

Assignment 2 : Complex Number

The **complex number** $a+bi$, contains two real numbers, the *real part* a and the *imaginary part* b . Write a Java program that defines **class Complex** of complex numbers. The class contains three constructors:

- Default constructor, set value to $0.0+0.0i$.
- Constructor of one real number parameter, r , set value to $r+0.0i$.
- Constructor of two real number parameters, r and s , set value to $r+si$.

There are five complex number arithmetic operations:

- Complex addition: $(a+bi)+(c+di) = (a+c)+(b+d)i$
- Complex subtraction: $(a+bi)-(c+di) = (a-c)+(b-d)i$
- Complex multiplication: $(a+bi)\times(c+di) = (a\times c-b\times d) + (a\times d+b\times c)i$
- Complex division: $(a+bi)\div(c+di) = ((a\times c+b\times d)+(-a\times d+b\times c)i)\div(c^2+d^2)$
- Complex absolute value: $|a+bi| = (a^2+b^2)^{1/2}$

Also, there are five supporting methods:

- Get real part of a complex number: `getRe()`
- Get imaginary part of a complex number: `getIm()`
- Set real part of a complex number: `setRe(r)`
- Set imaginary part of a complex number: `setIm(s)`
- Print a complex number: `printComplex()`

Create package `ComplexNumber` for your project and use file name `HW2_DXXXXXXX.java` for class and `HW2APP_DXXXXXXX.java` for the application program where `DXXXXXXX` is your student ID..

- 1 **Write a program to demonstrate the above arithmetic operations of two input complex numbers.**
- 2 **And use class `Complex` to write an application program to solve a quadratic equation and verify the two roots.** In your output, print a real numeral four digits after the decimal point. When verify the two roots, consider the precision error up to six digits after the decimal point, i.e., the absolute value the result of substituting a root to the quadratic equation is less than `0.000001`.

Write comments in your program solution. Also, write a report to explain how you develop your assignment solution using `HW2RPT_DXXXXXXX.pdf`.