Assignment #5
Check Your Understanding of CS Concepts!!!
Due: Sunday, 10/23/16, 11:59pm

We are going to add to our calculator by making it function as a programmer or scientific calculator. The user can choose the mode, and once in that mode the user gets a few options for calculations. You can now use conditionals and loops, but you may not use any built-in functions for the number conversion, such as bin()!!!

- In programmer mode, the user can enter any unsigned decimal number to convert to binary.
    - Your binary number should not print leading zeros this time, and it should convert numbers larger than 255!!!
    - **For this number, make sure you handle bad positive integers!!!** You do not have to handle those numbers that are too large to be represented, you just have to handle anything that isn't an unsigned decimal integer!!!
- In scientific mode, the user can choose between the following operations: +, -, *, /, and **.
    - Since all these operations are binary, then the user needs to be prompted for two operands following the operator. These operands can be floating point numbers.
- You will continue to ask the user if he/she wants to continue doing calculations or go to a different mode after each iteration.

- **Step 1: Problem Analysis**. **(10 pts)**
    a. Understanding the Problem – Do you understand everything in the problem? List anything you do not fully understand.
    b. What are the inputs, outputs, etc.?

- **Step 2: Program Design**. **(30 pts)**
    What are the decisions that need to be made in this program? How are you going to calculate the binary number for any number > 255? Are you going to ask for the starting exponent? Are you going to calculate this starting exponent?

    Based on your answers above, list the **specific steps or provide a flowchart** of what is needed to create this calculator with two modes. Be very explicit!!!

- **Step 3: Program Implementation**. **(40 pts)**
    This is the Python code that implements the programmer and scientific calculator.

- **Step 4: Program Testing**. **(20 pts)**
    Create a test plan with the test cases (bad, good, and edge cases). What do you hope to be the expected results? You can use your Lab #3 and Assignment #4 as a starting place for the table you need to develop.
    - What are the good, bad, and edge cases for ALL input in the program?
    - What are the actual results from testing this data?

(10 pts) **Extra Credit**
Add functionality to the programmer calculator
Binary to Decimal conversion:
- If the user chooses binary, then the user enters a number as 1s and 0s, and the calculator returns the decimal representation.

Electronically submit your **.py file** (Python code) and **definitions/design as a .pdf** by the assignment due date, using TEACH:
https://secure.engr.oregonstate.edu:8000/teach.php?type=want_auth