Website on Data Structure (DS) Algorithm Visualization

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ABSTRACT

The physical classroom learning nowadays is no longer applicable for the current younger generations. Internet and distance learning which is generally known as online education plays a vital roles in the country's education system. Online learning is education that takes place over the Internet. It is often referred to as "e- learning" among other terms. The Internet has made online learning possible, and many researchers and educators are interested in online learning to enhance and improve student learning outcomes while combating the reduction in resources, particularly in higher education.

Keyword: **-** Online education, online Learning, online higher Education, online learning community.

1. INTRODUCTION

Data Structure can be defined as the group of data elements which provides an efficient way of storing and organizing data in the computer so that it can be used efficiently. an algorithm is a collection of steps to solve a particular problem. Learning data structures and algorithms allow us to write efficient and optimized computer programs. Some examples of Data Structures are arrays, Linked List, Stack, Queue, etc. The data structure and algorithm provide a set of techniques to the programmer for handling the data efficiently. They can write the code in any programming language with minimal effort. If the programmer does not know the pre-defined algorithmic techniques, it may take the longer time to resolve the problem.

Online learning is a form of distance learning or distance education, which has long been a part of the American education system, and it has become the largest sector of distance learning in recent years. Website development is the program or coding that enables/helps website functionality as per the owner's requirements. However, online learning is just one type of "distance learning" - the umbrella term for any learning that takes place across distance and not in a traditional classroom**.** Some of the positive learning outcomes are improved learning as measured by test scores, student engagement with the class material, improved perception of learning and of the online format, stronger sense of community among students, and reduction in withdrawal or failure. From a more systematic analysis, Navarro and Shoemaker (2000) found that student learning outcomes for online learners were as good as or better than traditional learners regardless of background characteristics and that the students were greatly satisfied with online learning.

Data structures and algorithms (DSA) goes through solutions to standard problems in detail and gives you an insight into how efficient it is to use each one of them. It also teaches you the science of evaluating the efficiency of an algorithm. This enables you to choose the best of various choices. Data structure provides the right way to organize information in the digital space. The data structure is a key component of Computer Science and is largely used in the areas of Artificial Intelligence, operating systems, graphics, etc.

2. LITERATURE REVIEW

Online education enables the teacher and the student to set their own learning pace, and there's the added flexibility of setting a schedule that fits everyone's agenda. As a result, using an online educational platform allows for a better balance of work and studies, so there's no need to give anything up. Research has shown that students in online learning performed better than those receiving face-to-face instruction, but it has to be done right. We have used different types of languages for developing the website by deciding its future scope with attractive ideas and best designing such as: HTML, CSS, JavaScript and React. Main Language is the react. React is a declarative, efficient, and flexible JavaScript library for building user interfaces. It lets you compose complex UIs from small and isolated pieces of code called "components". We'll get to the funny XML-like tags soon. We use components to tell React what we want to see on the screen. It's used for handling the view layer for web and mobile apps. React also allows us to create reusable UI components.

Html Stands for Hypertext Markup Language. Html is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript. Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. JavaScript often abbreviated as JS, is an interpreted programming language that conforms to the ECMA Script specification. JavaScript is high-level, often just-in-time compiled, and multi-paradigm. It has curly- bracket syntax, dynamic typing.

Some of the features of this website are:
- Visualizations helps Better understanding
- Web-Based Support
- Online Learning
- Quality Content
- Quick user integration for visualization
- Responsive Design Features
- Better Learning Experience
- Interactive Elements

2.1 Various step consider in Website Development Process

Analysis - First we collected all the information about the topics. Firstly, better understand the website requirement creation, including website Design and Website looks and feels, the Web pages uses, website content and for suggestion and discussions, a proper space available on a web site for easily approachable.

Specification – Predicated on Requisite, prepare a draft designation of Web pages to be developed include the sitemap and a flow of various process

Design & Development - Then we made the whole website and structured it as planned making different categories for the algorithms, data structures according to the programming structures. Then we added all the animations and notes. we implemented these algorithms in JavaScript for animation. Invention and Development is a significant role plays in Web Development.

Content Writing- Writing of contents is a significant part of development of web pages and plays an important and necessary step in optimization Engine, a well-defined or easy content is utterly necessary to fall in internet site users. Content written by a more professional requires more pure, easy and accurate content.

