2001210004 – Lưu Đức Vinh

Bài tập về nhà Buổi 4:

Bài 2 và Bài 4:

#define \_CRT\_NONSTDC\_NO\_WARNINGS

#define \_CRT\_SECURE\_NO\_WARNINGS

#include <stdio.h>

#include <conio.h>

#include <stdlib.h>

#include <time.h>

#define MAX 100

void NhapMTV (int a[][MAX], int &n);

void NhapMTV\_Random (int a[][MAX], int &n);

void XuatMTV (int a[][MAX], int n);

void PT\_TrenDuongCheoChinh (int a[][MAX], int n);

void PT\_SongSongDuongCheoChinh (int a[][MAX], int n);

int TimPTMax\_TamGiacTren (int a[][MAX], int n);

void Sapxep\_Dgcheochinh\_TangdanTuTrenXuongDuoi (int a[][MAX], int n);

void Sapxep\_DgCheoPhu\_TangdanTuTrenXuongDuoi (int a[][MAX], int n);

void Sapxep\_DgCheoPhu\_GiamdanTuTrenXuongDuoi (int a[][MAX], int n);

void Sapxep\_DongChanGiam\_DongLeTang (int a[][MAX], int n);

void Sapxep\_CotChanTang\_CotLeGiam (int a[][MAX], int n);

//void SapxepPT\_SongSongDuongCheoChinh\_DuongcheoChinh\_Tangdan (int a[][MAX], int n);

int KiemTraPT\_DoixungQuaDuongcheochinh (int a[][MAX], int n);

int main ()

{

int a[MAX][MAX], n, chon;

do

{

printf("1.Nhap ma tran vuong n>= 5\n");

printf("2.Xuat ma tran vuong\n");

printf("3.Xuat cac PT tren duong cheo chinh\n");

printf("4.Xuat cac PT thuoc duong cheo song song voi duong cheo chinh\n");

printf("5.Tim Max thuoc tam giac tren cua duong cheo chinh\n");

printf("6.Sap xep ma tran tang dan theo kieu zic zac\n");

printf("7.Sap xep duong cheo chinh tang dan tu tren xuong duoi\n");

printf("8.Sap xep duong cheo phu tang dan/giam dan tu tren xuong duoi\n");

printf("9.Sap xep dong chan giam dong le tang\n");

printf("10.Sap xep cot chan tang cot le giam\n");

printf("11.Sap xep cac PT tren duong cheo chinh va duong cheo song song voi duong cheo chinh tang dan\n");

printf("12.Kiem tra cac PT trong mang co doi xung nhau qua duong cheo chinh\n");

printf("Chon chuc nang: "); scanf\_s("%d", &chon);

switch (chon)

{

case 1:

{

int choose;

do

{

printf("1.Nhap ma tran thu cong\n");

printf("2.Nhap ma tran ngau nhien\n");

printf("Chon chuc nang: "); scanf\_s("%d", &choose);

switch (choose)

{

case 1:

{

NhapMTV(a, n);

break;

}

case 2:

{

NhapMTV\_Random(a, n);

break;

}

}

}

while (choose != 1 && choose != 2);

break;

}

case 2:

{

XuatMTV(a, n);

break;

}

case 3:

{

PT\_TrenDuongCheoChinh(a, n);

break;

}

case 4:

{

PT\_SongSongDuongCheoChinh(a, n);

break;

}

case 5:

{

printf("PT Max thuoc tam giac tren cua duong cheo chinh trong mang la: %d\n", TimPTMax\_TamGiacTren(a, n));

break;

}

case 6:

{

break;

}

case 7:

{

Sapxep\_Dgcheochinh\_TangdanTuTrenXuongDuoi(a, n);

break;

}

case 8:

{

int choose;

do

{

printf("1.Tang dan tu tren xuong duoi\n");

printf("2.Giam dan tu tren xuong duoi\n");

printf("Chon chuc nang: "); scanf\_s("%d", &choose);

switch (choose)

{

case 1:

{

Sapxep\_DgCheoPhu\_TangdanTuTrenXuongDuoi(a, n);

break;

}

case 2:

{

Sapxep\_DgCheoPhu\_GiamdanTuTrenXuongDuoi(a, n);

break;

}

}

}

while (choose != 1 && choose != 2);

break;

}

case 9:

{

Sapxep\_DongChanGiam\_DongLeTang(a, n);

break;

}

case 10:

{

Sapxep\_CotChanTang\_CotLeGiam(a, n);

break;

}

case 11:

{

//SapxepPT\_SongSongDuongCheoChinh\_DuongcheoChinh\_Tangdan(a, n);

break;

}

case 12:

{

printf("%s\n", (KiemTraPT\_DoixungQuaDuongcheochinh(a, n) == 1 ? "Mang doi xung qua duong cheo chinh":"Mang ko doi xung qua duong cheo chinh"));

