



Minor Project

Title:

Analyzing various types of searching and sorting algorithms

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1. 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 there 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.

2. 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.

3. Motivation

- 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.

4. 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.

5. Technology Stack

Algorithms-

Searching Algorithms-

- Linear Search-
- Binary Search-
- Exponential Search-
- Fibonacci Search-
- Interpolation Search-
- Sub list Search-
- Ubiquitous Binary Search-
- Jump Search-

Sorting Algorithm-

- Selection Sort-
- Bubble Sort-
- Quick Sort-
- Merge Sort-
- Insertion Sort-
- Heap Sort-
- Counting Sort-
- Radix Sort-
- Bucket Sort-

6. Methodology

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Algorithm you
want to use

Searching

Sorting

	Time Complexity
Linear Search	$O(n)$
Binary Search	$O(\log(n))$
Jump Search	$O()$
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	$O(N \log_2 N)$	$O(N \log_2 N)$	$O(N^2)$

7. SWOT Analysis

Strength: The utmost strength of our project is that it is a real-time problem-solving project and can help to analyze various searching and sorting algorithms. This project will tell us how various algorithm works in the complex database when we try to search the element throughout the or sort the contents.

Weakness: The only weakness of our project is to implement various algorithmic techniques at once.

Opportunities: It can have wide range of valid possibility that this project can evolve into some bigger scenarios. This project can also be used for saving our time in finding the number of searching and sorting algorithms here and there on the web and can explain you everything in a very quick and precise manner at a single place only.

Threats: The threat in our algorithm is to constantly update and add the new searching and sorting techniques which will be built in future.

8. Application of the Project

- 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.

9. PERT Chart

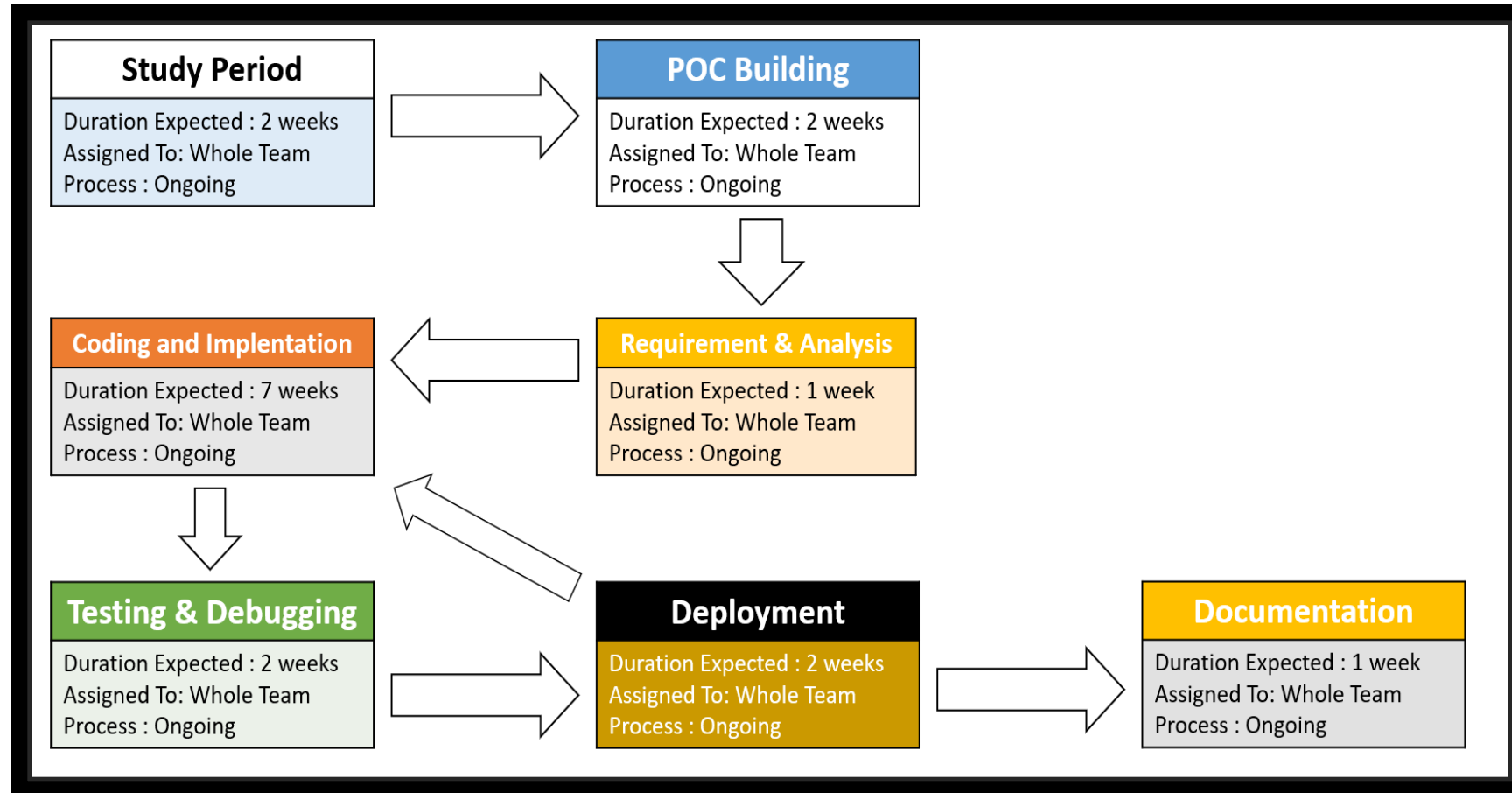


Fig.2 Program Evaluation Review Technique Chart

10. Objectives Covered

<u>Objectives</u>	<u>Status</u>
Learning the technologies used	In Progress
Developing Overall Risk Home	In Progress
Implementing workflow	In Progress

11. References

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- [3] <https://www.geeksforgeeks.org/sorting-algorithms/>
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Thank You