**Name:**

**Advanced Programming in C++**

**Lab Exercise 3/9/2020 Stardate: 73185.79**

In this exercise, you will be writing some programs that use will use data searching algorithms. In each of these exercises, you are to print and attach your source code as well as a sample output.

1. Write a program that lets the user enter a charge account number. The program should determine if the number is valid by checking it in the following list:

5658845 4520125 7895122 8777541 8451277 1302850

8080152 4562555 5552012 5050552 7825877 1250255

1005231 6545231 3852085 7576651 7881200 4581002

Initialize a one-dimensional array with these values. Then use a simple linear search to locate the number entered by the user. If the user enters a number that is in the array, the program should display a message saying the number is valid. If the user enters a number not in the array, the program should display a message indicating the number entered is invalid.

Note: I have placed a text file (accounts.txt) with these numbers on the server in the folder

\\ADA\Data Files\C++\Lab Exercise 3.7.2016\

for your convenience.

1. A prime number is any integer that is evenly divisible by itself and 1. The Sieve of Eratosthenes is a method of finding prime numbers. It operates as follows:
   1. Create an array of elements initialized to 1 (true). Array elements with prime subscripts will remain 1. All other array elements will eventually be set to 0 (false). Ignore elements 0 and 1 for this exercise.
   2. Starting with array subscript 2, every time an array element is found whose value is 1, loop through the remainder of the array and set to 0 every element whose subscript is a multiple of the subscript for the element with a value of 1. For array subscript 2, all elements beyond element 2 in the array that are multiples of 2 will be set to 0 (elements 4, 6, 8, 10, etc.); for array subscript 3, all elements beyond element 3 in the array that are multiples of 3 will be set to 0 (elements 6, 9, 12, 15, etc.); and so on.

When this process is complete, the array elements that are still set to 1 indicate that the subscript of that element is a prime number. These subscripts can then be printed. Write a program that uses an array of 10000 elements to determine and print the prime numbers between 2 and 9999. Also report the number of prime numbers that fall in the range of

2 → 99, 100 → 999, and 1000 → 9999