}

}

}

while (chon != 0);

return 0;

getch ();

}

void NhapMTV (int a[][MAX], int &n)

{

do

{

printf("Nhap cap cua ma tran: "); scanf\_s("%d", &n);

}

while (n < 5);

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

{

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

{

printf("Nhap a[%d][%d]: ", i, j);

scanf\_s("%d", &a[i][j]);

}

}

}

void NhapMTV\_Random (int a[][MAX], int &n)

{

do

{

printf("Nhap cap cua ma tran: "); scanf\_s("%d", &n);

}

while (n < 5);

srand((unsigned)time(NULL));

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

{

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

{

a[i][j] = rand() % 101;

}

}

}

void XuatMTV (int a[][MAX], int n)

{

printf("Xuat ma tran vuong:\n");

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

{

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

{

printf("%5d", a[i][j]);

}

printf("\n");

}

}

void PT\_TrenDuongCheoChinh (int a[][MAX], int n)

{

printf("Cac PT tren duong cheo chinh:\n");

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

{

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

{

if (i == j)

{

printf("%5d", a[i][j]);

}

}

}

printf("\n");

}

void PT\_SongSongDuongCheoChinh (int a[][MAX], int n)

{

printf("Cac PT thuoc duong cheo song song voi duong cheo chinh\n");

for (int x = 0; x < n; x++)

for (int y = 0; y < n; y++)

if (x == 0 && y != n - 1 && x != y || y == 0 && x != n - 1 && x != y)

{

for (int i = x, j = y; i < n && j < n; i++, j++)

{

printf("%5d", a[i][j]);

}

printf("\n");

}

}

int TimPTMax\_TamGiacTren (int a[][MAX], int n)

{

int max = a[0][n - 1];

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

{

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

{

if (i < j && a[i][j] > max)

{

max = a[i][j];

}

}

}

return max;

}

void swap (int &x, int &y)

{

int temp = x;

x = y;

y = temp;

}

void Sapxep\_Dgcheochinh\_TangdanTuTrenXuongDuoi (int a[][MAX], int n)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (a[i][i] > a[j][j])

{

int temp = a[i][i];

a[i][i] = a[j][j];

a[j][j] = temp;

}

}

}

}

void Sapxep\_DgCheoPhu\_TangdanTuTrenXuongDuoi (int a[][MAX], int n)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (a[i][n - 1 - i] > a[j][n - 1 - j])

{

swap(a[i][n - 1 - i], a[j][n - 1 - j]);

}

}

}

}

void Sapxep\_DgCheoPhu\_GiamdanTuTrenXuongDuoi (int a[][MAX], int n)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (a[i][n - 1 - i] < a[j][n - 1 - j])

{

swap(a[i][n - 1 - i], a[j][n - 1 - j]);

}

}

}

}

void Sapxep\_DongChanGiam\_DongLeTang (int a[][MAX], int n)

{

for (int k = 0; k < n; k++)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (k % 2 == 0 && a[k][i] < a[k][j])

{

swap(a[k][i], a[k][j]);

}

}

}

}

for (int k = 0; k < n; k++)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (k % 2 != 0 && a[k][i] > a[k][j])

{

swap(a[k][i], a[k][j]);

}

}

}

}

}

void Sapxep\_CotChanTang\_CotLeGiam (int a[][MAX], int n)

{

for (int k = 0; k < n; k++)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (k % 2 == 0 && a[i][k] > a[j][k])

{

swap(a[i][k], a[j][k]);

}

}

}

}

for (int k = 0; k < n; k++)

{

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

{

for (int j = i + 1; j < n; j++)

{

if (k % 2 != 0 && a[i][k] < a[j][k])

{

swap(a[i][k], a[j][k]);

}

}

}

}

}

//void SapxepPT\_SongSongDuongCheoChinh\_DuongcheoChinh\_Tangdan (int a[][MAX], int n)

//{

// printf("Cac PT thuoc duong cheo song song voi duong cheo chinh\n");

// for (int x = 0; x < n; x++)

// for (int y = 0; y < n; y++)

// if (x == 0 && y != n - 1 || y == 0 && x != n - 1)

// {

// for (int i = x, j = y; i < n - 1 && j < n - 1; i++, j++)

// {

// for (int d = x + 1, c = y + 1; d < n && c < n; d++, c++)

// {

// if (a[i][j] > a[d][c])

// {

// swap(a[i][j], a[d][c]);

// }

// }

// }

// }

//}

int KiemTraPT\_DoixungQuaDuongcheochinh (int a[][MAX], int n)

{

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

{

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

{

if (a[i][j] != a[j][i])

{

return 0;

}

}

}

return 1;

}