

Final.cpp

The screenshot shows a C++ source file named Final.cpp in the Sublime Text editor. The code implements a main function that takes command-line arguments and sets a global Mode variable based on those arguments.

```
#include <stdio.h>
#include <math.h>

#include "Mode.h"

int main(int argc, char* argv[])
{
    int a;
    Mode mod;

    if(argc != 2)
    {
        printf("\n\t\t\tBiomedical Engineering Survival Pack\n\n\n");
        printf("\t\t\t\tProgramming Final Project\n");
        printf("\t\t\t by Maria Prevolyta (11806002)\n");
        printf("\t\t\t Timotius Christopher Tantokusumo (11806001)\n");
        printf("\nPlease Choose a Mode:\n");
        printf("1. Matrices (Addition, Substraction, Multiplication, Transpose, Echelon)\n2. Polynomials (Graph, Peak)\n3. Complex\n");
        printf("4. Basic Calculator\n");
        return -1;
    }

    a = atoi(argv[1]);

    mod.setMode (a);

    printf(" ", mod.getMode());

return 0;
}
```

The code includes headers for standard I/O and mathematics, and a custom header Mode.h. It defines a main function that checks the number of arguments. If there are more than one argument, it prints a multi-line message identifying the project and authors before returning -1. Otherwise, it converts the first argument to an integer and calls setMode on a Mode object. Finally, it prints the result of getMode() and returns 0.

Mode.h

The image shows a Sublime Text editor window titled "C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Mode.h - Sublime Text (UNREGISTERED)". The editor is displaying the content of "Mode.h", which is a C++ header file. The code defines a class named "Mode" with a private member variable "mode" and two public methods: "setMode" and "getMode". The code is as follows:

```
1 #ifndef MODE_H
2 #define MODE_H
3
4 class Mode {
5
6 public:
7
8     int mode;
9
10    void setMode (int m);
11
12    int getMode (void);
13
14 };
15
16 #endif
```

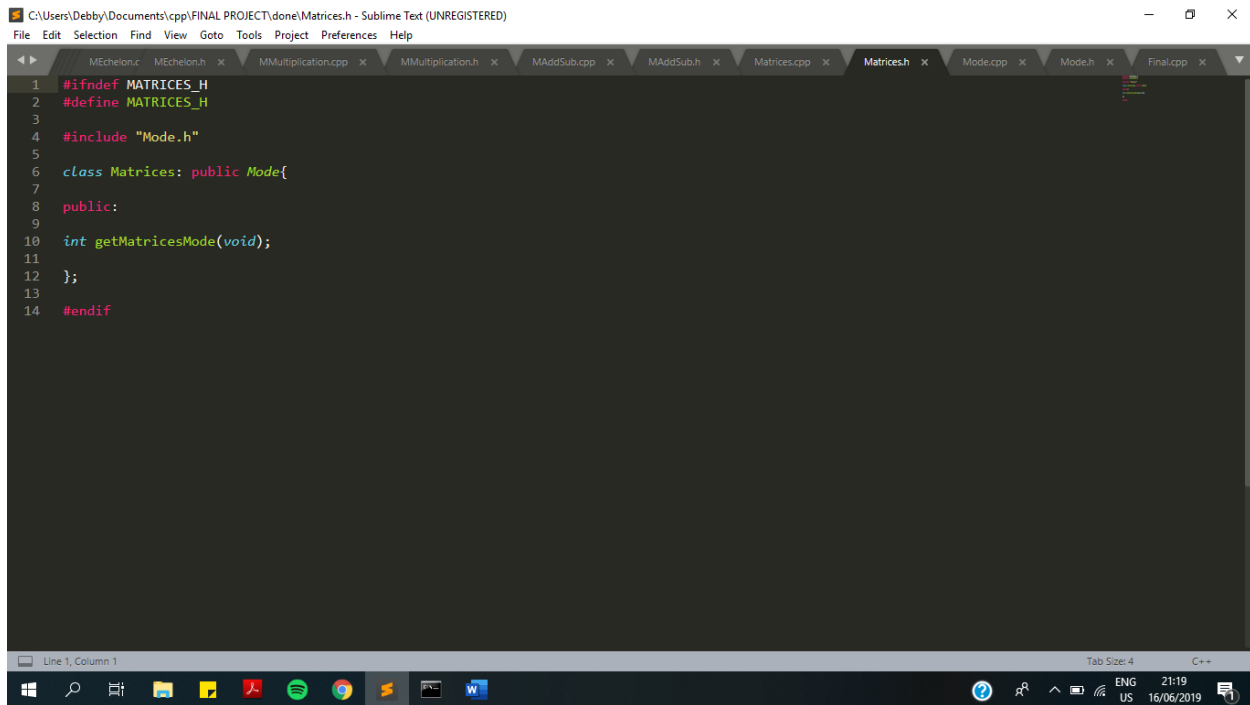
The editor interface includes a menu bar with options: File, Edit, Selection, Find, View, Goto, Tools, Project, Preferences, and Help. Below the menu bar is a tab bar showing several open files: MEcheleon.cpp, MEcheleon.h, MMultiplication.cpp, MMultiplication.h, MAddSub.cpp, MAddSub.h, Matrices.cpp, Matrices.h, Mode.cpp, Mode.h (the active file), and Final.cpp. The main editing area has a dark background with syntax-highlighted text. The status bar at the bottom indicates "Line 5, Column 1", "Tab Size: 4", and "C++". The Windows taskbar is visible at the very bottom, showing various application icons and the system clock displaying "21:18 16/06/2019".

