Benjamin Horn

Lab # 06

EECE 1080 – C++

4/1/2015

#include <stdio.h>

#include <ctype.h>

#include <iostream>

#include <ctime>

#include <iomanip>

using namespace std;

// const int rows=20, cols=20;

class mat

{

public:

int arrays[20][20];

int arrays2[20][20];

int max = 20;

int min = 0;

void mat1(int rows, int cols)

{

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

{

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

{

arrays[i][j] = rand() % max + min ;

}

}

cout << " Your matrix is . . ." << endl;

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

{

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

{

cout << arrays[i][j] << "," << setw(2);

}cout << endl;

}cout << endl;

if (rows == cols)

{

cout << "Your Matrix is Square" << endl;

}

}

void mat2(int rows, int cols)

{

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

{

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

{

arrays2[i][j] = rand() % max + min;

}

}

cout << " Your matrix is . . ." << endl;

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

{

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

{

cout << arrays2[i][j] << "," << setw(2);

}cout << endl;

}cout << endl;

}

int mult(int, int);

void subt(int, int);

void add(int, int);

void scalar(int, int);

void maximum(int, int);

void minimum(int, int);

void negate(int, int);

int sum(int, int);//done

};

void mat::subt(int rows, int cols)

{

cout << "subtraction matrix" << endl;

if (rows == cols)

{

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

{

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

{

cout << arrays2[i][j] - arrays[i][j] << ",";

}cout << endl;

}cout << endl;

}

else if (rows == cols)

{

cout << "matrix dimesnsions so not match, can not add" << endl;

}

}

void mat::add(int rows, int cols)

{

if (rows == cols)

{

cout << endl;

cout << "addition matrix" << endl;

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

{

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

{

cout << arrays2[i][j] + arrays[i][j] << ",";

}cout << endl;

}cout << endl;

}

else if (rows == cols)

{

cout << "Dimensions do not match, cant add" << endl;

}

}

void mat::negate(int rows, int cols)

{

cout << endl;

cout << "negated matrix" << endl;

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

{

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

{

cout << arrays[i][j] \* -1 << ",";

}cout << endl;

}cout << endl;

}

void mat::scalar(int rows, int cols)

{

int scal = 4;

cout << endl; cout << endl;

cout << endl;

cout << " matrix scaled by " << scal << endl;

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

{

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

{

cout << arrays[i][j] \* scal << ",";

}cout << endl;

}cout << endl;

}

void mat::maximum(int rows, int cols)

{

cout << endl;

int max = 0;

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

{

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

{

if (arrays[i][j] >= max)

max = arrays[i][j];

}

}

cout << "The highest value in the matrix is " << max << endl;

}

void mat::minimum(int rows, int cols)

{

cout << endl;

int minimum = 1000000;

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

{

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

{

if (arrays[i][j] <= minimum)

minimum = arrays[i][j];

}

}

cout << "The lowest value in the matrix is " << minimum << endl;

}

int mat::sum(int rows, int cols)

{

cout << endl;

int sum = 0;

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

{

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

{

sum = arrays[i][j] + sum;

}

}

cout << "Sum of Entire Matrix" << sum << endl;

return sum;

}

int mat::mult(int rows, int cols)

{

cout << endl;

if (rows == cols)

{

int matmult[20][20];

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

{

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

{

matmult[i][j] = (arrays[i][j] \* arrays2[i][j]);

}

}

cout << "Multiple Matrix . . ." << endl;

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

{

cout << "row " << i << endl;

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

{

cout << matmult[i][i] << ",";

}cout << endl;

}cout << endl;

if (rows == cols)

{

cout << "Your matrix is Square" << endl;

}

}

else if (rows != cols)

{

cout << "Dimensions Dont Match, cant mutiply" << endl;

}

return 0;

}

int main()

