# CpSc 1111 Lab 8
# Arrays

## Overview

This week, you will gain some experience with arrays, using loops to do the following:

- declaring and initializing arrays
- printing out the values in an array

## Background Information

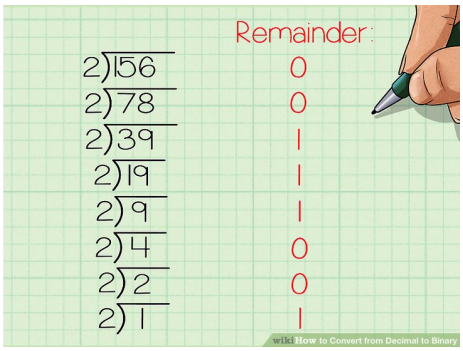
### Arrays

In lecture, you have learned that arrays are data structures that store sets of same-type data items under a single name declaration. You have seen how to declare and initialize arrays, including using a random number generator to initialize values of an array.

You have also seen the use loops to iterate through arrays to perform various tasks, such as finding the largest value in the array, swapping values of two elements in the array, etc. Don't forget that the index values for the elements in the array begin with 0.

In this lab, you will write a decimal-to-binary converter. The binary value of a decimal number can be found by repeatedly dividing the decimal number by 2 and keeping track of the remainders; the remainders in reverse order make up the binary number.

As shown in the graphic below, the binary equivalent of 156 is 10011100.




## Lab Assignment

For this week's lab assignment, you will write a program called lab8.c.

**Reminder About Formatting and Comments**

- The top of your file should have a header comment, which should contain:
  - Your name
  - Course and semester
  - Lab number
  - Brief description about what the program does
  - Any other helpful information that you think would be good to have.
- Variables should be declared at the top of the main function, and should have meaningful names.
- Always indent your code in a readable way. Some formatting examples may be found here: https://people.cs.clemson.edu/~chochri/Assignments/Formatting_Examples.pdf
- Don't forget to use the `-Wall` flag when compiling, for example: `gcc -Wall lab8.c`

Your program will ask the user to enter a decimal number. It will then use an integer array to store the values of the remainders after repeatedly dividing the user's input by 2. Finally, the array values representing the binary equivalent will be printed out to the user.

You should have two loops in your program:

1. a `while` or `do-while` loop to repeatedly divide the number and store the remainders in the array
2. a `for` loop to print the values of the array

Don't forget to break the program into smaller steps and compile and run ***AFTER EACH STEP***.

Sample output of three separate runs is show below with user input in **bold**:

```
> ./a.out

Enter a decimal number:  23
The binary equivalent of 23 is 10111


> ./a.out

Enter a decimal number:  729
The binary equivalent of 729 is 1011011001


> ./a.out

Enter a decimal number:  5923
The binary equivalent of 5923 is 1011100100011
```

## Turn In Work

1. Before turning in your assignment, make sure you have followed all of the instructions stated in this assignment and any additional instructions given by your lab instructor(s). Always test, test, and retest that your program compiles and runs successfully on our Unix machines before submitting it.
2. Show your TA that you completed the assignment. Then submit your `lab8.c` program using the handin page: http://handin.cs.clemson.edu. ***Don't forget to always check on the handin page that your submission worked. You can go to your bucket to see what is there.***

## Grading Rubric

If your program does not compile on our Unix machines or your assignment was not submitted on time, then you will receive a grade of zero for this assignment. Otherwise, points for this lab assignment will be earned based on the following criteria:

| | | |
|---|---|---|
| Functionality | 85 | 25 for general functionality (and MUST use an array)<br>30 for a while or do-while loop (dividing decimal number)<br>30 for a for loop (displaying binary number) |
| Code formatting | 10 | |
| No warnings when compile | 5 | |