Week 4 Lab: Simple Sorts

Next Week

Next week you will continue with the arrays demo. You will demonstrate Story 11, the insertion sort. In addition you will demonstrate Stories 12 and 13, linear and binary search. Linear search is easy—you did it in Structured Programming—binary search is a little trickier. You may find it easier to user recursion that to use iteration.

Demo

This week, you will be demonstrating matrix multiplication and simple sorts. Working with two dimensional arrays is a little tricky because you need to keep track of multiple counters. This is most complicated in the matrix multiplication.

There are three sorts to demo. Sorting is surprisingly difficult to do, even for the simple sorting algorithms. Note that correctness marks are given only for implementing the correct sort, not for achieving a sorted array. For example, replacing the input array with a sorted array achieves no marks.

Story 6 (15 Marks)

As a user, I want to print out a 2 dimensional array, so I can see the results of array multiplication.

1. Formatting is correct (5 Marks)
2. Compiles (5 Marks)
3. Runs (5 Marks)
    1. Uses print_1d_array (2 Marks)
    2. Prints all rows. (2 Marks)
    3. Prints nothing extra. (1 Mark)

Story 7 (15 Marks)

As a user, I want to be able to input out a 2 dimensional array of integers so I can input arrays to. Multiply.

4. Formatting is correct (5 Marks)
5. Compiles (5 Marks)
6. Runs (5 Marks)
    1. Uses read_1d_array (2 Marks)

2. Prompts for number to enter (1 Marks)
3. Prompts for each number. (1 Mark)
4. Inputs correct number of items. (1 Mark)
5. Puts items in correct place. (1 Mark)

Story 8 (15 Marks)

As a user, I want to be able to multiply matrices, to show I can manage two dimensional arrays.

7. Formatting is correct (5 Marks)
8. Compiles (5 Marks)
9. Runs (5 Marks)
    1. Multiplication is correct. (5 Marks)

Story 9 (15 Marks)

If you enter an 'S' command you are prompted to enter the type of sort. When you enter 'b' the array entered earlier is then sorted using a bubble sort.

1. Basics (5 Marks)
    1. Formatting is correct (3 Marks)
    2. Compiles without errors or warnings (2 Marks)
2. Correctness (10 Marks)
    1. Sort {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} (3 Marks)
    2. Sort {1, 4, 2, 3, 5, 8, 6, 7, 9, 0} (3 Marks)
    3. No visible errors (4 Marks)

Story 10 (15 Marks)

If you enter an 'S' command you are prompted to enter the type of sort. When you enter 's' the array entered earlier is then sorted using a selection sort.

3. Basics (5 Marks)
    1. Formatting is correct (3 marks)
    2. Compiles without errors or warnings (2 Marks)
4. Correctness (10 Marks)
    1. Sort {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} (3 Marks)

2. Sort {1, 4, 2, 3, 5, 8, 6, 7, 9, 0} (3 Marks)
3. No visible errors (4 Marks)