

1 UPC

The UPC uses 12 digits. The first 11 digits are information, and are used to compute the 12th digit. The formula is

$$3d_1 + d_2 + 3d_3 + d_4 + 3d_5 + d_6 + 3d_7 + d_8 + 3d_9 + d_{10} + 3d_{11} + d_{12} = 0 \bmod(10)$$

What is the UPC checksum digit for 246-897-531-24_?

2 ISBN

ISBN: International Standard Book Number, 10 digits, last is the checksum, and can have the value 'X' meaning 10:

$$10d_1 + 9d_2 + 8d_3 + 7d_4 + 6d_5 + 5d_6 + 4d_7 + 3d_8 + 2d_9 + 1d_{10} = 0 \bmod(11)$$

What is the ISBN checksum digit for 246-897-531-_?

3 Luhn/IBM

Luhn/IBM, any number of digits. Used on credit cards.

$$2\#d_1 + d_2 + 2\#d_3 + d_4 + 2\#d_5 + d_6 + 2\#d_7 + d_8 + \dots = 0 \bmod(10)$$

Here, $2\#d_1$ means compute $2 * d_1$ and sum the digits. What is the Luhn checksum digit for 246-897-531-_?

4 Bank

US Bank Routing Numbers: 9 digits, last digit is checksum.

$$3d_1 + 7d_2 + d_3 + 3d_4 + 7d_5 + d_6 + 3d_7 + 7d_8 + d_9 = 0 \bmod(10)$$

What is the ISBN checksum digit for 246-897-53_?