Mode.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Mode.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #include <stdio.h>
2 #include "Mode.h"
3 #include "Matrices.h"
4 #include "Polynomials.h"
5 #include "Complex.h"
6 #include "Calculator.h"
7
8 int mode;
9 Complex com;
10 Matrices mat;
11 Polynomials pol;
12 Calculator cal;
13
14 void Mode::setMode(int m)
15 { mode = m; }
16
17 int Mode::getMode(void)
18 {
19     if( mode == 1 )
20     {
21         printf(" ", mat.getMatricesMode());
22     }
23
24     if( mode == 2 )
25     {
26         printf("Mode: Polynomials\n");
27         printf(" ", pol.getPolynomials());
28     }
29
30     if( mode == 3 )
31     {
32         printf(" ", com.getComplex());
33     }
34 }
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Matrices.h

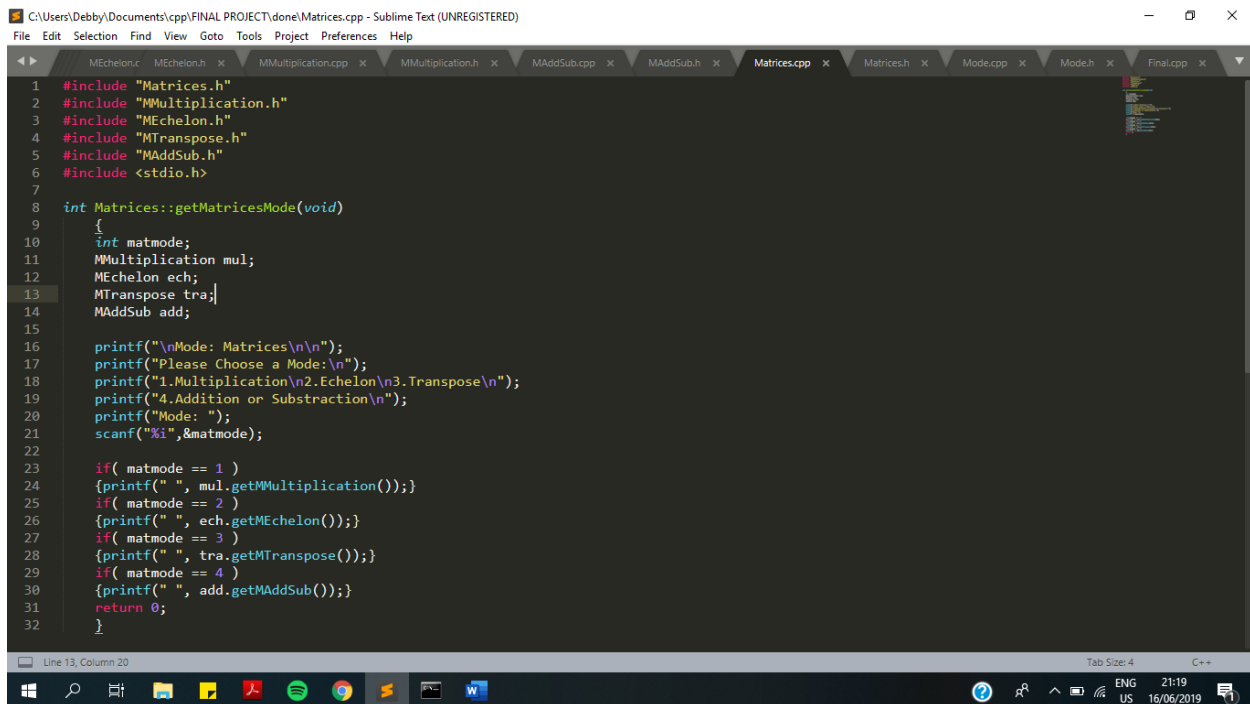


The screenshot shows the Sublime Text editor with the file `Matrices.h` open. The editor's title bar indicates the file path: `C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Matrices.h - Sublime Text (UNREGISTERED)`. The menu bar includes `File`, `Edit`, `Selection`, `Find`, `View`, `Goto`, `Tools`, `Project`, `Preferences`, and `Help`. The tab bar shows several open files, with `Matrices.h` selected. The code in the editor is as follows:

```
1 #ifndef MATRICES_H
2 #define MATRICES_H
3
4 #include "Mode.h"
5
6 class Matrices: public Mode{
7
8 public:
9
10 int getMatricesMode(void);
11
12 };
13
14 #endif
```

The status bar at the bottom indicates the cursor is at `Line 1, Column 1`, the tab size is `4`, and the encoding is `C++`. The Windows taskbar is visible at the bottom of the screen.