Coding- Coding is the most important part of the website Development. Coding start of a Web Pages in various languages like HTML, CSS, JavaScript, React. To do the coding we take the help of different websites like w3School, Java point and so on.

Testing& Security- Testing as well play an important role in website development, testing is done for browser compatibility. We can also check validation of HTML and CSS code, checking of spelling and can perform test of functions of website whether it work properly or not.

2.2. Actual Implementation

In our project, we have created the website of Data Structure algorithm Visualization which is Very helpful for the student to learning of any Data Structure Concepts. this website is informative Where these website developed with the help of basic languages. The website which is developed with some ideas.

In these website we have complete information of what is DS Algorithm Visualization and Online learning with its all-important data and best designing. In this website we provide various languages to Understand and learn Concept of programming languages on online platform. Here the data is arranged properly by which its updating will be easier in future as the requirement or demand increase towards the website.

After opening this website various square blocks are displayed. This blocks are divided into various categories like Searching, sorting algorithms Stack, Queue, Linked list, Tress, Graphs and so on. If you selected any one from it then you get the information or visualization of that particular topic. In this website various visualization concepts are added means How to sort order wise elements using different sorting techniques, Search the element using searching methods as well as you can also create a link list, add element in trees and graphs, you can also perform the various operations on data structures like stack, Queue and Linked list. This website fully helpful to you for the visualization concepts of Data Structure. You can also learn the different programming languages like C, C++, Python, Data Structures, Java, JavaScript, HTML and so on. In About tab there is the information i.e. its Introductory part and its concept like what is the programming language?, What is purpose of that?, Programming concept, What is used?, What are the benefits, advantages and Features of online Learning, Why Data Structure and Online Learning is very Important Today?, etc.

3. PROPOSED SYSTEM

By using Visualization Student can better understand the each and every Concept of our website instead of t heory part. This Website provides appropriate information about online Learning. Learning data structures and algorithms allow us to write efficient and optimized computer programs. E-learning is not just a change of technology. It is part of a redefinition of how we as a species transmit knowledge, skills, and values to younger generations of workers and students. Learners will have access to millions or billions of knowledge modules. The proposed system consists of the following goals & has the Objectives as follows:

3.1. Goals

The Goals of Our Website are:
- Enhance the quality of learning and teaching.
- Meet the learning style or needs of students.
- Improve the efficiency and effectiveness.
- Improve user-accessibility and time flexibility to engage learners in the learning process.

3.2. Objectives

The Objectives of Our Website are:
- Provide simple information and services for all faculty and students.
- Enhance the quality of learning of various Data Structures.
- Meet the learning style or understand the needs of students.
- Improve the efficiency and effectiveness.
- Improve user-accessibility and time flexibility to engage learners in the learning process.
- Expand and enhance technology support tools to meet the current needs and expectations.

4. RESULTS

Shown below are the screenshots of the various pages of our website:
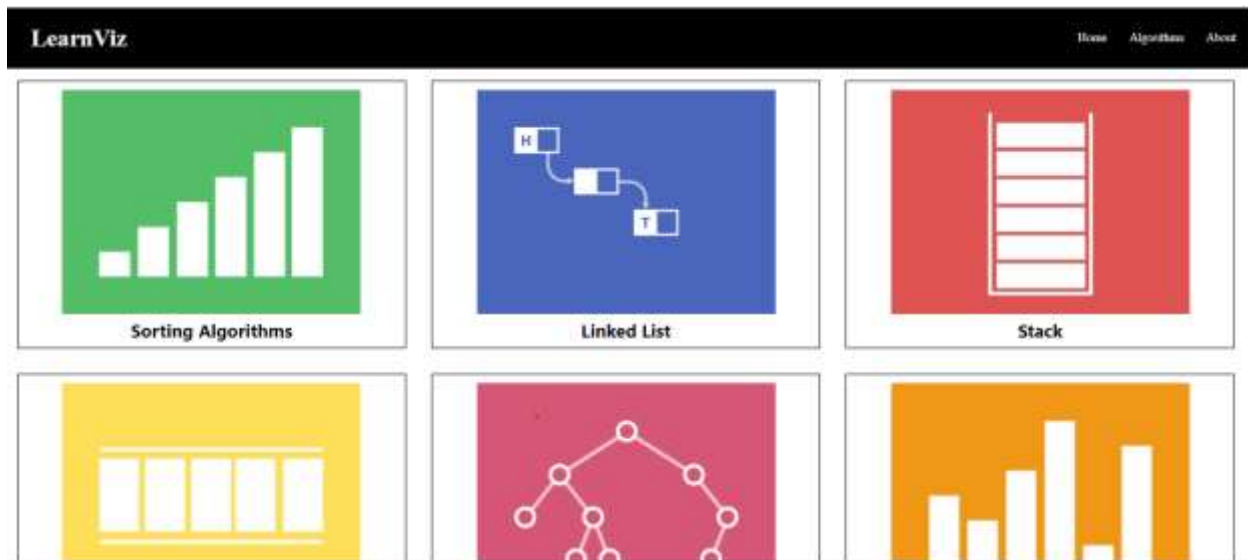
4.1 Home Page

