MINOR-1 PROJECT

SYNOPSIS TERM REPORT

For

Analyzing various types of searching and sorting algorithms

Submitted By

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Synopsis Report

1. Project Title

Analyzing various types of searching and sorting algorithms.

2. Abstract

Data structure is a special type of format which is used to store and organize data. Usually, data structure are of various types like array, the file, trees, tables etc. the basic concept behind the data structure is to organize the data for a specific purpose so as to access and work on it easily. And here the concept of searching and sorting comes since to use these we have had arranged data in a structure to make our task efficient and effective. Searching is the process finding the particular data in a group of files. Not even a single day passes when we don't have to search for something weather book, car keys, charger etc. Same exists in the computer as there so much data stores and when we want to see it, we use to search in the data and it must be efficient and quick. Also, we use sort thigs in our daily life weather alphabetically or the ascending or the descending. We also do it computer science. We have various searching and sorting algorithm which we use in the database to search or sort the data. This project is based on various types of searching and sorting algorithm and their efficiency and properties.

3. Introduction

Let's imagine that we are in a big library and there are thousands and thousands of books in the shelves. Now we want to find the particular book of our interest through the library and the library is not sorted. Each and every book is placed at wrong place and order. How could we sort to be able to search through to find the exact book we need? But if the library is well arranged i.e sorted then we could easily search our desired book from the library. So, we get to know how important is sorting and search in our real life. Same is in our computer science background. Searching and sorting plays very important role in creating the databases as we need to access it later on. Here in the project, we will be using various searching and sorting algorithms, showing you their practical implementation how they work, their efficiency and their properties. In technical language sorting basically helps to reduce the algorithmic complexity of the problem. A quick google search reveals that there are 40 different over 40 different sorting algorithms used on the computer science. On the other hand, search is the process of finding the value in a list of values or it is the process of locating given value position in a list. Both the searching and sorting algorithms are of various types and are interesting too. Let's see how they work and their efficiency.

4. Literature Review

Ajay Kumar, Bharat Kumar, Chirag Dawar and Dinesh Bajaj explained about different sorting techniques their behavior for different inputs. The research reveals that the Insertion sort is best for small data items and, Merge sort and quick sort is used for large data sets [1].

Rekhadwivedi and Dr. Dinesh C. Jain discussed about sorting, sorting algorithm, types of sorting algorithm and comparison on basis of time complexity. The research observed that quick sort is the best based on execution time [2].

Ramesh Chand Pandey explains about the various sorting algorithms, their advantages and disadvantages. It compared sorting algorithms based on time complexity, memory required and stability. It proposed a new sorting algorithm which works on priority basis. The new algorithm gives the specific data first then general data if required [3].

5. Problem Statement

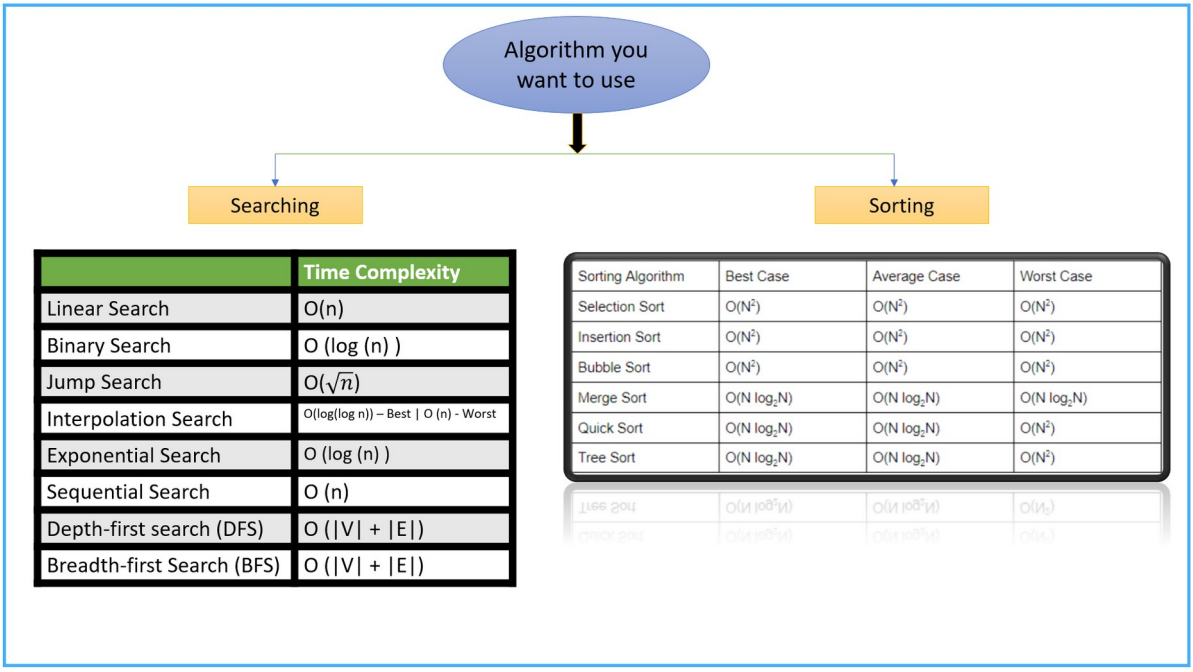
In our daily life we use to search or sort our data in various software, web apps etc, but we don't know how does it work or what are algorithm used. There are various types of searching and sorting algorithm to search or sort the data which makes our daily task very easy weather it a bank, university or any other organization data. In this project we will be showing various types of algorithms and their implementation.

