

## Programming Assignment 1:

### Quadratic Equation Verification with Complex Number Operation

#### How I develop your assignment solution

The assignment use the project in Dev C which combines the file of .c .h and .dev

In the complex.h file, I mention the function which are needed to use in the main file and the complex.c file. In the complex .c file, I declared the function I needed using in the main file to calculate the quadratic equation including the addition, the subtraction, the multiplication, the division, the absolute number calculation and the complex number transformation. The Verifier function declaration also included in the complex.c file to maintain the main file correct.

In the main file of main function, I first use the discrimination equation of  $D = b^2 - 4 * a * c$  to find out the equation contains two different real roots, which  $D > 0$ , two same roots, which  $D = 0$ , and two complex roots, which  $D < 0$ . While finding out the roots, I save the roots into complex, which include the real part and the imaginary part. Then I use the for loop to print out the full equation, which maintains the pretty printing format in many situation looking at the coefficient a, b and c. With using the function printComplex I mentioned in the complex.c file, I print the roots out.

Lastly, it's the time to check the quadratic equation's error, so I wrote the function of the Verifier to maintain the accuracy of the quadratic equation. I declared the root1 and root2 in complex form, and the coefficient of a, b and c in the float form. Then I initialized the coefficient of ax2, bx1 and cx0 to 0. After that I use the other functions mentioned in the complex.c file including the multiply function, and realpartTOcomplexpart function to find out each part of the equation. Using add function to find out the result. In the last step, I have to make sure the error of the result is less than 0.000001, which I use the if-else loop and the absoluteComplex function to find out id the error is included in the range.