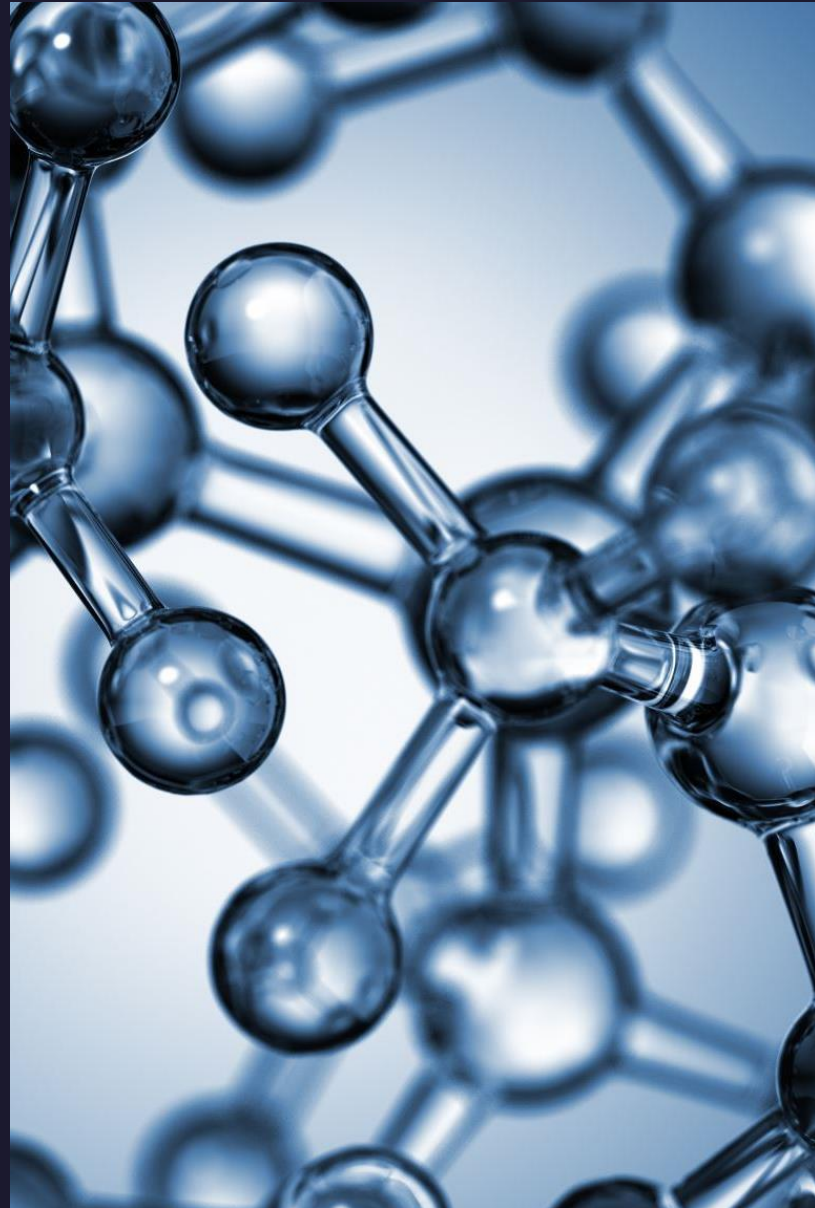


CSC 414 Software Design Project

By Ian Hurley



What is the Software



- The program is a simple menu-based calculator
- Does simple calculations, trigonometry functions, and more complex calculations
 - Exponents
 - Hypotenuses
 - Circumference

Software Design



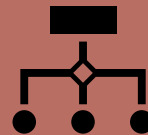
Program split into three file groups

A group being defined as the header and its corresponding .cpp file



First file is the main

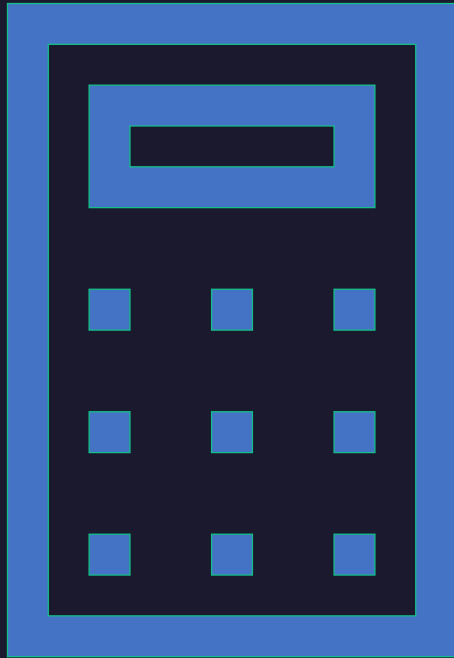
Only used as start for program and dives into other functions



Second file group is the menu

Is where the user will interact with the program
User picks what function they want and give their input

Software Design Cont.