Matrices.cpp



The screenshot shows the Sublime Text editor with the file `Matrices.cpp` open. The editor's title bar indicates the file path: `C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Matrices.cpp - Sublime Text (UNREGISTERED)`. The menu bar is the same as in the previous screenshot. The tab bar shows `Matrices.cpp` selected. The code in the editor is as follows:

```
1 #include "Matrices.h"
2 #include "MMultiplication.h"
3 #include "MEchelon.h"
4 #include "MTranspose.h"
5 #include "MAddSub.h"
6 #include <stdio.h>
7
8 int Matrices::getMatricesMode(void)
9 {
10     int matmode;
11     MMultiplication mul;
12     MEchelon ech;
13     MTranspose tra;
14     MAddSub add;
15
16     printf("\nMode: Matrices\n\n");
17     printf("Please Choose a Mode:\n");
18     printf("1.Multiplication\n2.Echelon\n3.Transpose\n");
19     printf("4.Addition or Substraction\n");
20     printf("Mode: ");
21     scanf("%i",&matmode);
22
23     if( matmode == 1 )
24     {printf(" ", mul.getMMultiplication());}
25     if( matmode == 2 )
26     {printf(" ", ech.getMEchelon());}
27     if( matmode == 3 )
28     {printf(" ", tra.getMTranspose());}
29     if( matmode == 4 )
30     {printf(" ", add.getMAddSub());}
31     return 0;
32 }
```

The status bar at the bottom indicates the cursor is at `Line 13, Column 20`, the tab size is `4`, and the encoding is `C++`. The Windows taskbar is visible at the bottom of the screen.

MAddSub.h

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MAddSub.h - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #ifndef MADDSUB_H
2 #define MADDSUB_H
3
4 #include "Matrices.h"
5
6 class MAddSub: public Matrices{
7
8 public:
9
10 int getMAddSub(void);
11
12 };
13
14 #endif

Line 1, Column 1 Tab Size: 4 C++
```

MAddSub.cpp (I)

```
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File Edit Selection Find View Goto Tools Project Preferences Help

1 #include "MAddSub.h"
2 #include <stdio.h>
3 #include <math.h>
4 #include <string.h>
5
6 int MAddSub::getMAddSub()
7 {
8     int mat1[4][4];
9     int mat2[4][4];
10    int result[4][4];
11    int r,c;
12    int method;
13
14
15    printf("\nMode: Matrix Addition or Subtraction (Max Row & Column = 4)\n\n");
16    printf("Enter rows of matrix : ");
17    scanf("%i", &r);
18    printf("Enter columns of matrix : ");
19    scanf("%i", &c);
20
21    if(r > 4 or c >4)
22    {
23        printf("ERROR");
24        return -1;
25    }
26
27    printf("Enter matrix A (%ix%i): \n", r, c);
28    for (int i = 0; i < r; i++)
29    {
30        for (int j = 0; j < c; j++)
31        {
32            printf("Element [%i][%i]: ", i, j);
33            scanf("%i", &mat1[i][j]);
34        }
35    }
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MAddSub.cpp (II)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MAddSub.cpp - Sublime Text (UNREGISTERED)
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26
27 printf("Enter matrix A (%ix%i): \n", r, c);
28 for (int i = 0; i < r; i++)
29 {
30     for (int j = 0; j < c; j++)
31     {
32         printf("Element [%i][%i]: ", i, j);
33         scanf("%i", &mat1[i][j]);
34     }
35 }
36
37 printf("Enter matrix B (%ix%i): \n", r, c);
38 for (int i = 0; i < r; i++)
39 {
40     for (int j = 0; j < c; j++)
41     {
42         printf("Element [%i][%i]: ", i, j);
43         scanf("%i", &mat2[i][j]);
44     }
45 }
46
47 printf("Choose Mode: \n1. Addition\n2. Substraction\n");
48 printf("Mode: ");
49 scanf("%i", &method);
50 if (method == 1)
51 {
52     for (int i = 0; i < r; i++)
53     {
54         for (int j = 0; j < c; j++)
55         {
56             result[i][j] = mat1[i][j] + mat2[i][j];
57         }
58     }
59 }
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MAddSub.cpp (IV)

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MAddSub.cpp x MAddSub.h x Matrices.cpp x Matrices.h x Mode.cpp x Mode.h x Final.cpp x

60
61     else if(method == 2)
62     {
63         for(int i = 0; i < r; i++)
64         {
65             for(int j = 0; j < c; j++)
66             {
67                 result[i][j] = mat1[i][j] - mat2[i][j];
68             }
69         }
70     }
71
72     for (int i = 0; i < r; i++)
73     {
74         for (int j = 0; j < c; j++)
75         {
76             printf(" %i ", result[i][j]);
77         }
78         printf("\n");
79     }
80
81     return 0;
82 }
```

Line 1, Column 1 Tab Size: 4 C++

MMultiplication.h

