

CSE 201, Fall 2016

Homework # 05

Due Thursday October 20th 2016 by 11:59pm

Deliverables:

1 python file.

Note: If you are working as a team of 2: Make sure to print team members' names, make sure that both team members upload the "same" file.

ISBN Validator Every book is identified by a 10-character International Standard Book Number (ISBN), which is usually printed on the back cover of the book.

The first nine characters are digits and the last character is either a digit or the letter *X* (which stands for ten).

Three examples of ISBNs are

0-13-030657-6,

0-32-108599-X,

and

0-471-58719-2.

The hyphens separate the characters into four blocks.

The first block usually consists of a single digit and identifies the language (0 for English, 2 for French, 3 for German, etc.).

The second block identifies the publisher.

The third block is the number the publisher has chosen for the book.

The fourth block, which always consists of a single character called the *check digit*, is used to test for errors.

Let's refer to the 10 characters of the ISBN as

$d_1, d_2, d_3, d_4, d_5, d_6, d_7, d_8, d_9$, and d_{10}

$$10 \cdot d_1 + 9 \cdot d_2 + 8 \cdot d_3 + 7 \cdot d_4 + 6 \cdot d_5 + 5 \cdot d_6 + 4 \cdot d_7 + 3 \cdot d_8 + 2 \cdot d_9 + 1 \cdot d_{10} (*)$$

is a multiple of 11. (Note: A number is a multiple of 11 if it is exactly divisible by 11.) If the last character of the ISBN is an *X*, then in the sum (*), d_{10} is replaced with 10.

For example, with the ISBN 0-32-108599-X, the sum would be:

$$10 \cdot 0 + 9 \cdot 3 + 8 \cdot 2 + 7 \cdot 1 + 6 \cdot 0 + 5 \cdot 8 + 4 \cdot 5 + 3 \cdot 9 + 2 \cdot 9 + 1 \cdot 10 = 165$$

Since

$10 \cdot 0 + 9 \cdot 3 + 8 \cdot 2 + 7 \cdot 1 + 6 \cdot 0 + 5 \cdot 8 + 4 \cdot 5 + 3 \cdot 9 + 2 \cdot 9 + 1 \cdot 10 = 165$ is 15, the sum is a multiple of 11.

This checking scheme will detect every single digit and -transposition- -of- -adjacent- -digits error. That is, if while copying an ISBN number you miscopy a single character or transpose two adjacent characters, then the sum (*) will no longer be a multiple of 11.

Write a program to accept an ISBN type number (including the hyphens) as input, calculate the sum (*), and tell if it is a valid ISBN. See **Fig below**. (Hint: The number n is divisible by 11 if $n \% 11$ is 0.) Before calculating the sum, the program should check that each of the first nine characters is a digit and that the last character is either a digit or an X.

Requirement: You must have at least one user defined function in your python program.

Sample Run:

```
Enter ten-character ISBN number: 0-13-030657-6
The number is valid.
>>>
```