{

int rows, cols;

cout << "Enter the rows of the matrix please" << endl;

cin >> rows;

cout << "Enter the columns of the matrix please" << endl;

cin >> cols;

system("PAUSE");

mat ret;

ret.mat1(rows, cols);

system("PAUSE");

ret.sum(rows, cols);

system("PAUSE");

ret.minimum(rows, cols);

system("PAUSE");

ret.maximum(rows, cols);

system("PAUSE");

ret.scalar(rows, cols);

system("PAUSE");

ret.negate(rows, cols);

system("PAUSE");

ret.mat2(rows, cols);

system("PAUSE");

ret.mult(rows, cols);

system("PAUSE");

ret.add(rows, cols);

system("PAUSE");

ret.subt(rows, cols);

system("PAUSE");

return 0;

}

OUTPUT------------------------------------------------------------------------------

Enter the rows of the matrix please

4

Enter the columns of the matrix please

4

Press any key to continue . . .

Your matrix is . . .

1, 7,14, 0,

9, 4,18,18,

2, 4, 5, 5,

1, 7, 1,11,

Your Matrix is Square

Press any key to continue . . .

Sum of Entire Matrix = 107

Press any key to continue . . .

The lowest value in the matrix is = 0

Press any key to continue . . .

The highest value in the matrix is = 18

Press any key to continue . . .

matrix scaled by 4

4,28,56,0,

36,16,72,72,

8,16,20,20,

4,28,4,44,

Press any key to continue . . .

negated matrix

-1,-7,-14,0,

-9,-4,-18,-18,

-2,-4,-5,-5,

-1,-7,-1,-11,

Press any key to continue . . .

Your matrix is . . .

15, 2, 7,16,

11, 4, 2,13,

12, 2, 1,16,

18,15, 7, 6,

Press any key to continue . . .

Multiple Matrix . . .

row 1

15,15,15,15,

row 2

16,16,16,16,

row 3

5,5,5,5,

row 4

66,66,66,66,

Your matrix is Square

Press any key to continue . . .

addition matrix

16,9,21,16,

20,8,20,31,

14,6,6,21,

19,22,8,17,

Press any key to continue . . .

subtraction matrix

14,-5,-7,16,

2,0,-16,-5,

10,-2,-4,11,

17,8,6,-5,

Press any key to continue . . .

Press any key to continue . . .

---------------- A second trial ----------------------------------

(This one will have uneven matrices to show that theydont evaluate and it will tell the user that)

Enter the rows of the matrix please

6

Enter the columns of the matrix please

7

Press any key to continue . . .

Your matrix is . . .

1, 7,14, 0, 9, 4,18,

18, 2, 4, 5, 5, 1, 7,

1,11,15, 2, 7,16,11,

4, 2,13,12, 2, 1,16,

18,15, 7, 6,11,18, 9,

12, 7,19,15,14, 3,11,

Press any key to continue . . .

Sum of Entire Matrix = 373

Press any key to continue . . .

The lowest value in the matrix is = 0

Press any key to continue . . .

The highest value in the matrix is = 19

Press any key to continue . . .

matrix scaled by 4

4,28,56,0,36,16,72,

72,8,16,20,20,4,28,

4,44,60,8,28,64,44,

16,8,52,48,8,4,64,

72,60,28,24,44,72,36,

48,28,76,60,56,12,44,

Press any key to continue . . .

negated matrix

-1,-7,-14,0,-9,-4,-18,

-18,-2,-4,-5,-5,-1,-7,

-1,-11,-15,-2,-7,-16,-11,

-4,-2,-13,-12,-2,-1,-16,

-18,-15,-7,-6,-11,-18,-9,

-12,-7,-19,-15,-14,-3,-11,

Press any key to continue . . .

Your matrix is . . .

2,13,13, 4, 1,11,13,

8, 7, 4, 2,17,17,19,

3, 1, 9,18,16,15,10,

2, 8, 6, 0, 2, 4, 8,

6, 5,10, 9,10,10, 6,

1,13, 8, 9, 3, 4,14,

Press any key to continue . . .

Dimensions Dont Match, cant mutiply

Press any key to continue . . .

Press any key to continue . . .