ECE 2305

Introduction to C Programming

Programming Project 04

Complex Numbers

Program Features: Looping structure, switch structure, variables, data input and

output, mathematical operators, user-defined functions.

Write a C++ application that will perform the following operations on complex numbers.

The application shall use a main function that presents the user with a display that

resembles the following.

Name:

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Complex Number A: Real: \_\_\_\_\_ Imaginary: \_\_\_\_\_ Magnitude: \_\_\_\_\_ Angle: \_\_\_\_\_

Complex Number B: Real: \_\_\_\_\_ Imaginary: \_\_\_\_\_ Magnitude: \_\_\_\_\_ Angle: \_\_\_\_\_

Complex Number C: Real: \_\_\_\_\_ Imaginary: \_\_\_\_\_ Magnitude: \_\_\_\_\_ Angle: \_\_\_\_\_

1. Enter Complex Number A in Rectangular Form.

2. Enter Complex Number A in Polar Form.

3. Enter Complex Number B in Rectangular Form.

4. Enter Complex Number B in Polar Form.

5. Add the two Complex Numbers: C = A + B.

6. Find the Complex Conjugate: C = A\*.

7. Multiply the two Complex Numbers: C = AB

8. Divide the two Complex Numbers: C = A / B.

9. End the program.

Select Option:

Write the main function in such a way that an improper response will cause the menu

items to be repeated. The menu options are to continue until the user chooses to end the

program.

Write a user-defined function to perform each of the operations shown in the Main Menu.

Pass the arguments to the user-defined functions by reference.

The results shall immediately be updated after each menu selection.

All angles shall be stored and presented in degrees. Take care to determine the Phase

Angle such that the complex number is located in the appropriate quadrant of the

Complex Plane. Use double-precision floating-point numbers in performing the

calculations. After each of the Complex Number Arithmetic Operations, present the

result in Rectangular and in Polar form.

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Limit the numerical display to 3 decimal points. Take care to not allow a divide by zero

error. Use the following structure for the program.

Provide the following documentation for the program in a PDF document.

A. A brief written description of the program including the purpose of the program and

the structure and programming techniques used in the program.

This program is meant to present the user with a menu of options that allows him to insert imaginary numbers into the algorithm and the code fills out the table as directed by the user.

It uses a global variable, 8 user defined functions and a main function. The main input has a do while loop with a switch function to allow the user to continue the program until he chooses to stop.

B. The code listing.

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A white background with blue and purple text

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A close-up of a computer screen

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A screenshot of a computer program

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C. Screen captures that demonstrate that each operation is performed correctly.

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