#include <stdio.h>

#include <iostream>

#include <string>

using namespace std;

bool isNumberString(const string& s) {

int len = s.length();

for (int i = 0; i < len; i++) {

if (s[i] < '0' || s[i] > '9')

return false;

}

return true;

}

int main() {

string ccNumber;

cout << "This program uses the Luhn Algorigthm to validate a CC number." << endl;

cout << "You can enter 'exit' anytime to quit." << endl;

while (true) {

cout << "Please enter a CC number to validate: ";

cin >> ccNumber;

if (ccNumber == "exit")

break;

else if (!isNumberString(ccNumber)) {

cout << "Bad input! ";

continue;

}

int len = ccNumber.length();

int doubleEvenSum = 0;

// Step 1 is to double every second digit, starting from the right. If it

// results in a two digit number, add both the digits to obtain a single

// digit number. Finally, sum all the answers to obtain 'doubleEvenSum'.

for (int i = len - 2; i >= 0; i = i - 2) {

int dbl = ((ccNumber[i] - 48) \* 2);

if (dbl > 9) {

dbl = (dbl / 10) + (dbl % 10);

}

doubleEvenSum += dbl;

}

// Step 2 is to add every odd placed digit from the right to the value

// 'doubleEvenSum'.

for (int i = len - 1; i >= 0; i = i - 2) {

doubleEvenSum += (ccNumber[i] - 48);

}

// Step 3 is to check if the final 'doubleEvenSum' is a multiple of 10.

// If yes, it is a valid CC number. Otherwise, not.

cout << (doubleEvenSum % 10 == 0 ? "Valid!" : "Invalid!") << endl;

continue;

}

return 0;

}