- Third file group is the calculator
 - Where all math functions are contained
 - Prints answer in format that shows how the equation was done

How is the Menu class designed?

- Uses 3 variables
 - One is to hold which menu option is used
 - Other two hold input to pass into math functions
- Is made up of one function
 - Prints options to screen then asks for input
 - Menu choice handled via switch statement
- Inside menu option input for problem is asked
 - Done in menu instead of calc for question specific lines
 - Keeps user strictly to menu class

```
void menu::printMenu() {  
  
    cout << "1) Add two numbers" << endl;  
    cout << "2) Subtract two numbers" << endl;  
    cout << "3) Multiply two numbers" << endl;  
    cout << "4) Divide two numbers" << endl;  
    cout << "5) Find the result of an exponent" << endl;  
    cout << "6) Find the hypotenuse" << endl;  
    cout << "7) Find the circumference of a circle" << endl;  
    cout << "8) Find the sine of a number" << endl;  
    cout << "9) Find the cosine of a number" << endl;  
    cout << "10) Find the tangent of a number" << endl;  
    cout << "11) Exit menu" << endl;  
  
    //marks end of menu prompt. Beginning of user input  
    cout << endl << "Please enter the number of the menu option you wish to use: "; //Extra endl to increase readability  
    cin >> choice;  
  
    switch (choice) {  
    case 1: //calls function that calculates a + b = c  
        cout << "Please enter the first number ";  
        cin >> a;  
        cout << endl << "Please enter the second number ";  
        cin >> b;  
  
        x.setXY(a, b); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.add();  
        break;  
  
    case 2: //calls function that calculates a - b = c  
        cout << "Please enter the first number ";  
        cin >> a;  
        cout << endl << "Please enter the second number ";  
        cin >> b;  
  
        x.setXY(a, b); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.subtract();  
        break;  
  
    case 3: //calls function that calculates a * b = c  
        cout << "Please enter the first number ";  
        cin >> a;  
        cout << endl << "Please enter the second number ";  
        cin >> b;  
  
        x.setXY(a, b); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.multiply();  
        break;  
  
    case 4: //calls function that calculates a / b = c  
        cout << "Please enter the first number ";  
        cin >> a;  
        cout << endl << "Please enter the second number ";  
        cin >> b;  
  
        x.setXY(a, b); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.divide();  
        break;  
  
    case 5: //calls function that calculates a^b = c  
        cout << "Please enter the base number ";  
        cin >> a;  
        cout << endl << "Please enter the exponent ";  
        cin >> b;  
  
        x.setXY(a, b); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.exponent();  
        break;  
  
    case 6: //calls function that calculates the hypotenuse  
        cout << "Please enter the first side of the triangle ";  
        cin >> a;  
        cout << endl << "Please enter the second side of the triangle ";  
        cin >> b;  
  
        x.setXY(a, b); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.hypotenuse();  
        break;  
  
    case 7: //calls function that calculates the circumference of a circle  
        cout << "Please enter the radius of the circle ";  
        cin >> a;  
  
        x.setXY(a); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.circumference();  
        break;  
  
    case 8: //calls function that calculates the sine of a number  
        cout << "Please enter the angle in degrees ";  
        cin >> a;  
  
        x.setXY(a); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.sine();  
        break;  
  
    case 9: //calls function that calculates the cosine of a number  
        cout << "Please enter the angle in degrees ";  
        cin >> a;  
  
        x.setXY(a); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.cosine();  
        break;  
  
    case 10: //calls function that calculates the tangent of a number  
        cout << "Please enter the angle in degrees ";  
        cin >> a;  
  
        x.setXY(a); //Passes input to calc  
        cout << endl; //endl for formatting reasons  
        x.tangent();  
        break;  
  
    case 11: //calls function that exits the menu  
        cout << "Exiting menu...";  
        break;  
    }  
}
```

No issues found

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How is the Calc class designed?

- Three variables are utilized
 - Two hold the user input from menu
 - Last one holds the answer
- Each function is set up in similar way for consistency
 - First the calculation is done
 - Then the answer is printed to screen in an 'a + b = c' format
- Only exception is the setter classes
 - One is for 'a' by itself
 - Other for 'a' and 'b'

```
void calc::sine() {  
    z = sin(x);  
    cout << "Sin(" << x << ") is " << z << endl;  
    return;  
}  
  
void calc::cosine() {  
    z = cos(x);  
    cout << "cos(" << x << ") is " << z << endl;  
    return;  
}  
  
void calc::tangent() {  
    z = tan(x);  
    cout << "tan(" << x << ") is " << z << endl;  
}  
  
void calc::setX(float a) {  
    x = a;  
    return;  
}  
  
void calc::setXY(float a, float b) {  
    x = a;  
    y = b;  
    return;  
}
```

✓ No issues found

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State Diagram

