# CSC 150: Computer Science I

# Assignment 6

Arrays

**Learning Objectives**

* To learn how to declare and use arrays for storing collections of values of the same type
* To understand how to use a subscript to reference the individual values in an array
* To learn how to process the elements of an array in sequential order using loops
* To understand how to pass individual array elements and entire arrays through function arguments
* To learn a method for searching an array
* To learn a method for sorting an array

A barcode scanner for Universal Product Codes (UPCs) verifies the 12-digit code scanned by comparing the code’s last digit (called a check digit) to its own computation of the check digit from the first 11 digits as follows:

1. Calculate the sum of the digits in the odd-numbered positions (the first, third… eleventh digits) and multiply this sum by 3.

2. Calculate the sum of the digits in the even-numbered positions (the second, fourth… tenth digits) and add this to the previous result.

3. If the last digit of the result from step 2 is 0, then 0 is the check digit. Otherwise, subtract the last digit from 10 to calculate the check digit.

4. If the check digit matches the final digit of the 12-digit UPC, the UPC is assumed correct.

Write a program that prompts the user to enter the 12 digits of a barcode separated by pressing <enter>. The program should store the digits in an integer array, calculate the check digit, and compare it to the final barcode digit. If the digits match, output the barcode with the message “validated.” If not, output the barcode with the message “error in barcode.”

Also, output with labels the results from steps 1 and 2 of the check-digit calculations. Note that the “first” digit of the barcode will be stored in element 0 of the array.

Try your program on the following barcodes, three of which are valid. For the first barcode, the result from step 2 is 79 ((0 + 9 + 0 + 8 + 4 + 0) \* 3 + (7 + 4 + 0 + 0 + 5)).

0 7 9 4 0 0 8 0 4 5 0 1

0 2 4 0 0 0 1 6 2 8 6 0

0 1 1 1 1 0 8 5 6 8 0 7

0 5 1 0 0 0 1 3 8 1 0 1

Program requirements:

* Beginning .c source code file used and authorship, date, etc. well documented
* Comments describing the statement actions
* Prompts the user to enter the 12 digits of a barcode
* Calculates the check digit and compare it to the final barcode digit
* Outputs the barcode with the message “validated” if the digits match
* Outputs the message “error in barcode.” if the digits do not match.
* Outputs, with labels, the results of the check-digit calculations

Compile, run and test your program.

Submit the working .c file in the Assignment 6 Dropbox.

Text

Description automatically generatedText

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