



TD8 Data structures

Ex 8.1 Complex Numbers

Write a program to perform operations on complex numbers. Recall that a complex number "z" is defined by its real part "a" and its imaginary part "b".

$$z = a + bi$$

The program should allow the user to enter two complex numbers and choose from the following operations:

1. Adding Two Complex Numbers
2. Subtracting Two Complex Numbers
3. Multiplying Two Complex Numbers
4. Dividing Two Complex Numbers
5. Calculating the Conjugate of a Complex Number.
Recall that the conjugate $\bar{z} = a - bi$ is also a complex number.
6. Calculating the Modulus of a Complex Number.

It should also be noted that the modulus $|z| = \sqrt{a^2 + b^2}$ is a positive real number.

The program should display the result of the operation selected by the user.

Ex 8.2 Email Password

Write a program that allows a user to register their first name, surname, email address, and a secure password. Here are the steps your program must follow:

- The user must enter their first and last names, which will be stored in an appropriate data structure.
- Next, the user will be asked to enter their email address. Your program will check if the email address is valid by following the standard criteria for a valid email address (for example, that it contains an "@" and a "."). If the email address is not valid, the user will have to re-enter it until it is correct.
- After that, the user must choose a password. The password must be at least 8 characters long and include at least one uppercase letter, one lowercase letter, and one number. Your program should check whether the password meets these criteria. If it does not, the user will have to choose another one until it is valid.
- Finally, the user will have to re-enter the password for confirmation. If the two passwords entered are identical, the password will be considered valid and saved. Otherwise, the user will have to try again until they are identical.
- Once all of these steps have been successfully completed, your program should display a message confirming that all the information has been successfully saved.