

# CS143-Introduction to Problem Solving and Programming

## Sorting and Searching

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1. Write a program with the following functions:
  - a. LinearSearch
  - b. BinarySearch
  - c. BubbleSort
  - d. SelectionSort

Write the main function that accepts an array of 10 integers, and two elements,  $x$  and  $y$ , then calls LinearSearch to search for  $x$ , and BinarySearch to search for  $y$ . Each function should print the number of comparisons performed.

The main then calls BubbleSort to sort the input array, and accept another array that is sorted using SelectionSort.

Test your program using the following data:

Array 1: 10 2 5 7 18 20 13 4 9 12

$x = 4$

$y = 9$

Array 2: 1 6 10 22 14 30 17 42 29 13

2. Given a 2D array, write an algorithm that searches for an element  $x$  in the 2D array. What is the maximum number of comparisons expected?
3. Write an algorithm that sorts a 2D array.