A PROJECT SYNOPSIS

On

Simplified Data Structure

Submitted By

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Under the Guidance of

Prof. Snehal Gavale

Department of Computer Science and Engineering In

Data Science

Saraswati Education Society's

SARASWATI COLLEGE OF ENGINEERING

Kharghar, Navi Mumbai

(Affiliated to University of Mumbai)

Academic Year:-2022-23

Saraswati College of Engineering, Kharghar

Vision

"To be universally accepted as autonomous center of learning in engineering education and research"

Mission

1. To educate Students to become responsible & quality technocrats to fulfill society and industry needs.
2. To nurture student's creativity and skills for taking up challenges in all facets of life.

Department of Computer Science and Engineering In Data Science

Vision

"To be among renowned institution in Computer Science Engineering (CSE) education and research by developing globally competent graduates."

Mission

1. To produce quality Engineering graduates by imparting quality training, hands on experience and value education.
2. To pursue research and new technologies in Computer Science Engineering and across interdisciplinary areas that extends the scope of Computer Engineering and benefit humanity.
3. To provide stimulating learning ambience to enhance innovative ideas, problem solving ability, leadership qualities, team-spirit and ethical responsibilities.

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CERTIFICATE

This is to certify that the requirements for the synopsis entitled," ***Simplified Data Structure "*** *have been successfully completed by the following students:*

Roll numbers	Name
11	Kaushal Choudhari
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In partial fulfillment of Sem –Vl **Bachelor of Engineering of Mumbai University, CSE-DS** ofSaraswati College of Engineering, Kharghar during the academic year 2022-23.

Internal Guide

Prof. Snehal Gavale

External Examiner

Project coordinator

Prof. Mitrakshi Patil

Head of Department

Prof. Shraddha Subhedar

Program Educational Objectives (PEO)

1. To apply statistical data analysis and other data science techniques to effectively solve real-world problems.
2. To motivate & prepare students for lifelong learning and research to manifest global competitiveness.
3. To equip students with communication, team work and leadership skills to accept challenges in all facets of life ethically.

Program Outcomes (PO)

At the end of the program, a student will be able to:

1. Apply the knowledge of Mathematics, Science and Engineering Fundamentals to solve complex Data Science Problems.
2. Identify, formulate and analyze Data analysis Problems and derive conclusion using First Principle of Mathematics, Engineering Science and Computer Science.
3. Investigate Complex Data Science problems to find appropriate solution leading to valid conclusion.
4. Design a data science model, process to meet specified needs with appropriate attention to health and Safety Standards, Environmental and Societal Considerations.
5. Create, select and apply appropriate techniques, resources and advance Engineering software to analyze tools and design for Data Science Problems.
6. Understand the Impact of Data Science solution on society and environment for Sustainable development.
7. Understand Societal, health, Safety, cultural, Legal issues and Responsibilities relevant to Engineering Profession.
8. Apply Professional ethics, accountability and equity in Engineering Profession.
9. Work Effectively as a member and leader in multidisciplinary team for a common goal.
10. Communicate Effectively within a Profession and Society at large.
11. Appropriately incorporate principles of Management and Finance in one’s own Work.
12. Identify educational needs and engage in lifelong learning in a Changing World of Technology.

Program Specific Objectives (PSO)

1. Identify, understand, formulate and analyse complex engineering problems in the field of Data Analysis, Big Data, Database Management, Predictive Analysis, Trends Identification and Identifying Business Insights.

2. Acquire, Store, Retrieve, Process and finally convert data into knowledge in the field of artificial intelligence, data mining, network management and security, and Internet of Things applications through use of secure, reliable and cost effective state of art Analysis tools efficiently

Lab Objectives:

Students will try to:

1. To acquaint with the process of identifying the needs and converting it into the problem.
2. To familiarize the process of solving the problem in a group.
3. To acquaint with the process of applying basic engineering fundamentals to attempt solutions to the problems.
4. To inculcate the process of self-learning and research.

Lab Outcomes:

Student will be able to:

1. Identify problems based on societal /research needs.
2. Apply Knowledge and skill to solve societal problems in a group.
3. Develop interpersonal skills to work as member of a group or leader.
4. Draw the proper inferences from available results through theoretical/ experimental/simulations.
5. Analyse the impact of solutions in societal and environmental context for sustainable development.
6. Use standard norms of engineering practices
7. Excel in written and oral communication.
8. Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
9. Demonstrate project management principles during project work

Acknowledgement

A project is something that could not have been materialized without cooperation of many people. This project shall be incomplete if I do not convey my heartfelt gratitude to those people from whom I have got considerable support and encouragement.

It is a matter of great pleasure for us to have a respected **Prof. Snehal Gavale** as my project guide. We are thankful to him/her for being constant source of inspiration.

We would also like to give our sincere thanks to **Prof. Shraddha Subhedar, H.O.D, CSE-DS** Department**, Prof. Mitrakshi Patil** , **Project co-coordinator of TE** for their kind support.

We would like to express our deepest gratitude to **Dr. Manjusha Deshmukh,** our principal of Saraswati College of Engineering, Kharghar, Navi Mumbai.

Last but not the least I would also like to thank all the staffs of Saraswati College of Engineering (CSE-DS Department) for their valuable guidance with their interest and valuable suggestions brightened us.

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Simplified Data Structure

ABSTRACT

Data structure visualizer is an application that is designed and developed for students and lecturers. The system helps students to visualize and practice. It also helps Students to measure their progress of how they are doing by competitive programming-based questions and answers popping up on the screen. The software is developed using html, CSS, JavaScript Programming and also by using MySQL.Before using the system user need to register and after that they must login with their username and password in order to enter the system. The DSA Visualization system for introduction to management is constituted of different components for instance login function. This Automated System helps student and lecturers to save time and make process faster. System is User friendly that has security, integrity and database is neither inconsistent nor redundant.

