re;j++)
				allocate[i][j] = sn.nextInt();

		System.out.println("Enter max number");
		for (int i=0;i<pro;i++)
			for (int j=0;j<re;j++)
				max[i][j] = sn.nextInt();

		System.out.println("Enter available number");
		for (int j=0;j<re;j++)
			avail[0][j] = sn.nextInt();

		sn.close();
	}

	//calculate the need matrix
	private int [][] cal_need(){
		for (int i=0;i<pro;i++)
			for (int j=0;j<re;j++)
				need[i][j] = max[i][j] - allocate[i][j];
		return need;
	}

	//Check if the requested resource is available or not
	private boolean check(int i){
```

```
            for (int j=0;j<re;j++)
                  if (avail[0][j]<need[i][j])
                        return false;
            return true;
      }

      public void isSafe(){
            input(); //collecting data from the user
            cal_need(); //calculation here
            boolean done[] = new boolean [pro];
            int j = 0;
            while(j<pro){//until all process allocate
                  boolean allocated = false;
                  for (int i=0;i<pro;i++)
                        if (!done[i] && check(i)){ //trying to allocate
                              for (int k=0;k<re;k++)
                                    avail[0][k] = avail[0][k] - need[i][k] +
max[i][k];
                              System.out.println("Allocated process: "+ i);
                              allocated = done[i] = true;
                              j++;
                        }
                  if (!allocated) break; //if no allocation
            }
            if (j == pro) //if all processes are allocated
                  System.out.println("\n Safety allocated");
            else
                  System.out.println("All process can't be allocated
safely");
      }

      public static void main (String agrs[]){
            new banker().isSafe();
      }
}
```