```
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MMultiplication.h x MAddSub.cpp x MAddSub.h x Matrices.cpp x Matrices.h x Mode.cpp x Mode.h x Final.cpp x

1 #ifndef MMULTIPLICATION_H
2 #define MMULTIPLICATION_H
3
4 #include "Matrices.h"
5
6 class MMultiplication: public Matrices{
7
8 public:
9
10 int getMMultiplication(void);
11
12 };
13
14 #endif
```

Line 1, Column 1 Tab Size: 4 C++

MMultiplication.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MMultiplication.cpp - Sublime Text (UNREGISTERED)
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1 #include "MMultiplication.h"
2 #include <stdio.h>
3 #include <math.h>
4
5 int MMultiplication::getMMultiplication()
6 {
7     int r, c, i, j, k;
8     int mat0[4][4];
9     int mat1[4][4];
10    int mat2[4][4];
11
12    printf("\nMode: Matrix Multiplication(Max Row & Column = 4)\n\n");
13    printf("Enter rows of matrix : ");
14    scanf("%i", &r);
15    printf("Enter columns of matrix : ");
16    scanf("%i", &c);
17
18    if(r > 4 or c>4)
19    {
20        printf("ERROR");
21        return -1;
22    }
23
24    printf("Enter Data for Matrix A (%ix%i): \n", r, c);
25    for (i = 0; i < r; i++)
26    {
27        for (j = 0; j < c; j++)
28        {
29            printf("Element [%i][%i]: ", i, j);
30            scanf("%i", &mat0[i][j]);
31        }
32    }
33
Line 1, Column 1 Tab Size: 4 C++
Windows Taskbar: File Explorer, VS Code, Spotify, Chrome, Firefox, Word, System Tray: ENG US, 21:23, 16/06/2019
```

MMultiplication.cpp (II)

```
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33
34    printf("Enter Data for Matrix B (%ix%i): \n", c, r);
35    for (i = 0; i < c; i++)
36    {
37        for (j = 0; j < r; j++)
38        {
39            printf("Element [%i][%i]: ", i, j);
40            scanf("%i", &mat1[i][j]);
41        }
42    }
43
44    printf("Entered Matrix:\n");
45    for (i = 0; i < r; i++)
46    {
47        for (j = 0; j < c; j++)
48        {
49            printf(" %i ", mat0[i][j]);
50        }
51        printf("\n");
52    }
53
54    printf("Entered Matrix:\n");
55    for (i = 0; i < c; i++)
56    {
57        for (j = 0; j < r; j++)
58        {
59            printf(" %i ", mat1[i][j]);
60        }
61        printf("\n");
62    }
63
64    printf("Result of Multiplication is:\n");
65    for (i = 0; i < r; i++)
66    {
Line 1, Column 1 Tab Size: 4 C++
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```

MMultiplication.cpp (III)

```
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63
64 printf("Result of Multiplication is:\n");
65 for (i = 0; i < r; i++)
66 {
67     for (j = 0; j < r; j++)
68     {
69         mat2[i][j] = 0;
70         for (k = 0; k < c; k++)
71         {
72             mat2[i][j] += mat0[i][k] * mat1[k][j];
73         }
74         printf(" %i ", mat2[i][j]);
75     }
76     printf("\n");
77 }
78
79 return 0;
80 }
```

Line 1, Column 1 Tab Size: 4 C++

MEchelon.h

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MEchelon.h - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #ifndef MECHELON_H
2 #define MECHELON_H
3
4 #include "Matrices.h"
5
6 class MEchelon: public Matrices{
7
8 public:
9
10 int getMEchelon(void);
11 };
12
13
14 #endif
```

Line 1, Column 1 Tab Size: 4 C++

MEchelon.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MEchelon.cpp - Sublime Text (UNREGISTERED)
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MEchelon.cpp x MEchelon.h x MMultiplication.cpp x MMultiplication.h x MAddSub.cpp x MAddSub.h x Matrices.cpp x Matrices.h x Mode.cpp x Mode.h x x

