ECCS 1611 – Programming 1

Pre-Lab 4 – Iteration - Programming practice with for and while statements.

Should be done as a team.

Please write the following programs using Visual Studio or Xcode. When completed, please submit your code on Moodle.

Credit Card Number Check. The last digit of a credit card number is the check digit, which protects against transcription errors such as an error in a single digit or switching two digits. The following method is used to verify actual credit card numbers but, for simplicity, we will describe it for numbers with 8 digits instead of 16:

• Starting from the **rightmost** digit, form the sum of every other digit. For example, if the credit card number is 43589795, then you form the sum: 5 + 7 + 8 + 3 = 23.

• Double each of the digits that were not included in the preceding step. Add all digits of the resulting numbers. For example, with the number given above, doubling the digits, starting with the next-to-last one, yields: 18 18 10 8. Adding all digits in these values yields: 1 + 8 + 1 + 8 + 1 + 0 + 8 = 27.

• Add the sums of the two preceding steps. If the last digit of the result is 0, the number is valid. In our case, 23 + 27 = 50, so the number is valid.

Discuss the following in your teams:

1. What are the potentially challenging aspects of making this calculation?
2. Would you need a for loop, a while loop, or combination to solve this problem?
3. What would be the pseudocode for this program? (i.e., write out the steps, make a flowchart, make a diagram, etc)
4. What would one “edge” or “boundary” test case (i.e., a method of validating our answer) be for this problem? Provide the 8-digit card number and if the card is valid or not valid.

Next, **in your team** write a C++ program that implements this algorithm. The user should supply an 8-digit number, and you should print out whether the number is valid or not. **HINTS: (1) look at digitStripper.cpp and (2) try to do this problem by hand for the second example below before trying to write code.**

Example runs (with user input indicated with ***bold italics***):

Please enter 8-digit card number: ***43589795***

Card is valid.

Please enter 8-digit card number: ***43589796***

Card is not valid.