6. Objectives

- To know about various types of searching and sorting algorithm.
- How searching and sorting algorithm work and their efficiency.
- Properties of various types of searching and sorting algorithm.
- To analyse various searching and sorting techniques.

7. Methodology

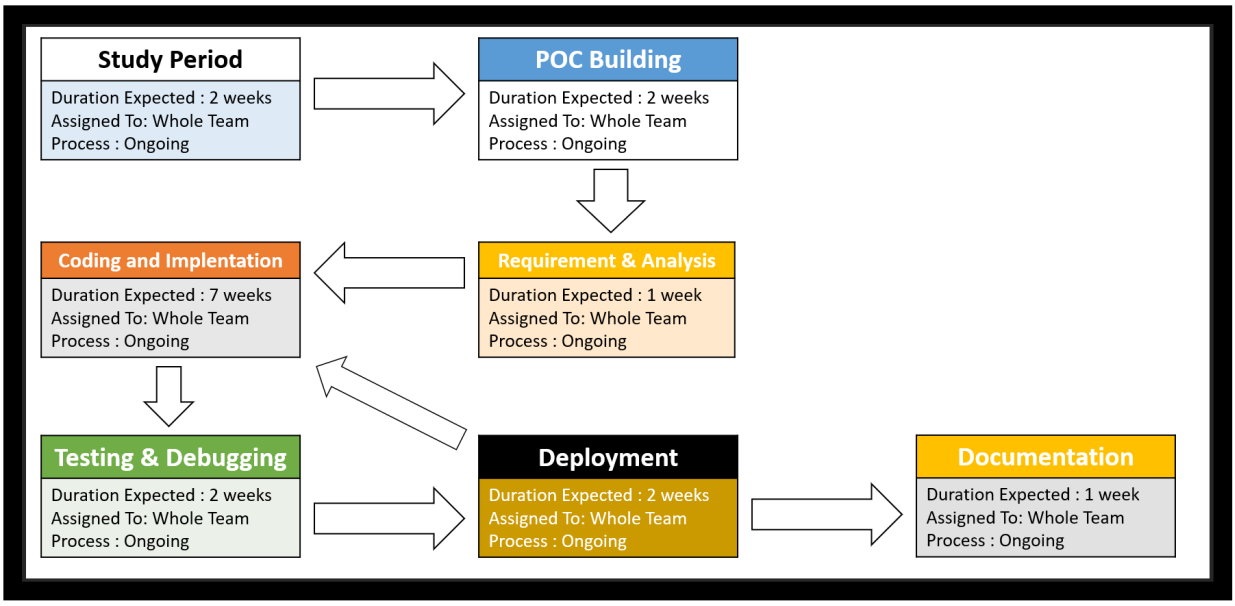
- Used various types of searching and sorting algorithm and shown the practical implementation in the small data base.
- A small data base id created initially on which various types of searching and sorting algorithm will be demonstrated.
- The multiple searching sorting algorithm will be assigned with the value which when called then only they will be implemented.
- Asked from the used to weather search or sort the data at a single command and then its types are executed.



	Time Complexity
Linear Search	O(n)
Binary Search	O (log (n))
Jump Search	$O(\sqrt{n})$
Interpolation Search	O(log(log n)) – Best | O (n) - Worst
Exponential Search	O (log (n))
Sequential Search	O (n)
Depth-first search (DFS)	O (|V| + |E|)
Breadth-first Search (BFS)	O (|V| + |E|)

Sorting Algorithm	Best Case	Average Case	Worst Case
Selection Sort	$O(N^2)$	$O(N^2)$	$O(N^2)$
Insertion Sort	$O(N^2)$	$O(N^2)$	$O(N^2)$
Bubble Sort	$O(N^2)$	$O(N^2)$	$O(N^2)$
Merge Sort	$O(N \log_2 N)$	$O(N \log_2 N)$	$O(N \log_2 N)$
Quick Sort	$O(N \log_2 N)$	$O(N \log_2 N)$	$O(N^2)$
Tree Sort	$O(N \log_2 N)$	$O(N \log_2 N)$	$O(N^2)$

8. PERT Chart



9. Results

Hence, this project is based on various types of searching and sorting algorithm and their properties. It will help us to know about how these various searching and sorting algorithms work efficiently.

10. References

[1] Ajay Kumar, Bharat Kumar, Chirag Dawar and Dinesh Bajaj, Comparison Among Different Sorting Techniques, International Journal for Research In Applied Science And Engineering Technology (IJRASET), 2014

[2] Ramesh Chand Pandey, Study and Comparison of various Sorting Algorithms, 2008

[3] https://www.geeksforgeeks.org/sorting-algorithms/

[4] https://www.javatpoint.com/searching-in-binary-search-tree

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