**Data Structures & Algorithms - 2 Days (2 x 4 = 8 Hours)**

**Pluralsight courses**

1. [**https://app.pluralsight.com/library/courses/algorithms-data-structures-part-one/table-of-contents**](https://app.pluralsight.com/library/courses/algorithms-data-structures-part-one/table-of-contents)
2. [**https://app.pluralsight.com/library/courses/algorithms-data-structures-part-two/table-of-contents**](https://app.pluralsight.com/library/courses/algorithms-data-structures-part-two/table-of-contents)

**Very Good for Understanding.**

[**https://www.youtube.com/watch?v=AT14lCXuMKI&list=PLdo5W4Nhv31bbKJzrsKfMpo\_grxuLl8LU**](https://www.youtube.com/watch?v=AT14lCXuMKI&list=PLdo5W4Nhv31bbKJzrsKfMpo_grxuLl8LU)

**Day 1**

* What is a data structure?
* Linked Lists *(code samples can be shown in the language of your choice)*
  + What & Why?
  + Nodes & Node Chaining
  + Adding & removing items in a linked list
  + Enumerating a linked list
  + Singly & Doubly linked lists
* Stacks & Queues *(code samples can be shown in the language of your choice)*
  + What & Why?
  + Push & Pop in Stacks
  + Enqueue and Dequeue in Queues

**ASSIGNMENTS**

1. Implement a linked list using JavaScript.

Link for hint : <https://www.c-sharpcorner.com/article/linkedlist-implementation-in-javascript/>

Create an HTML5 page and allow the user to input a node’s value. Create buttons to add a node, delete a node & print the linked list.

1. Implement a Stack using JavaScript.

Link for hint: <https://www.freecodecamp.org/news/stack-5404d9735f88/>

Create an HTML5 page and allow the user to input a value to be added to the stack. Create buttons to implement push, pop operations & to prin the stack. The stack must be printed in a table format consisting of only one column. As the user performs push and pop operations, the table must reflect the same.

1. Implement a Queue using JavaScript.

Link for hint: <https://betterprogramming.pub/implementing-a-queue-in-javascript-59b332c7ff0d>

Implement this similar to the stack implementation in the previous assignment.

**Day 2**

* Sorting and searching array data
  + Bubble sort algorithm - <https://www.youtube.com/watch?v=gJjnTtDqXTs>,

<https://www.youtube.com/watch?v=o4bAoo_gFBU>

* + Insertion sort algorithm - <https://www.youtube.com/watch?v=yCxV0kBpA6M>
  + Linear search algorithm - <https://www.youtube.com/watch?v=C46QfTjVCNU>
  + Binary Search algorithm - <https://www.youtube.com/watch?v=V_T5NuccwRA>
* Sets
  + What is a set?
  + Set operations
    - Union
    - Intersection
    - Difference & Symmetric Difference

**ASSIGNMENTS *(particpants can go though the provided links and implement it)***

1. Implement bubble sort algorithm to sort a numeric array in JavaScript.

Link for hint: <https://www.geeksforgeeks.org/bubble-sort-algorithms-by-using-javascript/>

1. Implement insertion sort algorithm to sort a numeric array in JavaScript.

Link for hint: <https://www.w3resource.com/javascript-exercises/searching-and-sorting-algorithm/searching-and-sorting-algorithm-exercise-4.php>

1. Implement linear search algorithm in JavaScript.

Link for hint: <https://www.oodlestechnologies.com/blogs/linear-search-implementation-using-javascript/>

1. Implement binary search algorithm in JavaScript.

Link for hint: <https://medium.com/@jeffrey.allen.lewis/javascript-algorithms-explained-binary-search-25064b896470>

1. Implement set operations in JavaScript.

Link for hint: <https://www.programiz.com/javascript/examples/set-operations>