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1. Introduction

Data structures and algorithms are central components of computer science programs and provide essential building blocks for all software engineering classes. When teacher teaches the data structures concept they mostly use pen and whiteboard. So the students only know how the data structures work theoretically. But they didn‟t get their actual working and it‟s implementation knowledge. So we are making Data structures visualization tool that determine standard operations when building, manipulating, and processing a particular Data structure. Such a tool can be used by the instructor to improve upon hand-drawn diagrams on awhiteboard.

Data structure visualizer is an application that is designed and developed for students and lecturers. The system helps students to visualize and practice. It also helps Students to measure their progress of how they are doing by competitive programming-based questions and answers popping up on the screen. Students can also practice program using ide or we can say practice their lab using it. Various algorithms related to data structure can be visualized easily.

Data structures are an essential part of computer science and are used to organize and store data efficiently. They help us solve complex problems by providing efficient algorithms to access, manipulate, and store data.

In this project, we will be creating visualizations of these data structures to help better understand their inner workings and how they can be used in practical applications. By visualizing the data structures, we can gain a deeper understanding of their functionality and how they can be optimized for various applications.

We will be using various programming languages, including Python and JavaScript, to implement the visualizations. We will also be using modern web technologies, such as HTML, CSS, and JavaScript, to create interactive visualizations that can be accessed through a web browser.

A data structure is a way of organizing and storing data in a computer so that it can be accessed and manipulated efficiently. It provides a framework for organizing data in a way that facilitates efficient storage and retrieval of information.

Data structures can be classified into two main categories: linear and non-linear. Linear data structures store data in a linear sequence, where each element is connected to the next element in a linear order. Examples of linear data structures include arrays, linked lists, and stacks.

Non-linear data structures, on the other hand, store data in a hierarchical or non-linear manner. Examples of non-linear data structures include trees and graphs.

Different data structures have different strengths and weaknesses, and are used for different purposes depending on the requirements of the problem being solved. For example, arrays are useful for storing a fixed number of elements of the same type, while linked lists are useful for storing a variable number of elements of the same or different types.

Data structures are an essential part of computer science and programming, as they provide a way of organizing and storing data in a way that can be easily accessed and manipulated. Understanding different data structures and their properties is crucial for developing efficient algorithms and solving complex problems.

Data structures can be categorized into two types: primitive data structures and non-primitive data structures. Primitive data structures are the most basic data structures available in a programming language, such as integers, floating-point numbers, characters, and booleans. Non-primitive data structures are complex data structures that are built using primitive data types, such as arrays, linked lists, stacks, queues, trees, graphs, and hash tables.

The choice of data structure for a particular task depends on the type and amount of data to be processed, the operations that need to be performed on the data, and the efficiency requirements of the program. Efficient use of data structures can greatly improve the performance of a program, making it faster and more memory-efficient. A data structure is a particular way of organizing data in a computer so that it can be used effectively. The idea is to reduce the space and time complexities of different tasks.

Overall, data structures are essential for managing and manipulating data in an efficient and effective way. They are a fundamental concept in computer science and are used extensively in programming and software development.

Data structures are used to solve a wide range of problems in computer science and programming. For example, arrays are useful for storing a fixed number of elements of the same type, while linked lists are useful for storing a variable number of elements of the same or different types.

Choosing the appropriate data structure for a particular problem can significantly impact the efficiency of the algorithm. For example, using a linked list instead of an array can reduce the time complexity of certain operations, such as inserting or deleting elements in the middle of the data structure.

Data structures can be implemented in various programming languages, such as C++, Java, Python, and JavaScript. There are also many libraries and frameworks that provide pre-built data structures, such as the Standard Template Library (STL) in C++.

In summary, data structures are a crucial concept in computer science and programming that provide a way of organizing and storing data in an efficient and effective manner, enabling the development of optimized algorithms for solving complex problems.

2. Literature Review

A literature review is an essential component of many academic research projects, including dissertations, theses, and research papers. It can help researchers to identify gaps in the existing knowledge on a topic and to develop new research questions and hypotheses. Additionally, a well-conducted literature review can demonstrate a researcher's knowledge of the subject area and their ability to critically analyze and synthesize complex information.

One study conducted by Rossevine Artha Nathasaya Christian Universities, Insonesia in 2019 titled as ”integrating programs and algorithm visualization for learning data structure implementation” explored the effectiveness of using a data structure visualizer called DSV is in a university-level data structures course. It is DS-piton tool that is combination of both Algorithm and program Visualuzation. In this paper we will review the study of students who used DSV is had a better understanding of the data structures and were able to complete programming assignments more efficiently than those who did not use the tool[1].

Another study conducted by Michael Striewe, Goedlcke in 2014 titled as “ Visualizing data strcture in an e- learning system” investigated the modules such as java platform debugging architecture and ds implementation based on object oriented programming effectiveness of a data structure visualization tool called VDS in improving students' understanding of binary trees. In this we will review the study of Retrieving Data, Drawing Graphs, Creating and deleting objects, storing and merging data structure[2].

In addition to these studies, there are several other data structure visualization tools available for use in education and programming, such as Visualgo, Algorithm Visualizer, and Data Structure Visualizations (DSV). These tools provide interactive visualizations of different data structures and algorithms, making it easier for students to understand their behavior and functionality[3].

Overall, the literature suggests that data structure visualizers can be an effective tool for improving students' structures, which can improve students' retention and comprehension of the understanding of data structures. They provide an interactive and engaging way to learn about data material.

3. Problem statement

To visualize the working of the data structures for easy understanding. It becomes quite confusing and tedious to visualize them on our own since abstract thinking plays acrucial role in forming its conceptual model in our mind. Thus, a need for a tool for visualizing the data structure algorithms interactively so that the student can experiment and learn as need arises. To develop algorithm and program visualization tool, to provide visualization and implementation of all data structures, to provide command toolbar , input and output panel , error panel , variable content displaypanel for users understanding.

4. Proposed system

The Browser Page consists of 5 main Sections.