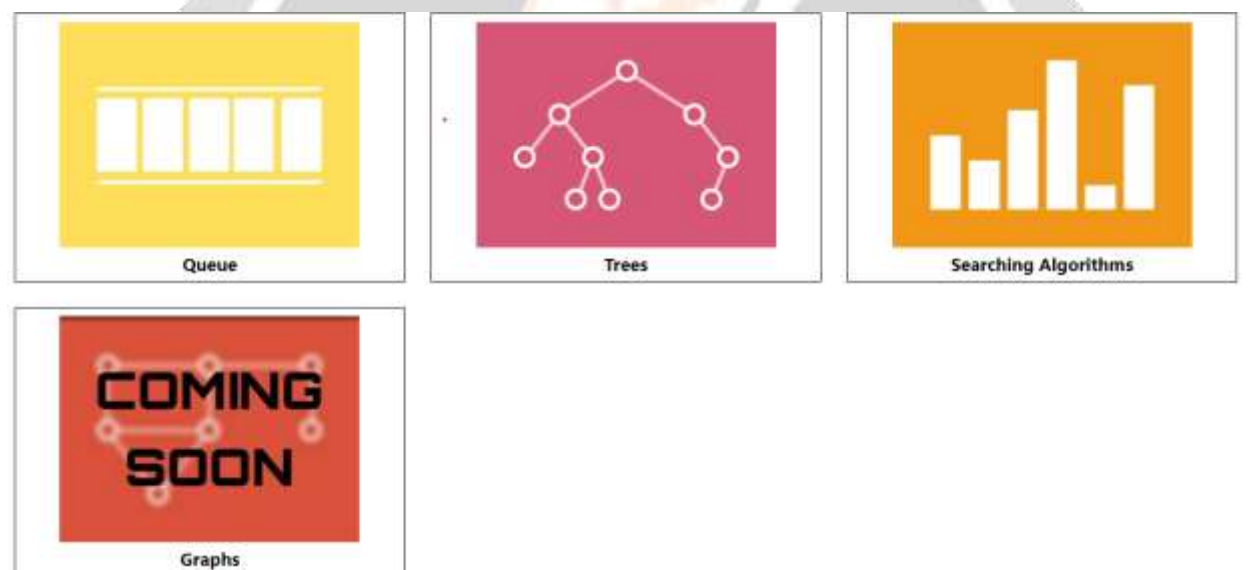**Fig-1:** Home Page 1

Fig-2: Home Page 2

4.2 Sorting algorithm

This page contains the some information and visualization about various sorting techniques.
