

## CS 12 - Lab 4 Pointers

In this lab you will use pointers to write your program. You are not allowed to use the subscript operator (`[]`) throughout the program. Be sure to include all necessary information at the top of the program and use good commenting and style throughout your program.

You will begin to learn the Linux operating system during this lab. For the rest of the quarter you must make sure that your programs compile using g++.

Write a short program that asks the user how many integers they would like to store. Your program will then dynamically allocate an array of integers of the specified size. You will then fill them with random numbers, between 1 and 10, using the `rand()` function (described below). Your program should then prompt the user to input a number to be searched for. You should count and output the number of times the specified number occurs in the array and then print the array.

You should only use pointers in this program as you manipulate the array. The subscript operator (`[]`) is only allowed to appear when the array is declared. You may not use the subscript operator at any other time in this program.

**Random Numbers** The `rand()` function returns an integer between 1 and `MAX_INT`. You must include the standard library header file `stdlib.h` in order to use this function. To generate random numbers within a specific range use the following formula,

```
num = (rand()%num_items) + base_num
```

where *num\_items* is the number of values in the range and *base\_num* is the lowest value. For example, to get values between 50 and 60 you would use the following expression,

```
int num = (rand()%11) + 50;
```

`rand()` actually generates a set of random numbers. Each run of the program will generate the same set of numbers in the same order, it only looks random within that run of the program.

A seed value can be used to generate a unique set of random numbers. Each seed value produces its own set. A seed value for the `rand()` function can be set by using the following function.

```
srand(seed);
```

The seed value is a long int. The default seed value is zero, which is why each program run produces the same set of random numbers. To generate a unique set for each run of the program, a random seed value should be chosen. A way of setting a pseudo-random seed value is to use the *time* at the beginning of the program execution. You must include the time header file *time.h* in order to use this function. An example is shown below.

```
srand(time(NULL));  
int num = (rand()%11) + 50;
```