1) **Authentication**
2) **DSA (Algorithm) Visualization**
3) **Practice Lab**
4) **Study Material**
5) **Contact**

1) **Authentication**

   The Students can register with name, email, password etc and then proceed further with login and launching into interactive dashboard of the website. Wherein all the study related tabs such as study material, practice lab, data structure algorithms will appear.

2) **DSA (Algorithm) Visualization**

   In this tab algorithms related to data structure such as sorting and searching techniques will appear. User can select any one technique that he/she wants to learn. Selected data structure page will appear in a visualize manner. Not only this, various quiz questions will pop up to test the ability of the user. This can help student to measure his/her progress and can learn algorthims in effective manner.

3) **Practice Lab**

   The user can also practice coding skills with the help of ide complier which is provided on the website. This makes easy for students as there is no need of using another tab. With the help of editor student try to code the algorithm correctly by visualizing the techniques of data structure (sorting and searching technique)

4) **Study Material**

   Notes related to particular techniques will appear on the same site. This makes the site more easy to use as student will find everything on single web page.

5) **Contact us**

   This section provides contact information of admin. Wherein student can contact admin and can also share their doubt, suggestions related to the site.

4.1 Algorithm

Step 1: Start

Step 2: Open the website.

Step 3: various Data structure algorithm will appear.

Step 3: Select which data structure topic you want to learn.

Step 4: selected data structure page will appear in a visualize manner.

Step 5: Various quiz questions will pop up to test the ability of the user

Step 6: The user can also practice coding skills with the help of ide complier which is provided on the website.

Step 7: End

4.2 Flowchart

Flowcharts are powerful visual representations used to depict the logical flow of processes, algorithms, and decision-making in various domains, including computer science, engineering, business, and problem-solving.

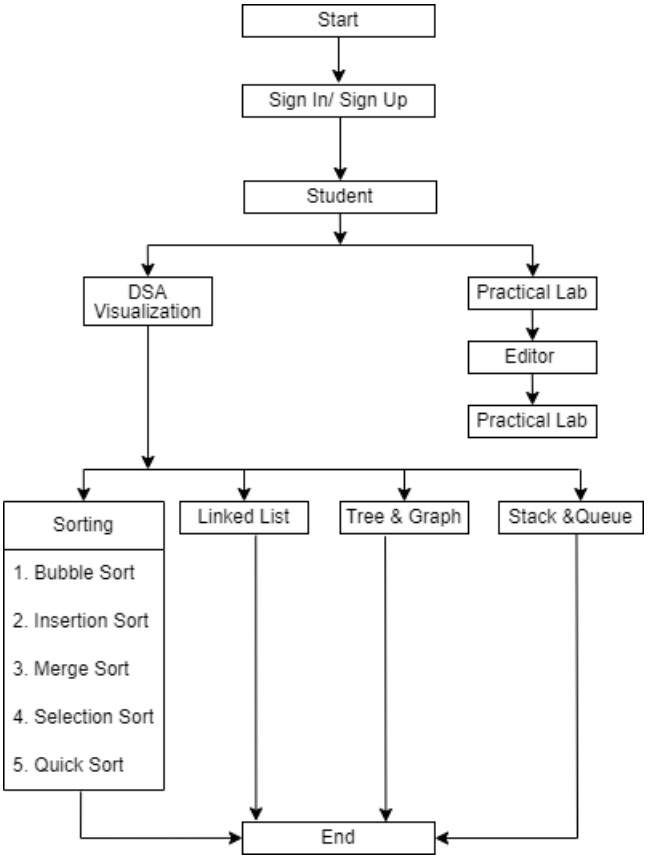

Fig-4.2 Flowchart Figure

This flowchart describes the section where each module is located. Simply student/user can login into the site and he/she will be directed towards the amazing dashboard. Now probably there are two sections wherein user can directly go into visualization tab or can explore other tabs such as practice tab, test your knowledge, contact, etc. In visualization tab the user can simply go through all the learning techniques and can learn it all in easy way which is the main aim of our project.