1 #include <stdio.h>
2 #include <math.h>
3 #include "MEchelon.h"
4
5 int MEchelon::getMEchelon()
6 {
7     int mat0[4][4];
8     int mat1[4][4];
9     int mat2[4][4];
10    int mat3[4][4];
11    int r, c, i, j, k, l, v;
12
13    printf("\nMode: Matrix Echelon(Max Row & Column = 4)\n\n");
14    printf("Enter rows of matrix : ");
15    scanf("%i", &r);
16    printf("Enter columns of matrix : ");
17    scanf("%i", &c);
18
19    if(r > 4 || c > 4)
20    {
21        printf("ERROR");
22        return -1;
23    }
24
25    printf("Enter Data for Matrix A (%ix%i): \n", r, c);
26    for (i = 0; i < r; i++)
27    {
28        for (j = 0; j < c; j++)
29        {
30            printf("Element [%i][%i]: ", i, j);
31            scanf("%i", &mat0[i][j]);
32        }
33    }
```

MEchelon.cpp (II)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MEchelon.cpp - Sublime Text (UNREGISTERED)
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

34
35    printf("Entered Matrix:\n");
36    for (int i = 0; i < r; i++)
37    {
38        for (int j = 0; j < c; j++)
39        {
40            printf(" %i ", mat0[i][j]);
41        }
42        printf("\n");
43    }
44
45    //computing Echelon
46
47    for (int i = 1; i < r; i++)
48    {
49        for (int j = 0; j < c; j++)
50        {
51            mat1[0][j] = mat0[0][j];
52            mat1[i][j] = (mat0[i][j]*mat0[0][0]) - (mat0[0][j]*mat0[i][0]);
53        }
54    }
55
56
57    for (int i = 2; i < r; i++)
58    {
59        for (int j = 0; j < c; j++)
60        {
61            mat2[0][j] = mat1[0][j];
62            mat2[1][j] = mat1[1][j];
63            mat2[i][j] = (mat1[i][j]*mat1[1][1]) - (mat1[1][j]*mat1[i][1]);
64        }
65    }
66
67
```

MEchelon.cpp (III)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MEchelon.cpp - Sublime Text (UNREGISTERED)
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

67
68     for (int i = 3; i < r; i++)
69     {
70         for (int j = 0; j < c; j++)
71         {
72             mat3[0][j] = mat2[0][j];
73             mat3[1][j] = mat2[1][j];
74             mat3[2][j] = mat2[2][j];
75             mat3[i][j] = (mat2[i][j]*mat2[2][2]) - (mat2[2][j]*mat2[i][2]);
76         }
77     }
78
79 //printing echelon
80
81 printf("\nEchelon Matrix:\n");
82 for (int i = 0; i < r; i++)
83 {
84     for (int j = 0; j < c; j++)
85     {
86         printf(" %i ", mat1[i][j]);
87     }
88     printf("\n");
89 }
90
91 printf("\n\n");
92
93 if(r>=3)
94 {
95     for (int i = 0; i < r; i++)
96     {
97         for (int j = 0; j < c; j++)
98         {
99             printf(" %i ", mat2[i][j]);
100         }
101     }
102 }
103
104 printf("\n\n");
105
106 if(r==4)
107 {
108     for (int i = 0; i < r; i++)
109     {
110         for (int j = 0; j < c; j++)
111         {
112             printf(" %i ", mat3[i][j]);
113         }
114         printf("\n");
115     }
116 }
117
118 return 0;
119 }
```

MEchelon.cpp (IV)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MEchelon.cpp - Sublime Text (UNREGISTERED)
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

102
103
104 if(r>=3)
105 {
106     for (int i = 0; i < r; i++)
107     {
108         for (int j = 0; j < c; j++)
109         {
110             printf(" %i ", mat2[i][j]);
111         }
112         printf("\n");
113     }
114 }
115
116 printf("\n\n");
117
118 if(r==4)
119 {
120     for (int i = 0; i < r; i++)
121     {
122         for (int j = 0; j < c; j++)
123         {
124             printf(" %i ", mat3[i][j]);
125         }
126         printf("\n");
127     }
128 }
129
130 return 0;
131 }
```

MTranspose.h

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MTranspose.h - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

MTranspose.h x MEchelon.cpp x MEchelon.h x MMultiplication.cpp x MMultiplication.h x MAddSub.cpp x MAddSub.h x Matrices.cpp x Matrices.h x Mode.cpp x

1 #ifndef MTRANSPOSE_H
2 #define MTRANSPOSE_H
3
4 #include "Matrices.h"
5
6 class MTranspose: public Matrices{
7
8 public:
9
10 int getMTranspose(void);
11
12 };
13
14 #endif

Line 1, Column 1 Tab Size: 4 C++
```

MTranspose.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MTranspose.cpp - Sublime Text (UNREGISTERED)
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MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x MMultiplication.cpp x MMultiplication.h x MAddSub.cpp x MAddSub.h x Matrices.cpp x es.h x

1 #include "MTranspose.h"
2 #include <stdio.h>
3 #include <math.h>
4
5 int MTranspose::getMTranspose()
6 {
7     int r, c, i, j;
8     int mat0[4][4];
9     printf("\nMode: Matrix Transpose(Max Row & Column = 4)\n\n");
10    printf("Enter rows of matrix : ");
11    scanf("%i", &r);
12    printf("Enter columns of matrix : ");
13    scanf("%i", &c);
14
15    if(r > 4 or c>4)
16    {
17        printf("ERROR");
18        return -1;
19    }
20
21    printf("Enter Data for Matrix A (%i x %i): \n", r, c);
22    for (i = 0; i < r; i++)
23    {
24        for (j = 0; j < c; j++)
25        {
26            printf("Element [%i][%i]: ", i, j);
27            scanf("%i", &mat0[i][j]);
28        }
29    }
30
31    printf("Entered Matrix:\n");
32    for (int i = 0; i < r; i++)
33    {
```

