#include <stdio.h>

#include <stdlib.h>

#include <time.h>

//#define N 5 //rows

//#define M 5 // columns

int\*\* init(int\* N, int\* M);

void print(int\*\* mas, int N, int M);

int randnum(int min, int max);

void UPcircleshiftALL(int\*\* mas, int N, int M);

void DOWNcircleshiftALL(int\*\* mas, int N, int M);

void LEFTcircleshiftALL(int\*\* mas, int N, int M);

void RIGHTcircleshiftALL(int\*\* mas, int N, int M);

void shiftUP(int \*\*mas, int N, int index);

void shiftDOWN(int \*\*mas, int N, int index);

void shiftLEFT(int \*mas, int M);

void shiftRIGHT(int \*mas, int M);

int main(void)

{

int N, M, \*\*tmas = init(&N, &M);

printf("N = %d\nM = %d\n", N, M);

print(tmas, N, M);

UPcircleshiftALL(tmas, N, M);

print(tmas, N, M);

getchar();

getchar();

return 0;

}

int\*\* init(int\* N, int\* M)

{

int\*\* mas;

srand(time(NULL));

scanf("%d %d", N, M);

mas = (int \*\*)malloc(sizeof(int\*) \* \*N);

for (int i = 0; i < \*N; ++i)

{

\*(mas + i) = (int \*)malloc(sizeof(int) \* \*M);

}

for (int i = 0; i < \*N; ++i)

{

for (int j = 0; j < \*M; ++j)

{

mas[i][j] = randnum(1, 100);

}

}

return mas;

}

void print(int\*\* mas, int N, int M)

{

putchar('\n');

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

{

for (int j = 0; j < M; ++j)

{

printf(" %3d", mas[i][j]);

}

putchar('\n');

}

}

int randnum(int min, int max)

{

return min + rand() % (max - min + 1);

}

void UPcircleshiftALL(int\*\* mas, int N, int M)

{

for (int i = 1; i < M; ++i)

for (int j = i; j > 0; --j)

shiftUP(mas, N, i);

}

void shiftUP(int \*\*mas, int N, int index)

{

int a = mas[0][index];

for (int i = 0; i < N - 1; ++i)

mas[i][index] = mas[i + 1][index];

mas[N - 1][index] = a;

}

void DOWNcircleshiftALL(int\*\* mas, int N, int M)

{

for (int i = 1; i < M; ++i)

for (int j = i; j > 0; --j)

shiftDOWN(mas, N, i);

}

void shiftDOWN(int \*\*mas, int N, int index)

{

int a = mas[N - 1][index];

for (int i = N - 1; i > 0; i--)

mas[i][index] = mas[i - 1][index];

mas[0][index] = a;

}

void LEFTcircleshiftALL(int\*\* mas, int N, int M)

{

for (int i = 1; i < N; ++i)

for (int j = i; j > 0; --j)

shiftLEFT(mas[i], M);

}

void shiftLEFT(int \*mas, int M)

{

int i, k = mas[0];

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

mas[i] = mas[i + 1];

mas[M - 1] = k;

}

void RIGHTcircleshiftALL(int\*\* mas, int N, int M)

{

for (int i = 1; i < N; ++i)

for (int j = i; j > 0; --j)

shiftRIGHT(mas[i], M);

}

void shiftRIGHT(int \*mas, int M)

{

int i, k = mas[M - 1];

for (i = M - 1; i > 0; i--)

mas[i] = mas[i - 1];

mas[0] = k;

}