5. Code

```
<!DOCTYPE html>
<html>
<head>
    <link rel="shortcut icon" type="png" href="images/icon/favicon.png">
    <meta charset="utf-8">
    <meta http-equiv="X-UA-Comaptible" content="IE=edge">
    <title>Learn DS</title>
    <meta name="desciption" content="">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link rel="stylesheet" type="text/css" href="style.css">
    <script type="text/javascript" src="script.js"></script>
    <script src="https://code.jquery.com/jquery-3.2.1.js"></script>
    <script>
        $(window).on('scroll', function () {
            if ($(window).scrollTop()) {
                $('nav').addClass('black');
            } else {
                $('nav').removeClass('black');
            }
        })
    </script>
</head>

<body style="background-color: black;">
    <!-- Navigation Bar -->
```

```
<header id="header">
    <nav>
        <div class="logo"><img src="images/icon/logo - Copy.png" alt="logo"></div>
        <ul>
            <li><a class="active" href="">Home</a></li>
            <li><a href="#learnds_section">Learn Data Structures</a></li>
            <li><a href="#team_section">Practice Tab</a></li>
            <li><a href="#study_section">Study Materials</a></li>
            <li><a href="#about_section">About Us</a></li>
            <li><a href="#contactus_section">Contact Us</a></li>

        </ul>
        <a class="get-started" href="login.html">Get Started</a>
        <img src="images/icon/menu.png" class="menu" onclick="sideMenu(0)" alt="menu">

    </nav>
    <div class="head-container">
        <div class="quote">
            <p style="color: white;">The beautiful thing about learning is that nobody can take it
away from you.
            </p>
            <h5>
                Data dominates. If you've chosen the right data structures and organized things well,
the algorithms
                will almost always
                be self-evident. Data structures and Algorithms, are central to Programming.
            </h5>
            <div class="play" style="color: white;
```

```
            <img src="images/icon/play.png" alt="play" style="color: white;"> <span><a
                href="https://www.youtube.com/watch?v=d_XvFOkQz5k" target="_blank"
style="color: white;">Watch DS's Real Life
                Examples Now</a></span>
        </div>
      </div>
      <div class="svg-image">
        <img src="images/extra/svg1.jpg" alt="svg">
      </div>
    </div>
    <div class="side-menu" id="side-menu">
      <div class="close" onclick="sideMenu(1)"><img src="images/icon/close.png"
alt=""></div>
      <div class="user">
        <img src="images/creator/roshan.jpeg" alt="Username">
        <p>roshank9419</p>
      </div>

      <ul>
        <li><a href="#about_section">About</a></li>
        <li><a href="#portfolio_section">Portfolio</a></li>
        <li><a href="#team_section">Team</a></li>
        <li><a href="#learnds_section">Services</a></li>
        <li><a href="#contactus_section">Contact</a></li>
       <li><a href="#feedBACK">Feedback</a></li>
      </ul>
    </div>
```

```
  </header>
  <!-- LEARN DATA STRUCTURES SECTION -->
  <div class="service-swipe">
    <div class="diffSection" id="learnds_section">
      <center>
        <p style="font-size: 50px; padding: 100px; padding-bottom: 40px; color:
#fff;">LEARN DATA STRUCTURES
          THROUGH VISUALIZATION</p>
      </center>
    </div>

    <a href="stack_index.html">
      <div class="s-card"><img src="learnds_images/learn_stack.PNG" width="130px"
height="130px">
        <p>STACK</p>
      </div>

      <a href="sorting_index.html">
        <div class="s-card"><img src="learnds_images/learn_sorting.PNG" width="130px"
height="130px">
          <p>SORTING</p>
        </div>
      </a>

    </a>
    <a href="linear_index.html">
      <div class="s-card"><img src="learnds_images/leran_search.PNG " width="100px"
height="100px">
        <p>LINEAR SEARCH</p>
```

```
        </div>
    </a>
    <a href="">
        <div class="s-card"><img src="learnds_images/learn_binary.PNG" width="120px"
height="120px">
            <p>BINARY SEARCH</p>
        </div>
    </a>

    <a href="link_index.html">
        <div class="s-card"><img src="learnds_images/learn_link.PNG" width="500px"
height="80px">
            <p>LINKED LIST</p>
        </div>
    </a>
    <a href="#contactus_section">
        <div class="s-card"><img src="images/icon/discussion.png" width="100px"
height="100px">
            <p>DISCUSSION WITH US</p>
        </div>
    </a>
  </div>

  <!-- STUDY MATERIALS-->
  <div class="studysection" id="study_section">
    <span>
        <br>
        <br>
```

```
<br>
<center style="color: white;">STUDY MATERIALS FOR LEARNING DATA STRUCTURES</center>
</span>
<br>
<div class="course">
<center>
<div class="cbox">
<div class="det"><a href="study_materials/ds_basic.pdf"><img src="images/courses/data.png">BASIC
DS CONCEPTS</a></div>
<div class="det"><a href="study_materials/algorithms.pdf"><img
src="images/courses/paper.png">ALGORITHMS</a></div>
<div class="det"><a href="study_materials/linear.pdf"><img src="images/courses/book.png">LINEAR
SEARCH</a>
</div>
<div class="det"><a href="study_materials/12-BinarySearch.pdf"><img
src="images/courses/d1.png">BINARY
SEARCH</a>
</div>
<div class="det"><a href="study_materials/linked.pdf"><img src="images/courses/d1.png">LINKED
LIST</a>
</div>
</div>
</center>
<div class="cbox">
```

```
            <div class="det"><a href="study_materials/stack.pdf"><img
src="images/courses/computer.png">STACK</a>
            </div>

            <div class="det"><a href="study_materials/queue_pdf.pdf"><img
src="images/courses/algo.png">QUEUE</a>
            </div>
            <div class="det det-last"><a href="study_materials/Tree.pdf"><img
                    src="images/courses/projects.png">Trees</a></div>
        </div>
    </div>
  </div>
  <!-- ABOUT -->
  <div class="diffSection" id="about_section">
    <center>
      <br>
      <p style="font-size: 50px; padding: 100px; color: white;">About Us</p>
    </center>
    <div class="about-content">
      <div class="side-image">
        <img class="sideImage" src="learnds_images/about_us.PNG">
      </div>
      <div class="side-text">

        <h2>What you think about us ? </h2>
        <p>Education is the process of facilitating learning, or the acquisition of knowledge,
skills,
            values,
```

```
            beliefs, and habits. Educational methods include teaching, training, storytelling,

            discussion

            and

            directed research.<br> We are providing you a new way to teach Data Strutures and
algorithms

            through

            Visualization.

            That makes easier to get practical knowledge and helps you to solve real world
problems

            easily.

            We

            are providing you Visualization of different

            Data Structures like Stack , Linked list , Linear & Binary search, Sorting. So through
this

            you

            can

            get an exact idea about it.

            Stay tuned on website and Learn More!!

          </p>

        </div>

    </div>

  </div>


    <!-- PRACTICE TAB SECTION  -->

    <div class="diffSection" id="team_section">

        <center>

          <p style="font-size: 50px; padding-top: 100px; padding-bottom: 60px;color:
white;"><br>

            <BR> <BR> PRACTICE MAKES MAN PERFECT
```

```
            PRACTICE HERE!!
          </p>
        </center>
        <div class="totalcard">
          <div class="card">
            <center><img src="learnds_images/Practice_tab.PNG"></center>
            <center>
              <div class="card-title">First, solve the problem. Then, write the code from here!!
</div>
              <div id="detail">
                <p>“ Any fool can write code that a computer can understand. Good
programmers write code
                  that
                  humans can understand  "</p>

              </div>
              <div class="duty"></div>
              <a href="Compiler_index.html" target="_blank"><button class="btn-
practice">CLICK HERE TO
                  CODE!!
                </button></a>
          </div>
          </center>
        </div>

    </div>
  </div>
```

```
<!-- CONTACT US -->
<div class="diffSection" id="contactus_section">
    <center>
        <p style="font-size: 50px; padding: 100px; color: white;">Contact Us</p>
    </center>
    <div class="csec"></div>
    <div class="back-contact">
        <div class="cc">
            <form action="mailto:roshank9419@gmail.com" method="post" enctype="text/plain">
                <label>First Name <span class="imp">*</span></label><label style="margin-left:
185px">Last Name
                    <span class="imp">*</span></label><br>
                <center>
                    <input type="text" name="" style="margin-right: 10px; width: 175px"
required="required"><input
                        type="text" name="lname" style="width: 175px" required="required"><br>
                </center>
                <label>Email <span class="imp">*</span></label><br>
                <input type="email" name="mail" style="width: 100%" required="required"><br>
                <label>Message <span class="imp">*</span></label><br>
                <input type="text" name="message" style="width: 100%" required="required"><br>
                <label>Additional Details</label><br>
                <textarea name="addtional"></textarea><br>
                <button type="submit" id="csubmit">Send Message</button>
            </form>
        </div>
    </div>
</div>
```

```
<!-- FEEDBACK -->
<div class="title2" id="feedBACK">
    <span style="color: white;">Give Feedback</span>
    <div class="shortdesc2">
        <p style="color: white;">Please share your valuable feedback to us</p>
    </div>
</div>
<div class="feedbox">
    <div class="feed">
        <form action="mailto:roshank9419@gmail.com" method="post" enctype="text/plain">
            <label>Your Name</label><br>
            <input type="text" name="" class="fname" required="required"><br>
            <label>Email</label><br>
            <input type="email" name="mail" required="required"><br>
            <label>Additional Details</label><br>
            <textarea name="addtional"></textarea><br>
            <button type="submit" id="csubmit">Send Message</button>
        </form>
    </div>
</div>
<!-- Sliding Information -->
<marquee style="background: linear-gradient(to right, #FA4B37, #DF2771); margin-top:
50px;" direction="left"
    onmouseover="this.stop()" onmouseout="this.start()" scrollamount="20">
    <div class="marqu">“Education is the passport to the future, for tomorrow belongs to those
who prepare for
        it
```

