Programming Fundamentals

Assignment # 02

Note:

- First think about a problem statement and then write/draw your logic on paper.
- After designing the logic on paper, code the problem statement on any editor (VS Code, Dev C++, etc).
- Copied tasks will be awarded **zero** marks without any investigation.
- Comment your code properly.
- Assignment after the due date will not be accepted.
- Understanding questions is part of the assignment.
- Plagiarism of any shape or form will not be tolerated. In case of plagiarism, the particular question will be marked zero and 50% marks from total obtained marks will be deducted.

NOTE : if anyone use any Ai ChatBot there will be strong consequences

Problem 1

Write a C++ program to calculate the amount of money a person would have after 10 years,given an initial deposit, a fixed annual interest rate,number of years, and the number of compounding periods per year. get these values from the user.

Example:

Initial deposit = $3000, Annual interest rate = 3%, Compounding periods per year = 2

The formula to calculate the amount of money after n years is:

$$A = P * (1 + r/k)(k * n)$$

where A is the amount of money after n years, P is the initial deposit, r is the annual interest rate,k is the number of compounding periods per year, and n is the number of years.

Problem 2

i)Write a program to show the difference between signed and unsigned integers.
ii) Demonstrate what happens when an unsigned integer goes below zero and a signed integer overflows.

Problem 3

An embedded system is using limited memory to store various sensor data values. You need to determine the optimal data type for storing different ranges of values efficiently.

1. If you have an unsigned char type, how many bits are required to store its maximum value?
2. Now, suppose you need to store a combination of two maximum values of unsigned char in a single variable without exceeding the size of an unsigned int. How many bits would be required in total for this storage?
3. Additionally, if you want to store three maximum values of unsigned char in three separate variables, one of which is an unsigned short, another an unsigned int, and the last one as an unsigned long, what is the minimum number of bits required for each of these types?

Important Instructions

- For Problem 1 and 2 part(i) only submit a .cpp file and for Problem 2 part(ii) and Problem 3 submit only one pdf file otherwise 1 mark will be deducted from each question.
- Only a PDF file is acceptable, no handwritten assignment will be accepted, it will be marked 0 straight forward.
- Don't Forget to turn in your Assignment after you upload.