#include <stdio.h>

int current[5][5], maximum\_claim[5][5], available[5];

int allocation[5] = {0, 0, 0, 0, 0};

int maxres[5], running[5], safe = 0;

int counter = 0, i, j, exec, resources, processes, k = 1;

int main()

{

printf("\nEnter number of processes: ");

scanf("%d", &processes);

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

{

running[i] = 1;

counter++;

}

printf("\nEnter number of resources: ");

scanf("%d", &resources);

printf("\nEnter Claim/Available Vector:");

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

{

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

}

printf("\nEnter Allocated Resource Table:\n");

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

{

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

{

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

}

}

printf("\nEnter Maximum Claim/Need Table:\n");

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

{

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

{

scanf("%d", &maximum\_claim[i][j]);

}

}

printf("\nThe Claim/Available Vector is: ");

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

{

printf("\t%d", maxres[i]);

}

printf("\nThe Allocated Resource Table:\n");

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

{

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

{

printf("\t%d", current[i][j]);

}

printf("\n");

}

printf("\nThe Maximum Claim/Need Table:\n");

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

{

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

{

printf("\t%d", maximum\_claim[i][j]);

}

printf("\n");

}

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

{

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

{

allocation[j] += current[i][j];

}

}

printf("\nAllocated resources:");

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

{

printf("\t%d", allocation[i]);

}

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

{

available[i] = maxres[i] - allocation[i];

}

printf("\nAvailable resources:");

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

{

printf("\t%d", available[i]);

}

printf("\n");

while (counter != 0)

{

safe = 0;

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

{

if (running[i])

{

exec = 1;

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

{

if (maximum\_claim[i][j] - current[i][j] > available[j])

{

exec = 0;

break;

}

}

if (exec)

{

printf("\nProcess%d is executing\n", i + 1);

running[i] = 0;

counter--;

safe = 1;

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

{

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

}

break;

}

}

}

if (!safe)

{

printf("\nThe processes are in unsafe state.\n");

break;

}

else

{

printf("\nThe process is in safe state");

printf("\nAvailable vector:");

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

{

printf("\t%d", available[i]);

}

printf("\n");

}

}

return 0;

}