

Department of Information Systems and Technologies

CTIS 152 – Algorithms and Data Structures

Spring 2024 – 2025

EXTRA QUESTION # 04

An international standard book number (ISBN) is used to uniquely identify a book. It is made of 10 digits as shown below. Write a function that tests an ISBN to see if it is valid. For an ISBN number to be valid, the weighted sum of the ten digits must be evenly divisible by 11. The tenth digit may be x, which indicates 10.

To determine the weighted sum, the values of each position is multiplied by its relative position, starting from the right, and the sum of the products is determined. The calculation of the weighted sum for ISBN shown above is:

Code	Weight	Weighted Value
0	10	0
0	9	0
7	8	56
0	7	0
2	6	12
1	5	5
6	4	24
0	3	0
4	2	8
5	1	5

Weighted sum: **110**

Since the weighted sum modulus 11 is zero, the ISBN is valid. Test your function with the above example, the ISBN number for this text, and 0-08-781809-5 (an invalid ISBN-the third and fourth digits are reversed).

Example Run#1:

Enter an isbn:
0-07-021604-5

Code	Weight	Weighted Value
****	*****	*****
0	10	0
0	9	0
7	8	56
0	7	0
2	6	12
1	5	5
6	4	24
0	3	0
4	2	8
5	1	5

Weighted Sum: 110

The given isbn is valid!

Example Run#2:

Enter an isbn:
0-08-781809-5

Code	Weight	Weighted Value
****	*****	*****
0	10	0
0	9	0
8	8	64
7	7	49
8	6	48
1	5	5
8	4	32
0	3	0
9	2	18
5	1	5

Weighted Sum: 221

The given isbn is NOT valid

Example Run#3:

Enter an isbn:
0-07-881809-5

Code	Weight	Weighted Value
****	*****	*****
0	10	0
0	9	0
7	8	56
8	7	56
8	6	48
1	5	5
8	4	32
0	3	0
9	2	18
5	1	5

Weighted Sum: 220

The given isbn is valid!