

Introduction:

Welcome to your first-year C programming assignment, where you'll build an interactive console application that incorporates essential concepts of Variables and Constants, Data Types, printf and scanf, and Operators. This assignment will provide hands-on experience in developing an interactive program that covers these fundamental C programming topics.

Assignment Instructions:

Part I: Interactive Console Application (100 points):

You are tasked with creating a single interactive console application that covers all the specified topics. This application should meet the following requirements:

Variables and Constants (20 points):

1. Declare and initialize variables of different data types (int, float, char).
2. Use const to define relevant constants, such as the value of pi.
3. Implement an interactive user interface that allows users to input values for these variables.
4. Perform arithmetic operations on these variables and constants.
5. Display the results with proper formatting within the console application.

Data Types (30 points):

1. Utilize various data types (int, float, char, double) for storing and manipulating data within your application.
2. Implement interactive input by prompting users to enter values for the variables.
3. Perform typecasting operations when needed, demonstrating data type conversions within the interactive console application.
4. Calculate and display the maximum and minimum values for different data types within the interactive console application.

printf and scanf (30 points):

1. Utilize printf for user-friendly output within the interactive console application, including advanced formatting options such as specifying field widths, precision, and alignment.
2. Implement interactive input using scanf, ensuring proper validation and error handling.
3. Allow users to perform basic mathematical operations (addition, subtraction, multiplication, and division) within the console application.
4. Provide interactive file input and output using printf and scanf to save user input and results to a text file, and display these results within the console application.

Operators (20 points):

1. Use arithmetic operators (addition, subtraction, multiplication, division, and modulus) to perform calculations within the interactive console application.

2. Apply arithmetic operations to variables and constants to produce results.
3. Implement the use of const for defining constants.
4. Display the results with proper formatting, without using condition-based flow control statements.

Submission Requirements:

- You are required to submit a well-commented, single C source code file that contains the entire interactive console application.
- Include a readme.txt file explaining the purpose and functionality of each section of your application.
- Compress your assignment files and submit them electronically within the specified deadline.
- This assignment challenges you to create a comprehensive interactive console application that showcases your understanding of Variables and Constants, Data Types, printf and scanf, and Operators, while eliminating the use of enums and flow control statements. Enjoy the coding process, and good luck!

Sample Output

```
Enter an integer: 1
Enter a floating-point number: 2
Enter a character: G
Enter a double: 2.2
Variable Values:
Integer: 1
Float: 2.00
Character: G
Double: 2.200000

Mathematical Calculations:
2 * integerVar = 2
floatVar + 5.5 = 7.50
charVar as an integer: 71
doubleVar * PI = 6.911504
```