today.” “Your attitude, not your aptitude, will determine your altitude.” “If you think education is

expensive, try ignorance.” “The only person who is educated is the one who has learned how to learn …and

change.”

</marquee>

<!-- FOOTER -->

<footer>

<img src="images/icon/logo - Copy.png" style="width: 200px;">

<img src="images/icon\fb.png">

<img src="images/icon\insta.png">

<img src="images/icon\tt.png">

<img src="images/icon\ytube.png">

<img src="images/icon\linkedin.png">

Copyright © 2022 All Rights Reserved.

<img src="images/icon/phone.png"> 7083071799
<img src="images/icon/mail.png">

yashmatha404@gmail.com

```
            <h1 style="color: #fff">Our Newsletter</h1>
            <div class="border"></div><br>
            <p>Enter Your Email to get our News and updates.</p>
            <form class="newsletter-form">
               <input class="txtb" type="email" placeholder="Enter Your Email">
               <input class="btn" type="submit" value="Submit">
            </form>
         </div>
      </div>
   </footer>
</body>
</html>
```

5. Project Output

Screenshots of working project

5.1 Authentication:

The Students can register with name, email, password etc and then proceed further with login and launching into interactive dashboard of the website. Wherein all the study related tabs such as study material, practice lab, data structure algorithms will appear.

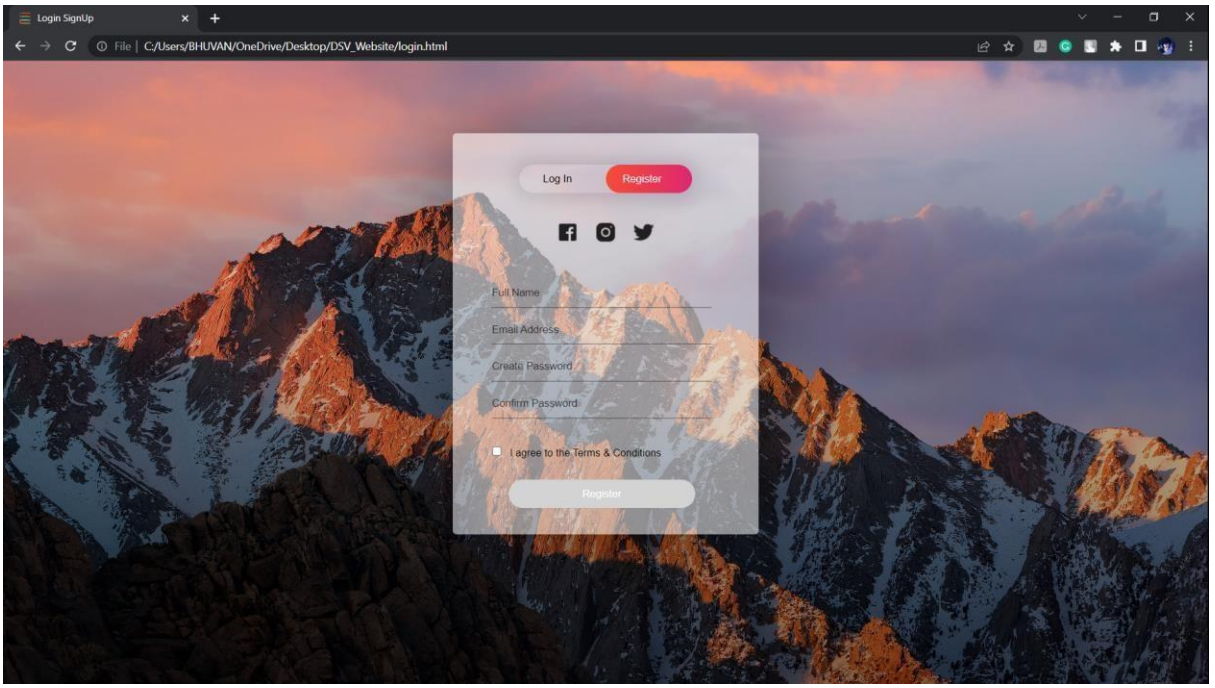

Fig-5.1 Login Page:

From here the user can login to our website. It is useful for maintaining record. If user don‟t want to add password and username then he/she can also login with the help of Google account.