MTranspose.cpp (II)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\MTranspose.cpp - Sublime Text (UNREGISTERED)
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MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x MMultiplication.cpp x MMultiplication.h x MAddSub.cpp x MAddSub.h x Matrices.cpp x es.h x

30
31     printf("Entered Matrix:\n");
32     for (int i = 0; i < r; i++)
33     {
34         for (int j = 0; j < c; j++)
35         {
36             printf(" %i ", mat0[i][j]);
37         }
38         printf("\n");
39     }
40
41     printf("Transpose of Matrix : \n ");
42     for (int i = 0; i < c; i++)
43     {
44         for (int j = 0; j < r; j++)
45         {
46             printf("%i", mat0[j][i]);
47         }
48         printf("\n ");
49     }
50     return 0;
51 }
```

Line 1, Column 1 Tab Size: 4 C++

Polynomials.h

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Polynomials.h - Sublime Text (UNREGISTERED)
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

1  #ifndef POLYNOMIALS_H
2  #define POLYNOMIALS_H
3
4  #include "Mode.h"
5
6  class Polynomials: public Mode{
7
8  public:
9
10     int getPolynomials(void);
11
12 };
13
14 #endif
```

Line 9, Column 1 Tab Size: 4 C++

Polynomials.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Polynomials.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

1 #include <stdio.h>
2 #include <math.h>
3 #include "Polynomials.h"
4
5 int Polynomials::getPolynomials()
6 {
7     float sq1, sq2;
8     float xp, yp;
9     float x, y;
10    float a,b,c;
11
12    FILE* graph = fopen("parabola.csv","a");
13    FILE* gnuplotPipe = popen ("gnuplot -persistent","w");
14
15    printf("\nMode: Polynomials\n\n");
16    printf("Quadratic Formula Calculator\n\n");
17    printf("General Equation:\n y = ax^2 + bx + c");
18
19    printf("\nEnter the data (Decimals are allowed)\n");
20    printf("a = ");
21    scanf("%f", &a);
22    printf("b = ");
23    scanf("%f", &b);
24    printf("c = ");
25    scanf("%f", &c);
26
27    printf("General Formula\n");
28    printf("(-b±√(b² - 4ac))/(2a)\n\n", 241, 251);
29
30    sq1 = (-b+sqrt(pow(b,2)-(4.0*a*c)))/(2.0*a);
31    sq2 = (-b-sqrt(pow(b,2)-(4.0*a*c)))/(2.0*a);
32
33    printf("X1 = %.2f\n", sq1);
34
35    Line 1, Column 1
36    Tab Size: 4 C++
37    16/06/2019
```

Polynomials.cpp (II)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Polynomials.cpp - Sublime Text (UNREGISTERED)
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

30    sq1 = (-b+sqrt(pow(b,2)-(4.0*a*c)))/(2.0*a);
31    sq2 = (-b-sqrt(pow(b,2)-(4.0*a*c)))/(2.0*a);
32
33    printf("X1 = %.2f\n", sq1);
34    printf("X2 = %.2f\n", sq2);
35
36    xp = -b/(2*a);
37    yp = a*pow(xp,2)+b*xp+c;
38
39    printf("Vertex of the parabola (%f,%f)", xp, yp);
40
41    for (int i = -100; i <= 100; i++){
42        y = a*pow(i,2)+b*i+c;
43        x = i;
44        fprintf(graph, "%f\t%f\n", x, y);
45    }
46
47    fprintf(gnuplotPipe, "%s\n", "set title 'Quadratic Graph'");
48    fprintf(gnuplotPipe, "%s\n", "set ylabel 'y'", "set xlabel 'x'");
49    fprintf(gnuplotPipe, "%s\n", "plot 'parabola.csv' u 1:2 w l title 'quadra'");
50
51    fclose(graph);
52    fclose(gnuplotPipe);
53
54    return 0;
55 }
```

Complex.h

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Complex.h - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #ifndef COMPLEX_H
2 #define COMPLEX_H
3
4 #include "Mode.h"
5
6 class Complex: public Mode{
7
8 public:
9
10 int getComplex(void);
11
12 };
13
14 #endif

