**TASK 1:**

#include <iostream>

using namespace std;

int main()

{

int numOfProcess, numOfResources, i, j, k;

numOfProcess = 5;

numOfResources = 3;

int allocation[5][3] = { { 0, 1, 0 },{ 2, 0, 0 },{ 3, 0, 2 },{ 2, 1, 1 },{ 0, 0, 2 } };

int max[5][3] = { { 7, 5, 3 },{ 3, 2, 2 },{ 9, 0, 2 },{ 2, 2, 2 },{ 4, 3, 3 } };

int available[3] = { 3, 3, 2 };

int arr[numOfProcess], safeSeq[numOfProcess], count = 0;

for (k = 0; k < numOfProcess; k++)

{

arr[k] = 0;

}

int need[numOfProcess][numOfResources];

for (i = 0; i < numOfProcess; i++)

{

for (j = 0; j < numOfResources; j++)

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

}

int y = 0;

for (k = 0; k < 5; k++)

{

for (i = 0; i < numOfProcess; i++)

{

if (arr[i] == 0)

{

int flag = 0;

for (j = 0; j < numOfResources; j++)

{

if (need[i][j] > available[j])

{

flag = 1;

break;

}

}

if (flag == 0)

{

safeSeq[count++] = i;

for (y = 0; y < numOfResources; y++)

available[y] += allocation[i][y];

arr[i] = 1;

}

}

}

}

int flag = 1;

for(int i = 0;i<numOfProcess;i++)

{

if(arr[i]==0)

{

flag = 0;

cout << "This is an unsafe sequence.";

break;

}

}

if(flag==1)

{

cout << "The SAFE Sequence is :";

for (i = 0; i < numOfProcess - 1; i++)

cout << " P" << safeSeq[i] << " ->";

cout << " P" << safeSeq[numOfProcess - 1] <<endl;

}

return 0;

}

