

```

Script started on 2022-05-20 08:15:31-05:00 [TERM="xterm" TTY="/dev/pts/5" COLUMNS=
a_vitale7@ares:~$ CPP pointyopers.cpp point.cpp point.h
cat point.hopers.info
pwdCPP applyfnc.cpp genarr.h
catpwdpwd
/home/students/a_vitale7
a_vitale7@ares:~$ cat mathtable.info
/*****
*
* NAME: Antonino Vitale CLASS: CSC122-W01 *
*
* Lab: A little to the left, Louie! Level: 3 *
*
* Description: *
*
* This program outputs to either the console or a chosen file *
* a equation table for add, subtract, multiply, divide, and *
* remainder. *
* *****/
a_vitale7@ares:~$ cat mathtable.cpp
#include <iostream>

#include <iomanip>

#include <string>

#include <cmath>

#include <fstream>

using namespace std;

void disp_tableMenu(string filename = "");

void table(const int a, const char type = '+', ostream& out = cout);

int int_input = 0;

string input, file_name;

ofstream to_file;

bool open_file = false;

int main( void )

```

```

{

bool exit_main = false;

cout << "\n\t\tComplex number class program" << endl; //program start state

while (!exit_main) {

    disp_tableMenu(file_name);

    cout << "\n\tChoice: ";

    cin >> input;

    cin.ignore(numeric_limits<streamsize>::max(), '\n');

    switch (tolower(input[0])) {

        case '0': {

            cout << "\n(Type \"exit\" to return to menu and remove file)" << endl;

            cout << "\nPlease enter the name of your data file: ";

            do {

                input.clear();

                getline(cin, input);

                if (input == "exit") {

                    to_file.close();

                    to_file.clear();

                    file_name = "";

                    open_file = false;

                    break;

                }

                to_file.open(input);

                if (to_file) {

                    file_name = input;

                    open_file = true;

                    cout << "\nFile \"" << file_name << "\" opened" << endl;

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        } else {
            to_file.close();
            to_file.clear();
            file_name = "";
            open_file = false;
            cout << "\nInvalid file name.\n\nPlease eni
        }
    } while (!to_file && file_name != "exit");
    break;
} case '1': {
    cout << "\nWhat size should the addition table be? ";
    int_input = 0;
    cin >> int_input;
    if (int_input > 0 && int_input <= 20) {
        if (open_file) {
            cout << "\nCalculating..." << endl;
            table(int_input, '+', to_file);
            cout << "\nWritten to file." << endl;
        } else {
            cout << "\nCalculating..." << endl;
            table(int_input, '+');
        }
    }
    } else if (int_input <= 0) {
        cout << "\nI'm sorry, the table size must be greater than 0";
    } else if (int_input > 20) {
        cout << "\nI'm sorry, " << int_input << " is too large";
    }
}

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        break;
    } case '2': {
        cout << "\nWhat size should the subtraction table be? ";
        int_input = 0;
        cin >> int_input;
        if (int_input > 0 && int_input <= 20) {
            if (open_file) {
                cout << "\nCalculating..." << endl;
                table(int_input, '-', to_file);
                cout << "\nWritten to file." << endl;
            }
            else {
                cout << "\nCalculating..." << endl;
                table(int_input, '-');
            }
        }
        else if (int_input <= 0) {
            cout << "\nI'm sorry, the table size must be greater than 0";
        }
        else if (int_input > 20) {
            cout << "\nI'm sorry, " << int_input << " is too large";
        }
        break;
    } case '3': {
        cout << "\nWhat size should the multiplication table be? ";
        int_input = 0;
        cin >> int_input;
    }
}