Line 1, Column 1 Tab Size: 4 C++
```

Complex.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Complex.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #include "Complex.h"
2 #include <stdio.h>
3 #include <math.h>
4 #include <stdlib.h>
5 #include <string.h>
6
7 #define PI 3.14159265
8
9 int Complex::getComplex()
10 {
11     int chs, compute;
12     float A, B;
13     float theta1, theta2;
14     float a, b, c, d;
15     float x,y,r;
16     float real1, real2, real3, real4;
17     float img1, img2, img3, img4;
18     char method[10];
19     char form[5];
20
21     printf("\nMode: Complex\n\n");
22     printf("Rectangular ==> a+jb\nPolar ==> r<(theta)\n");
23     printf("Decimals are allowed\n");
24     printf("Please Choose a Mode: \n");
25     printf("1.Conversion\n2.Computation");
26     printf("\nMode: ");
27     scanf("%i", &chs);
28
29     if(chs == 1)
30     {
31         printf("Input Command:\nRectangular To Polar: pol\nPolar To Rectangular: rec\n");
32         printf("Enter the Desired Mode:");
33         scanf("%s", &form);
34     }
35 }
```

Complex.cpp (II)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Complex.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help
Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x
29     if(chs == 1)
30     {
31         printf("Input Command:\nRectangular To Polar: pol\nPolar To Rectangular: rec\n");
32         printf("Enter the Desired Mode:");
33         scanf("%s", &form);
34
35         printf("Input the a or r:");
36         scanf("%f", &x);
37         printf("Input the b or theta:");
38         scanf("%f", &y);
39
40         if(strcmp(form,"pol") ==0)
41         {
42             //==0 equal !=0 not equal
43             r = sqrt(pow(x,2)+pow(y,2));
44             theta1 = atan(y/x)*180/PI;
45
46             printf("Polar Equation\tr<(theta)\n");
47             printf("%.2f<(%0.2f)", r, theta1);
48         }
49         else if(strcmp(form, "rec") ==0)
50         {
51             A = x*cos(y/180*PI);
52             B = x*sin(y/180*PI);
53
54             printf("Rectangular Equation\n a+j(b)\n");
55             printf("%.2f+j(%0.2f)", A, B);
56         }
57     }
58
59     else if(chs == 2){
60         printf("1. Addition & Substraction\n2. Multiplication & Division\n");
61         printf("Enter the computation method:\n");
62     }
63
Line 16, Column 38
Tab Size: 4 C++
Windows taskbar icons: File Explorer, VS Code, Spotify, Chrome, Firefox, Word, etc.
System tray: ENG US, 21:27, 16/06/2019
```

Complex.cpp (III)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Complex.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help
Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x
59     else if(chs == 2){
60         printf("1. Addition & Substraction\n2. Multiplication & Division\n");
61         printf("Enter the computation method:\n");
62         scanf("%i", &compute);
63
64         if(compute == 1)
65         {
66             printf("(a+jb) +|- (c+jb)\n");
67             printf("Enter the value (a,b,c,d):\n");
68             printf("a = ");
69             scanf("%f", &a);
70             printf("b = ");
71             scanf("%f", &b);
72             printf("c = ");
73             scanf("%f", &c);
74             printf("d = ");
75             scanf("%f", &d);
76
77             printf("\n");
78             printf("Input Command:\nAddition: add\nSubstraction: sub\n");
79             printf("Enter the Desired Mode: ");
80             scanf("%s", &method);
81
82             if(strcmp(method,"add") ==0)
83             {
84                 //addition
85                 real1 = a+c;
86                 img1 = b+d;
87
88                 printf("Result = %.2f+j(%0.2f)", real1, img1);
89             }
90             else if(strcmp(method,"sub") ==0)
91             {
92                 //subtraction
93             }
94         }
95     }
96
Line 16, Column 38
Tab Size: 4 C++
Windows taskbar icons: File Explorer, VS Code, Spotify, Chrome, Firefox, Word, etc.
System tray: ENG US, 21:28, 16/06/2019
```

Complex.cpp (IV)

```
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

90     else if(strcmp(method,"sub")==0)
91     {
92         //subtraction
93         real2 = a-c;
94         img2 = b-d;
95
96         printf("Result = %.2f+j(%.2f)", real2, img2);
97     }
98
99     else if(compute == 2)
100    {
101        printf("(A<theta1) +/- (B<theta2)\n");
102        printf("Enter the value (A,theta1,B,theta2):\n");
103        scanf("%f", &A);
104        scanf("%f", &theta1);
105        scanf("%f", &B);
106        scanf("%f", &theta2);
107
108        printf("\n");
109        printf("Input Command:\nMultiplication: mult\nDivision: div\n");
110        printf("Enter the Desired Mode: ");
111        scanf("%s", &method);
112
113        if(strcmp(method,"mult")==0)
114        {
115            //Multiplication
116            real3 = A*B;
117            img3 = theta1+theta2;
118
119            printf("Result = %.2f<(%2f)", real3, img3);
120        }
121
122        else if(strcmp(method,"div")==0)
123        {
124            //Division
125            real4 = A/B;
126            img4 = theta1-theta2;
127            printf("Result = %.2f<(%2f)", real4, img4);
128        }
129    }
130
131    else
132    {
133        printf("ERROR\n");
134        return -1;
135    }
136    return 0;
137 }
```

Complex.cpp (V)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Complex.cpp - Sublime Text (UNREGISTERED)
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

