**DESIGN AND ANALYSIS OF ALGORITHM (CSE – 5311)**

**Project Report on Sorting Algorithms**

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**Search Algorithms Implemented:**

* **Linear Search**
* **Binary Search**
* **Binary Search Tree**
* **Red Black Tree**

**Time Complexities :**

* **Linear Search –** Best Case**:** Ω(1), Average: Θ (N), Worst case: O(N)
* **Binary Search (sorted array) -** Best Case: Ω(1), Average: Θ (log N), Worst Case: O(log N)
* **Binary Search Tree-** Best Case: Ω(1), Worst Case : O(N), Average Case: Θ (log N)
* **Red black Tree –** Best Case: Ω(1), Worst Case: O(log N), Average Case : Θ (log N)

**GUI Web Page (Default.aspx):**

The web page for getting the input size from the user, algorithm selection, and charts are written on this page.

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

**GUI Web Page Code Behind cs file(Default.aspx.cs):**

This is code behind the component for the Default aspx page it has actions to be performed by the button click event.

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application, Word

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application, Word

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, application

Description automatically generated

**Binary Search Tree class (BinarySearchTree.cs):**

This class has the code for performing Binary Searching Tree algorithm like Insertion and searching.

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

**Node class(Node.cs) :** This has the structure of the Binary search tree node.

Graphical user interface, application, Word

Description automatically generated

**Searching Algorithms (SearchingAlgorithm.cs):**

This has the implementations of Linear search algorithm and binary search algorithm.

Graphical user interface, text, application, email

Description automatically generated

**RedBlack Tree (RedBlackNode.cs):**

This has the implementation of Redblack tree like insertion, and searching.Graphical user interface, application, Word

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Graphical user interface, application, table, Excel

Description automatically generated

Graphical user interface, application, Word

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, application

Description automatically generated

Graphical user interface, application

Description automatically generated

**Site.Master:** This is the master page of the application.

Graphical user interface, text, application

Description automatically generated

**Results:**

* Results generated when a randomly generating input array with input size 10 and searching a random key and comparing the running times for the algorithms are given below.

Graphical user interface, text

Description automatically generated

* Results generated by randomly generated data for the input size 1000 and comparison of the algorithms is given below.

Text

Description automatically generated

Chart

Description automatically generated with low confidence