```

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        if (int_input > 0 && int_input <= 20) {
            if (open_file) {
                cout << "\nCalculating..." << endl;
                table(int_input, '*', to_file);
                cout << "\nWritten to file." << endl;
            }
            else {
                cout << "\nCalculating..." << endl;
                table(int_input, '*');
            }
        }
        else if (int_input <= 0) {
            cout << "\nI'm sorry, the table size must be greater than 0." << endl;
        }
        else if (int_input > 20) {
            cout << "\nI'm sorry, " << int_input << " is too large." << endl;
        }
        break;
    } case '4': {
        cout << "\nWhat size should the division table be? ";
        int_input = 0;
        cin >> int_input;
        if (int_input > 0 && int_input <= 20) {
            if (open_file) {
                cout << "\nCalculating..." << endl;
                table(int_input, '/', to_file);
                cout << "\nWritten to file." << endl;
            }
            else {
                cout << "\nCalculating..." << endl;
                table(int_input, '/');
            }
        }
        else if (int_input <= 0) {
            cout << "\nI'm sorry, the table size must be greater than 0." << endl;
        }
        else if (int_input > 20) {
            cout << "\nI'm sorry, " << int_input << " is too large." << endl;
        }
        break;
    } case '5': {
        cout << "\nWhat size should the remainder table be? ";
        int_input = 0;
        cin >> int_input;
        if (int_input > 0 && int_input <= 20) {
            if (open_file) {
                cout << "\nCalculating..." << endl;
                table(int_input, '%', to_file);
                cout << "\nWritten to file." << endl;
            }
            else {
                cout << "\nCalculating..." << endl;
                table(int_input, '%');
            }
        }
        else if (int_input <= 0) {
            cout << "\nI'm sorry, the table size must be greater than 0." << endl;
        }
        else if (int_input > 20) {
            cout << "\nI'm sorry, " << int_input << " is too large." << endl;
        }
        break;
    }
}

```

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    }
    else {
        cout << "\nCalculating..." << endl;
        table(int_input, '/');
    }
}
else if (int_input <= 0) {
    cout << "\nI'm sorry, the table size must be greater than 0." << endl;
}
else if (int_input > 20) {
    cout << "\nI'm sorry, " << int_input << " is too large." << endl;
}
break;
} case '5': {
    cout << "\nWhat size should the remainder table be? ";
    int_input = 0;
    cin >> int_input;
    if (int_input > 0 && int_input <= 20) {
        if (open_file) {
            cout << "\nCalculating..." << endl;
            table(int_input, '%', to_file);
            cout << "\nWritten to file." << endl;
        }
        else {
            cout << "\nCalculating..." << endl;
            table(int_input, '%');
        }
    }
    else if (int_input <= 0) {
        cout << "\nI'm sorry, the table size must be greater than 0." << endl;
    }
    else if (int_input > 20) {
        cout << "\nI'm sorry, " << int_input << " is too large." << endl;
    }
    break;
}
}

```

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        }
        else if (int_input <= 0) {
            cout << "\nI'm sorry, the table size must be greater than 0";
        }
        else if (int_input > 20) {
            cout << "\nI'm sorry, " << int_input << " is too large";
        }
        break;
    } case '6': case 'e': {
        exit_main = true;
        break;
    } default: {
        cout << "\nInvalid Choice." << endl;
        break;
    }
}

cout << "\nExiting program." << endl; //program end statement
to_file.close();
to_file.clear();
return 0;
}

void disp_tableMenu(string filename) {
    cout << "\n\t\tTable Menu" << endl;
    cout << "\n\t0) Output to file: ";
    if (filename != "") {

```

```

        cout << "\"" << filename << "\"";
    } else {
        cout << "NONE";
    }

    cout << "\n\t1) Addition table";
    cout << "\n\t2) Subtraction table";
    cout << "\n\t3) Multiplication table";
    cout << "\n\t4) Division table";
    cout << "\n\t5) Remainder table";
    cout << "\n\t6) exit" << endl;
    return;
}

void table(const int a, const char type, ostream& out) {
    int width;
    if (type != '+' && type != '-' && type != '*' && type != '/' && type != '%')
        out << "Error making table" << endl;
    return;
} else {
    width = ((type == '+') ? (static_cast<int>(log10(2 * abs(a))) + 2)
            : (type == '-') ? (static_cast<int>(log10(abs(a) - 1)) + 3)
            : (type == '*') ? (static_cast<int>(log10(abs(a) * abs(a)))
            : (type == '/' || type == '%') ? (static_cast<int>(log10(abs(a) / abs(a)))
            : (0));