112
113     if(strcmp(method,"mult")==0)
114     {
115         //Multiplication
116         real3 = A*B;
117         img3 = theta1+theta2;
118
119         printf("Result = %.2f<(%2f)", real3, img3);
120     }
121
122     else if(strcmp(method,"div")==0)
123     {
124         //Division
125         real4 = A/B;
126         img4 = theta1-theta2;
127         printf("Result = %.2f<(%2f)", real4, img4);
128     }
129 }
130
131 else
132 {
133     printf("ERROR\n");
134     return -1;
135 }
136 return 0;
137 }
```


Calculator.h

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Calculator.h - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #ifndef CALCULATOR_H
2 #define CALCULATOR_H
3
4 #include "Mode.h"
5
6 class Calculator: public Mode{
7
8 public:
9
10 int getCalculator(void);
11
12 };
13
14 #endif

Line 1, Column 1 Tab Size: 4 C++
```

Calculator.cpp (I)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Calculator.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

1 #include "Calculator.h"
2 #include <stdio.h>
3 #include <string.h>
4 #include <stdlib.h>
5 #include <math.h>
6 #define PI 3.14159265
7
8 int Calculator::getCalculator(void)
9 {
10     int i;
11     char mode1[1]; char mode2[1]; char mode3[1]; char mode4[1];
12     float digit1, digit2, digit3, digit4, digit5, digit6;
13
14     printf("\nMode: Basic Calculator\n\n");
15     printf("Please Choose a Mode:\n");
16     printf("1. Addition and Substraction\n2. Multiplication and Division\n");
17     printf("3. Trigonometry\n4. Logarithmic\n");
18
19     printf("Mode: ");
20     scanf("%i", &mode);
21     printf("\n");
22
23     if( mode == 1)
24     {
25         printf("Mode: Addition and Substraction\n\n");
26         printf("Maximum Operands: 2 (Decimals are allowed)\n");
27         printf("Input Format Example: '5.67 + 8.98'\n");
28         scanf("%f %s %f", &digit1, &mode1, &digit2);
29         if(strcmp(mode1, "+") == 0)
30             {printf(" = %.5f", digit1 + digit2);}
31         if(strcmp(mode1, "-") == 0)
32             {printf(" = %.5f", digit1 - digit2);}
33     }
34 }
```

Calculator.cpp (II)

```
C:\Users\Debby\Documents\cpp\FINAL PROJECT\done\Calculator.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help

Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

35     if( mode == 2)
36     {
37         printf("Mode: Multiplication and Division\n\n");
38         printf("Maximum Operands: 2 (Decimals are allowed)\n");
39         printf("Input Format Example: '5.67 / 8.98'\n");
40         scanf("%f %s %f", &digit3, &mode2, &digit4);
41         if(strcmp(mode2, "**") == 0)
42             {printf(" = %.5f", digit3 * digit4);}
43         if(strcmp(mode2, "/") == 0)
44             {printf(" = %.5f", digit3 / digit4);}
45     }
46
47     if( mode == 3)
48     {
49         printf("Mode: Trigonometry\n\n");
50         printf("(Decimals are allowed)\n");
51         printf("Input Command:\nCos:cos\t\t|Arc Cos:acos\nSin:sin\t\t|Arc Sin:asin\nTan:tan\t\t|Arc Tan:atan\n");
52         printf("Input Format Example: 'sin (98)'\n");
53         scanf("%s (%f)", &mode3, &digit5);
54         if(strcmp(mode3, "cos") == 0)
55             {printf(" = %.5f", cos(digit5*PI/180.00));}
56         if(strcmp(mode3, "sin") == 0)
57             {printf(" = %.5f", sin(digit5*PI/180.00));}
58         if(strcmp(mode3, "tan") == 0)
59             {printf(" = %.5f", tan(digit5*PI/180.00));}
60         if(strcmp(mode3, "acos") == 0)
61             {printf(" = %.5f", acos(digit5*PI/180.00));}
62         if(strcmp(mode3, "asin") == 0)
63             {printf(" = %.5f", asin(digit5*PI/180.00));}
64         if(strcmp(mode3, "atan") == 0)
65             {printf(" = %.5f", atan(digit5*PI/180.00));}
66     }
67
Line 47, Column 9
Tab Size: 4 C++
```

Calculator.cpp (III)

```
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Calculator.cpp x Calculator.h x Complex.cpp x Complex.h x Polynomials.cpp x Polynomials.h x MTranspose.cpp x MTranspose.h x MEchelon.cpp x MEchelon.h x

67
68     if( mode == 4)
69     {
70         printf("Mode: Logarithmic\n\n");
71         printf("(Decimals are allowed)\n");
72         printf("Input Format Example: 'log (5)'\n");
73         scanf("%s (%f)", &mode4, &digit6);
74         if(strcmp(mode4, "log") == 0)
75             {printf(" = %.5f", log10 (digit6));}
76     }
77
78     return 0;
79 }

Line 47, Column 9
Tab Size: 4 C++
```