5.2 Home Page:

After login the site will get directed towards interactive dashboard which will provide user with basic information related to site. Various information related to site basic idea about tabs will land.

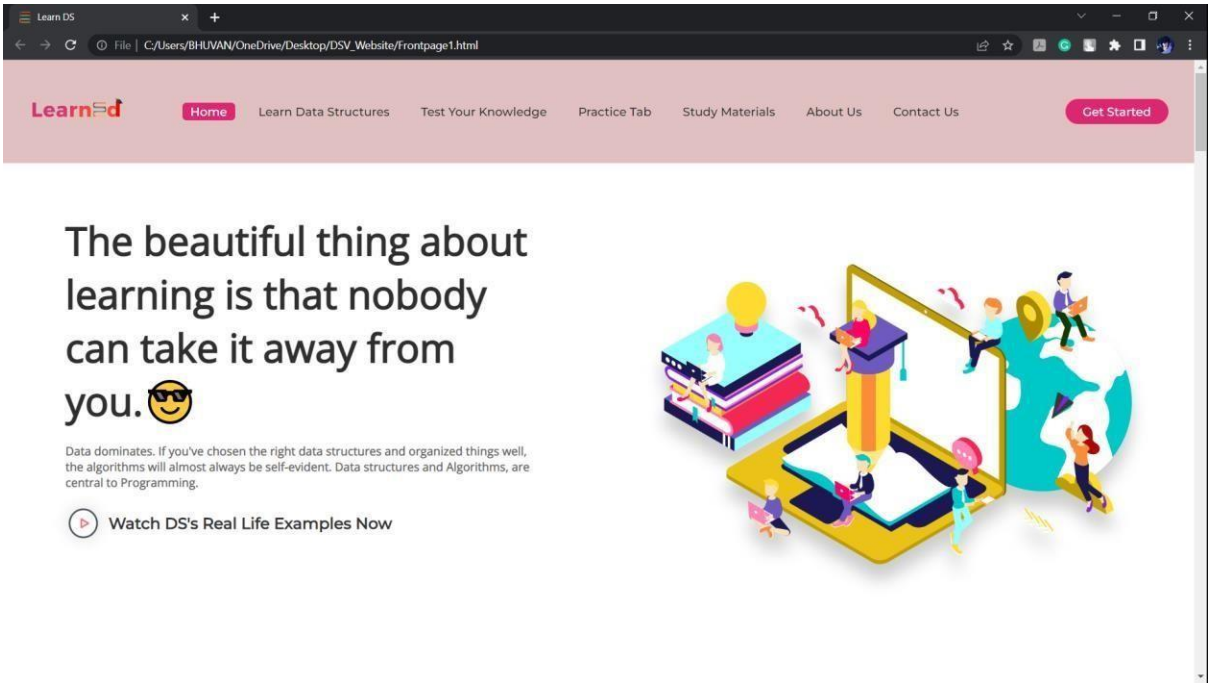

Fig -5.3 Home Page:

This is the landing page of our site. It shows the basic information about our site. Information related to various tabs such as practice tab, study material, etc will appear in an innovative way. Home page mainly includes tabs that help user to learneasily.

5.3 Learn Data Structure Page:

In this tab algorithms related to data structure such as sorting and searching techniques will appear. User can select any one technique that he/she wants to learn. Selected data structure page will appear in a visualize manner. Not only this, various quiz questions will pop up to test the ability of the user. This can help student to measure his/her progress and can learn algorthims in effective manner.

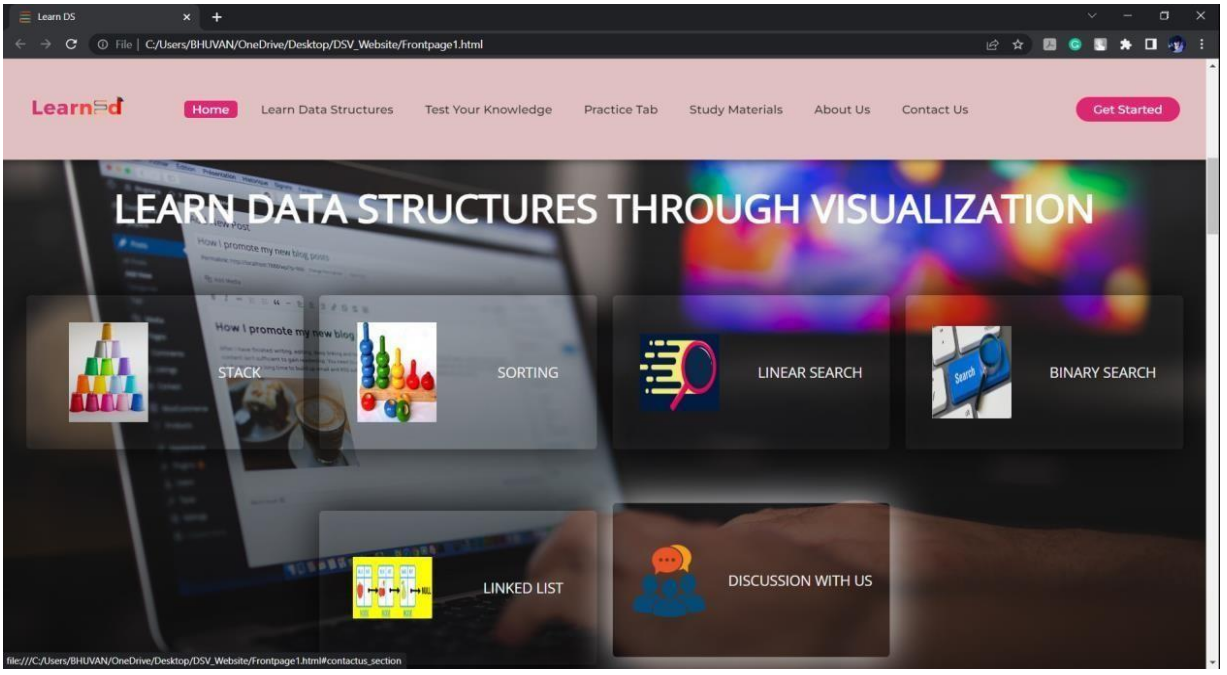

Fig-5.3 Learn Data Structure Page:

