**OPERATING SYSTEM - CS23431**

**EXP 9**

**DEADLOCK AVOIDANCE**

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**PROGRAM:**

#include <stdio.h>

int main() {

int resource, process;

printf("Enter number of resources: ");

scanf("%d", &resource);

printf("Enter number of processes: ");

scanf("%d", &process);

int inst[resource];

printf("Enter max instance of each resource: ");

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

scanf("%d", &inst[i]);

}

int allocated[process][resource], max[process][resource], need[process][resource];

int available[resource];

printf("Enter allocated matrix row-wise:\n");

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

printf("Process %d: ", i + 1);

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

scanf("%d", &allocated[i][j]);

}

}

printf("Enter Max matrix row-wise:\n");

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

printf("Process %d: ", i + 1);

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

scanf("%d", &max[i][j]);

}

}

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

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

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

}

}

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

int sum = 0;

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

sum += allocated[i][j];

}

available[j] = inst[j] - sum;

}

int finish[process];

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

finish[i] = 0;

}

int safeseq[process];

int count = 0, canrun, notsafe = 0;

while (count < process) {

int found = 0;

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

if (!finish[i]) {

canrun = 1;

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

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

canrun = 0;

break;

}

}

if (canrun) {

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

available[j] += allocated[i][j];

}

safeseq[count++] = i;

finish[i] = 1;

found = 1;

}

}

}

if (!found) {

printf("System is not in safe sequence\n");

notsafe = 1;

break;

}

}

if (!notsafe) {

printf("The system is in a safe sequence:\n");

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

printf("P%d", safeseq[i]);

if (i != process - 1) {

printf(" -> ");

}

}

printf("\n");

}

return 0;

}

**OUTPUT:**

