**CS 10 - Assignment 2: ISBN Checksum**

**Collaboration Policy**

We encourage collaboration on various activities such as lab, codelab, and textbook exercises. However, **no collaboration between students is allowed on the programming assignments**. Please be sure to read and understand our full policy at: [Full Collaboration Policy](https://docs.google.com/document/d/1WyzL3qvKLrC1UCRf178b_wYWQmEZlhDObFNFb79U63I/edit?usp=sharing)

**Submission Instructions**

Submit to [R’Sub](https://galah.cs.ucr.edu) testing, feedback and grading.

**Assignment Specifications**

A ten digit ISBN number uses a checksum as its last digit to verify the first nine digits are valid. Before 2007, all ISBN numbers were composed like this, such as: 0-20-508005-7 or 1-234-56789-X. The first nine digits are assigned by a book’s publisher and the last digit is calculated by “weighted sum” (described below). The X stands for the checksum value of 10, in order to represent ten as a single digit.

**Your Assignment**

You must write a program that calculates and outputs this checksum value given the first nine digits of the ISBN number, utilizing the checksum algorithm below.

**ISBN Checksum Algorithm**

To compute the *weighted sum* we start from the left-most digit:  
Sum one times the first digit, plus two times the second digit, plus three times the third, etc. all the way to nine times the ninth digit.

*Note: Just because we describe the calculation as “starting with the left-most digit” does NOT mean that that is the best order for the C++ algorithm! Plan carefully for the simplest way of isolating each digit from the whole number.*

Next we take this weighted sum, and calculate *the remainder after it is divided by eleven*.

(i.e. “weighted sum modulo eleven”)

Finally, the ISBN standard requires that we take this checksum digit and convert it if needed (i.e. 10 is replaced by X). **We will omit this step and just output the value from 0 through 10 without any conversion.**

**Input/Output Requirements**

Your main function must prompt the user to enter the first 9 digits of an ISBN, and then read in that input as a **single integer**.

Your program must then calculate the corresponding checksum, and output it as shown in the example run below.

**Test Values** (Single program execution per row)

|  |  |
| --- | --- |
| **ISBN (first 9-digits)**  123456789  000000000  987654321  047147063 | **Checksum Value**  10  0  0  5 |

**Example Run**

Make sure your program output looks exactly the same as this.  
*User input has been bolded and underlined to distinguish it from program output.*

user@cs10: $ g++ isbn.cpp -o isbn.out

user@cs10: $ run isbn.out

Please enter the first 9 digits of the ISBN: **123456789**

Checksum: 10

user@cs10: $