    out << endl << setfill(' ') << setw(width) << type << " |" << ((type == '/' || type == '%') ? "a/b" : "a % b");
    for (int i = 1; i <= abs(a); i++) {
        out << setfill(' ') << setw(width) << i << ((type == '/') ? " / " : " % ") << abs(a) << endl;
    }
}

```


What size should the multiplication table be? 5

Calculating...

*	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 4

What size should the division table be? 5

Calculating...

/	1	2	3	4	5
1	1.000	0.500	0.333	0.250	0.200
2	2.000	1.000	0.666	0.500	0.400
3	3.000	1.500	1.000	0.750	0.600
4	4.000	2.000	1.333	1.000	0.800
5	5.000	2.500	1.666	1.250	1.000

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 6

Exiting program.
a_vitale7@ares:~\$./mathtable.out

Complex number class program

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 1

What size should the addition table be? 10

Calculating...

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 2

What size should the subtraction table be? 10

Calculating...

-	1	2	3	4	5	6	7	8	9	10
1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
2	1	0	-1	-2	-3	-4	-5	-6	-7	-8
3	2	1	0	-1	-2	-3	-4	-5	-6	-7
4	3	2	1	0	-1	-2	-3	-4	-5	-6
5	4	3	2	1	0	-1	-2	-3	-4	-5
6	5	4	3	2	1	0	-1	-2	-3	-4
7	6	5	4	3	2	1	0	-1	-2	-3
8	7	6	5	4	3	2	1	0	-1	-2

```
9 | 8 7 6 5 4 3 2 1 0 -1
10 | 9 8 7 6 5 4 3 2 1 0
```

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 3

What size should the multiplication table be? 10

Calculating...

*	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 4

What size should the division table be? 10

Calculating...

/	1	2	3	4	5	6	7	8	9	10
1	1.000	0.500	0.333	0.250	0.200	0.166	0.142	0.125	0.111	0.100
2	2.000	1.000	0.666	0.500	0.400	0.333	0.285	0.250	0.222	0.200
3	3.000	1.500	1.000	0.750	0.600	0.500	0.428	0.375	0.333	0.300
4	4.000	2.000	1.333	1.000	0.800	0.666	0.571	0.500	0.444	0.400