This page shows all the supported data structures for visualization that our website provides. Techniques such as sorting and searching techniques will appear and this technique will guide us in innovative manner to learn quickly. Dashboard mainly includes techniques of data structure such as stack, sorting, linear search, binary search, linked list, etc.

5.4 Stack Visualization:

Stack visualization is a powerful tool used to understand and analyze the behavior and execution of programs. It provides a graphical representation of the stack data structure, which plays a vital role in managing function calls, memory allocation, and program execution flow.

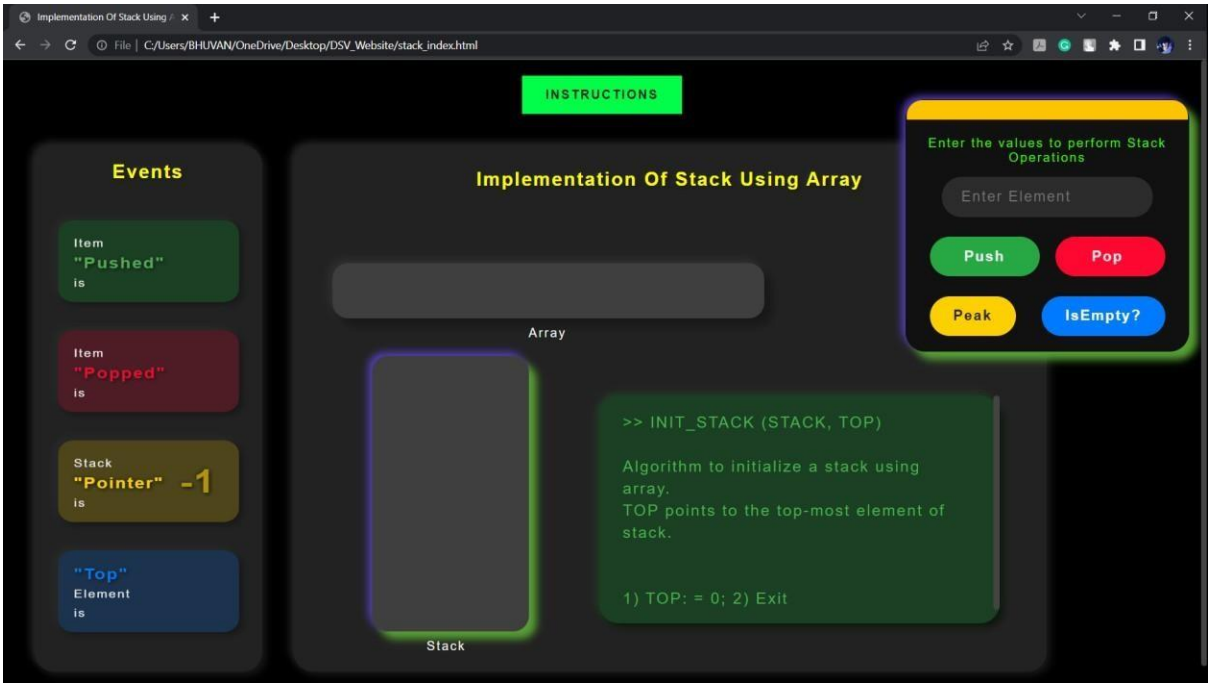

Fig-5.4 Stack Visualization:

This page visualizes stack data structure in such away that it helps the user the easily understand the working of stack. Static stack visualization involves analyzing source code and constructing a visual representation of the stack structure before program execution. It helps developers to present whole concept related to stack . user learns operations easily.

5.5 Linear search Visualization

Linear search visualization in data structures is a valuable tool for comprehending, analyzing, and optimizing search operations. Basically, Linear search is a fundamental searching algorithm used to locate a target element in a collection of data. The benefits of linear search visualization in data structures extend beyond comprehension. Visualization facilitates error detection, performance analysis, and optimization of search algorithms. By visualizing the search process, developers can identify inefficiencies, detect potential search-related bugs, and optimize algorithms.

