

# Barcode Challenge

## What are Barcodes?

Barcodes are everywhere! Barcodes are used to help organise and index information or prices for different objects. Barcodes were first developed to help automate supermarket checkouts. A barcode scan is fast and reliable and takes infinitely less time than entering data by hand. A check digit (checksum) is the last digit of the barcode and is used to ensure accuracy and check for errors.

## What You'll Need

Pen/Pencil, paper,  
different items with  
13-digit barcodes

## Extensions

Calculating a 13-digit barcode  
can be found here:

<https://csunplugged.org/en/resources/barcode-checksum-poster/>

## Why are we doing this?

You will be able to look for errors in a product code. The purpose of a check digit is to verify that the information on the barcode has been entered correctly. You will also be able to check how accurate the barcode is by calculating the check digit.

## Barcode Activity

*How to calculate the checksum of a 13-digit barcode?*



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- ❖ Add the digits in the even-numbered positions (second, fourth, sixth, etc.,) together and multiply by 3.

$$0 + 0 + 7 + 9 + 7 + 7 = 30$$

$$30 * 3 = 90$$

- ❖ Add the digits in the odd-numbered positions (first, third, fifth, etc.,) together.

$$4 + 7 + 0 + 1 + 6 + 0 = 18$$

- ❖ Add the two results together.

$$90 + 18 = 108$$

- ❖ Now what single digit number makes the total a multiple of 10? That's the check digit.

$$108 + ? = \text{multiple of } 10?$$

$$108 + 2 = 110 \text{ (11 times } 10 = 110)$$



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When a barcode is scanned, an easy way to check the digits is to add the check digit to the total, and make sure that the sum ends with a 0. ( $30 + 18 = 48 + 2$  (check digit) = 50)

# Activity

Calculate the checksum of the given 13-digit barcode and find the last digit:



$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad} \text{ (odd)}$$

$$\underline{\quad} * \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad} \text{ (even)}$$

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + ? = \text{multiple of } 10?$$

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

## Activity 2:

Now run to the kitchen, Grab 5 items from the cupboard with a 13-digit barcode. Let's do the checksum!