```
5 | 5.000 2.500 1.666 1.250 1.000 0.833 0.714 0.625 0.555 0.500
6 | 6.000 3.000 2.000 1.500 1.200 1.000 0.857 0.750 0.666 0.600
7 | 7.000 3.500 2.333 1.750 1.400 1.166 1.000 0.875 0.777 0.700
8 | 8.000 4.000 2.666 2.000 1.600 1.333 1.142 1.000 0.888 0.800
9 | 9.000 4.500 3.000 2.250 1.800 1.500 1.285 1.125 1.000 0.900
10 | 10.000 5.000 3.333 2.500 2.000 1.666 1.428 1.250 1.111 1.000
```

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 5

What size should the remainder table be? 10

Calculating...

%	1	2	3	4	5	6	7	8	9	10
1	0	1	1	1	1	1	1	1	1	1
2	0	0	2	2	2	2	2	2	2	2
3	0	1	0	3	3	3	3	3	3	3
4	0	0	1	0	4	4	4	4	4	4
5	0	1	2	1	0	5	5	5	5	5
6	0	0	0	2	1	0	6	6	6	6
7	0	1	1	3	2	1	0	7	7	7
8	0	0	2	0	3	2	1	0	8	8
9	0	1	0	1	4	3	2	1	0	9
10	0	0	1	2	0	4	3	2	1	0

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 6

Exiting program.
a_vitale7@ares:~\$./mathtable.out

Complex number class program

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 1

What size should the addition table be? 999

I'm sorry, 999 is too large of an addition table.

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 2

What size should the subtraction table be? 999

I'm sorry, 999 is too large of a table.

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 3

What size should the multiplication table be? 30

I'm sorry, 30 is too large of a table.

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table

- 5) Remainder table
- 6) exit

Choice: 4

What size should the division table be? 20

Calculating...

/	1	2	3	4	5	6	7	8	9	10	11
1	1.000	0.500	0.333	0.250	0.200	0.166	0.142	0.125	0.111	0.100	0.090
2	2.000	1.000	0.666	0.500	0.400	0.333	0.285	0.250	0.222	0.200	0.181
3	3.000	1.500	1.000	0.750	0.600	0.500	0.428	0.375	0.333	0.300	0.272
4	4.000	2.000	1.333	1.000	0.800	0.666	0.571	0.500	0.444	0.400	0.363
5	5.000	2.500	1.666	1.250	1.000	0.833	0.714	0.625	0.555	0.500	0.454
6	6.000	3.000	2.000	1.500	1.200	1.000	0.857	0.750	0.666	0.600	0.545
7	7.000	3.500	2.333	1.750	1.400	1.166	1.000	0.875	0.777	0.700	0.636
8	8.000	4.000	2.666	2.000	1.600	1.333	1.142	1.000	0.888	0.800	0.727
9	9.000	4.500	3.000	2.250	1.800	1.500	1.285	1.125	1.000	0.900	0.818
10	10.000	5.000	3.333	2.500	2.000	1.666	1.428	1.250	1.111	1.000	0.909
11	11.000	5.500	3.666	2.750	2.200	1.833	1.571	1.375	1.222	1.100	1.000
12	12.000	6.000	4.000	3.000	2.400	2.000	1.714	1.500	1.333	1.200	1.090
13	13.000	6.500	4.333	3.250	2.600	2.166	1.857	1.625	1.444	1.300	1.181
14	14.000	7.000	4.666	3.500	2.800	2.333	2.000	1.750	1.555	1.400	1.272
15	15.000	7.500	5.000	3.750	3.000	2.500	2.142	1.875	1.666	1.500	1.363
16	16.000	8.000	5.333	4.000	3.200	2.666	2.285	2.000	1.777	1.600	1.454
17	17.000	8.500	5.666	4.250	3.400	2.833	2.428	2.125	1.888	1.700	1.545
18	18.000	9.000	6.000	4.500	3.600	3.000	2.571	2.250	2.000	1.800	1.636
19	19.000	9.500	6.333	4.750	3.800	3.166	2.714	2.375	2.111	1.900	1.727
20	20.000	10.000	6.666	5.000	4.000	3.333	2.857	2.500	2.222	2.000	1.818

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 5

What size should the remainder table be? 21

I'm sorry, 21 is too large of a table.

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table

- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 6

Exiting program.
a_vitale7@ares:~\$./mathtable.out

Complex number class program

Table Menu

- 0) Output to file: NONE
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 0

(Type "exit" to return to menu and remove file name)
Please enter the name of your data file: output.txt

File "output.txt" opened successfully!

Table Menu

- 0) Output to file: "output.txt"
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 1

What size should the addition table be? 5

Calculating...

Written to file.

Table Menu

- 0) Output to file: "output.txt"
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table

- 6) exit

Choice: 2

What size should the subtraction table be? 10

Calculating...

Written to file.

Table Menu

- 0) Output to file: "output.txt"
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 3

What size should the multiplication table be? 3

Calculating...

Written to file.

Table Menu

- 0) Output to file: "output.txt"
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table
- 6) exit

Choice: 4

What size should the division table be? 2

Calculating...

Written to file.

Table Menu

- 0) Output to file: "output.txt"
- 1) Addition table
- 2) Subtraction table
- 3) Multiplication table
- 4) Division table
- 5) Remainder table

```
*
* How can you easily determine the widest that the columns need to
* be? (Hint: See this page about calculating the number of digits
* in a whole number.)
*     depending on the arithmetic type the width would vary, but
*     overall it should be similar to one another. As an example
*     simple addition would likely have a width of +2 at a table
*     of 5 because 5+5=10, but division would have a constant
*     added to the width to deal with the decimal places
*
*
* Once you know the width of a column, how can you determine
* whether a table will fit on the screen?
*     youd have to count the total width and compare it with the
*     width of the screen, but with output files you are able to
*
```

```
*          scroll horizontally.          *
*                                         *
*   How can you get the columns to line up so nice and neat?   *
*       the evaluation of the width would use the largest possible *
*       number from the arithmetic type                          *
*                                         *
*                                         *
*****/
a_vitale7@ares:~$ exit
exit
```

Script done on 2022-05-20 08:18:56-05:00 [COMMAND_EXIT_CODE="0"]