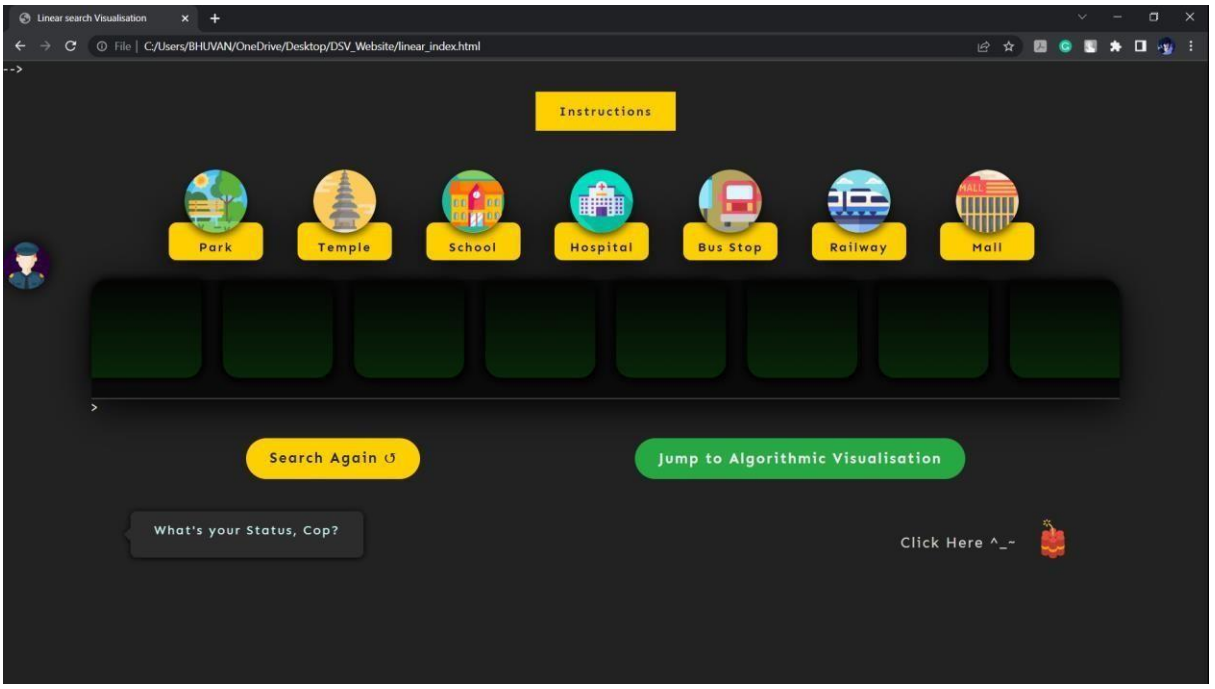

Fig-5.5 Linear Search Visualizer:

This is the linear search visualizer in whichthe user can see how the linear searching algorithm works with the help of our visualizer. Algorithm willget easily learned by user with the help of innovative visualizing techniques. Infact the user can perform this search by entering any element in the array and searching it.

5.6 IDE:

The user can also practice coding skills with the help of ide complier which is provided on the website. This makes easy for students as there is no need of using another tab. With the help of editor student try to code the algorithm correctly by visualizing the techniques of data structure (sorting and searching technique).

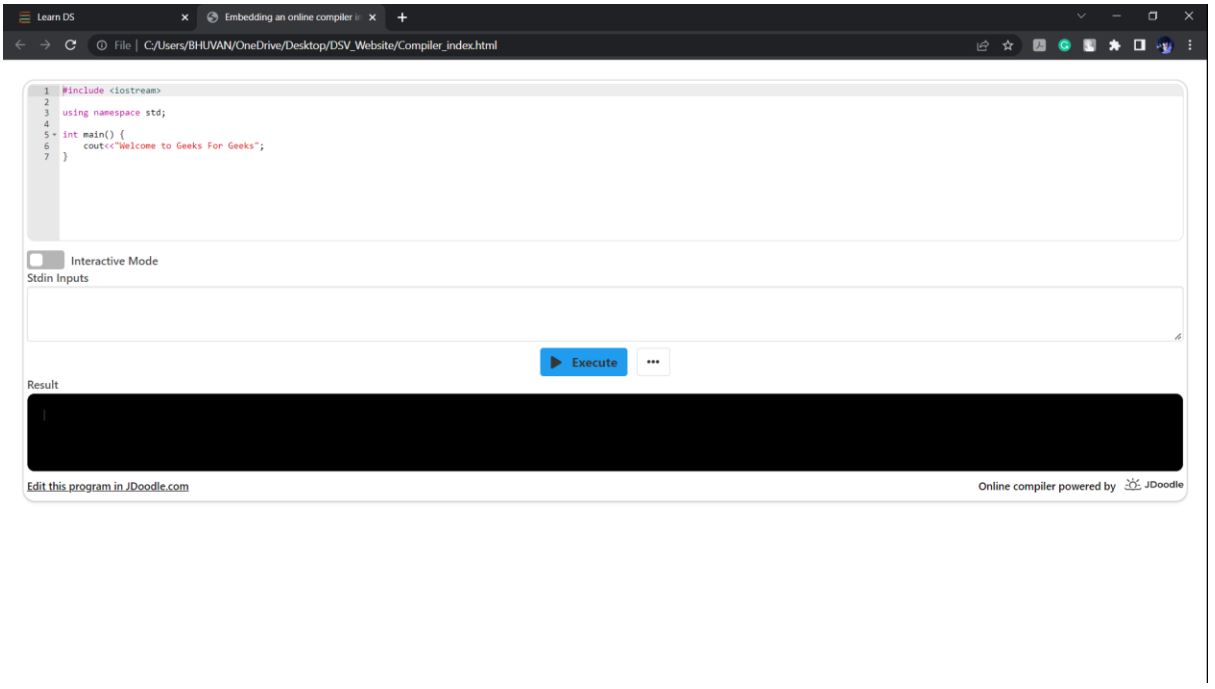

Fig-5.6 IDE:

We have integrated an IDE onto our website so that users canpractice their coding skills and improve their technical skills. This tab will get directed towards practicing of learned concept easily under one site only so that user don‟t have to go to another site. With the help of editor student try to code the algorithm correctly.

6. Conclusion

Thus we have implemented our project **"Simplified Data Structure**". The whole project provides a base for students and lecturers. It also helps Students to measure their progress of how they are doing by competitive programming-based questions and answers popping up on the screen. allow lecturers to add questions and answers into the system. This Automated system helps students and lecturers to save time and makes the process faster, with a user-friendly system that has security, integrity and the database is neither inconsistent nor redundant.In Future, the project can be enhanced by making it more interactive and by adding more features. So our aim is to integrate program visualization and algorithm visualization tool together so that it is useful for understanding the theoretical as well as practice knowledge with visualization. The system is developed using HTML ,CSS AND JAVASCRIPT programming language and data are saved in the MYSQL database. With the completion of this project, I conclude that it has achieved its purpose.

7. References

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