CEC Landran

Department of Computer Science & Engineering

Format for B.Tech Project Synopsis

Title page:

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4. Branch : CSE
5. Batch : 2020 -2024
6. Proposed Topic : Sorting Visualizer

Introduction :
We have learnt sorting algorithms like bubble sort, selection sort, insertion sort, quick sort, heap sort, etc. But often we fail to understand the core idea of a particular algorithm, maybe because we are unable to visualize how they work. So the most important thing to understand about these algorithms is visualization.

That's why we are making this project to let everyone understand how these algorithms work and through this project you also will get a deep understanding of such sorting algorithms.

This project will guide you step by step to complete this project and at the end of this project you will have an immense grip on some core concepts of Javascript as well. Adding this project on your resume will showcase your skills and add a great value to your profile.

This project is a good start for beginners and a refresher for professionals who have dabbled in data structures and algorithms using Javascript before and also web developers.
This project is based on three languages as we design the UI of visualization which is HTML, CSS(Cascading Style Sheet), and JavaScript. These three languages are interconnected with each other without any one of them we can't make an awesome UI.

HTML was created by Tim Berners-Lee. The first version of HTML was written by Tim Berners-Lee in 1993. Since then, there have been many different versions of HTML. The most widely used version throughout the 2000's was HTML 4.01, which became an official standard in December 1999

HTML stands for Hyper Text Markup Language. It is the standard markup language for creating Web pages, describes the structure of a Web page, consists of a series of elements, elements tell the browser how to display the content and elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.

CSS was first proposed by Håkon Wium Lie in 1994. At the time, Lie was working with Tim Berners-Lee at CERN. Several other style sheet languages for the web were proposed around the same time.
Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

Brendan Eich 1961 is an American computer programmer and technology executive. He created the JavaScript programming language and co-founded the Mozilla project, the Mozilla Foundation, and the Mozilla Corporation.
JavaScript is a text-based programming language used both on the client-side and server-side that allows you to make web pages interactive. Where HTML and CSS are languages that give structure and style to web pages.

High-Level Approach:
Creating the website's User Interface (UI) using HTML, CSS and enhancing it further using Bootstrap; without actually implementing any of the app's core features.
Implementation of animations, effects and core functionalities (sorting algorithms) using JavaScript.
This website is hosted on Netlify. **Netlify** is a web developer platform that multiplies productivity. By unifying the elements of the modern decoupled web, from local development to advanced edge logic, Netlify enables a 10x faster path to much more performant, secure, and scalable websites and apps.
This project is available on GitHub.
GitHub link- https://github.com/keshavkumar9431/sorting.visualizer
Hosted link- https://javascriptvisualizer.netlify.app/

Literature Survey:
Many coding (technical) platforms have worked on it in JavaScript and Python language, like Geeksforgeeks, dev community, code projects. The code of this project is also available on code project, devcommunity and on github in python language.

By knowing researchGate(website) three authors named Christopher Hundhausen, Sarah A. Douglas and John Staskowho worked for research(analysis) on it. They all are professors and researched in higher universities.

Even some of the youtube channels like codedrifter and Clément Mihailescu also work on it. This is a very easy way to learn and understand the working of sorting algorithms by this visualization project.

Useful websites describing the algorithms used:

- Bubble Sort (GeeksforGeeks)
- Selection Sort (GeeksforGeeks)
- Insertion Sort (GeeksforGeeks)
- Merge Sort (GeeksforGeeks)
- Quick Sort (GeeksforGeeks)
- Heap Sort (GeeksforGeeks)

Methodology/ Planning of work (should not exceed 1 page)
I selected and built a Sorting visualizer to visualize and understand the sorting algorithms.
As of now, I built 6 sorting algorithms as -
1. Bubble Sort
2. Selection Sort
3. Insertion Sort
4. Merge Sort
5. Quick Sort
6. Heap Sort

The main reason I chose this project is to become more familiar with the javascript concepts, and CSS styling. So, I didn't use any frameworks other than HTML, CSS, and JS. On successful completion with this project,
Now I'm familiar with the JS concepts, can confidently solve coding problems, and write stylings in CSS.
This project is built using HTML, CSS, and JS. This project sorting visualizer is a very simple UI and it allows the users to select the sort algorithm, select the array size, and speed of the visualization.
There are mainly 10 files used in this project:
1. bubble_sort.js
2. heap_sort.js
3. insertion_sort.js
4. main.js
5. merge_sort.js
6. quick_sort.js
7. selection_sort.js
8. visualizations.js
9. index.html
10. style.css

Facilities required for proposed work

Minimum Software/Hardware Configurations:

● Microsoft Windows Vista SP1/Windows 7 Professional:

● Processor: 800MHz Intel Pentium III or equivalent

- Memory: 512 MB

- Disk space: 750 MB of free disk space

- Ubuntu 9.10:

- Processor: 800MHz Intel Pentium III or equivalent

- Memory: 512 MB

- Disk space: 650 MB of free disk space

- Macintosh OS X 10.7 Intel:

- Processor: Dual-Core Intel

- Memory: 2 GB

- Disk space: 650 MB of free disk space

Recommended Software/Hardware Configurations:

- Microsoft Windows 7 Professional/Windows 8/Windows 8.1:

- Processor: Intel Core i5 or equivalent

- Memory: 2 GB (32-bit), 4 GB (64-bit)

- Disk space: 1.5 GB of free disk space

- Ubuntu 15.04:

- Processor: Intel Core i5 or equivalent

- Memory: 2 GB (32-bit), 4 GB (64-bit)

- Disk space: 1.5 GB of free disk space

- OS X 10.10 Intel:

- Processor: Dual-Core Intel

- Memory: 4 GB

- Disk space: 1.5 GB of free disk space

References
Inspiration taken from Clément Mihailescu
(https://www.youtube.com/watch?v=pFXYym4Wbkc)

Useful links describing the algorithms used:

- Bubble Sort
(https://www.geeksforgeeks.org/sorting-algorithms-visualization-bubble-sort/)

- Selection Sort
(https://www.geeksforgeeks.org/selection-sort-visualizer-in-javascript/)

- Insertion Sort
(https://www.geeksforgeeks.org/insertion-sort-visualization-using-javascript/)

- Merge Sort
(https://www.geeksforgeeks.org/sorting-algorithm-visualization-merge-sort/)

- Quick Sort
(https://www.geeksforgeeks.org/quick-sortlomuto-partition-visualization-using-javascript/)

- Heap Sort
(https://www.geeksforgeeks.org/heap-sort-visualization-using-javascript/)

SORTING VISUALIZER

PROJECT SYNOPSIS

OF MAJOR PROJECT

BACHELOR OF TECHNOLOGY

Branch CSE

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