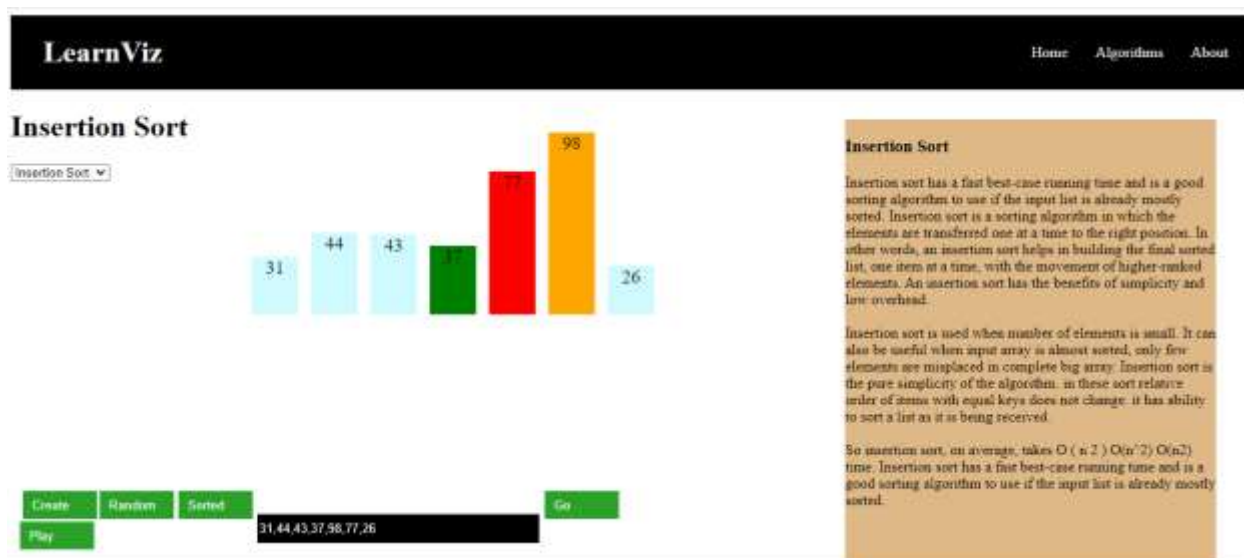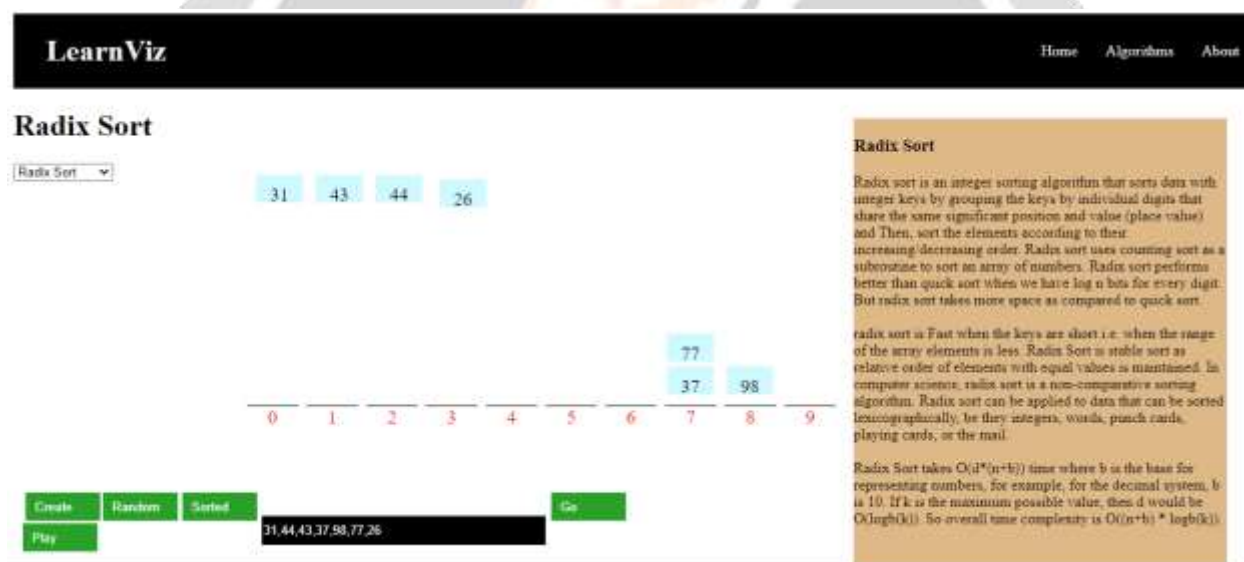
Fig-3: Insertion sort Algorithm Page

Fig-4: Radix sort Algorithm Page

4.3 Linked List

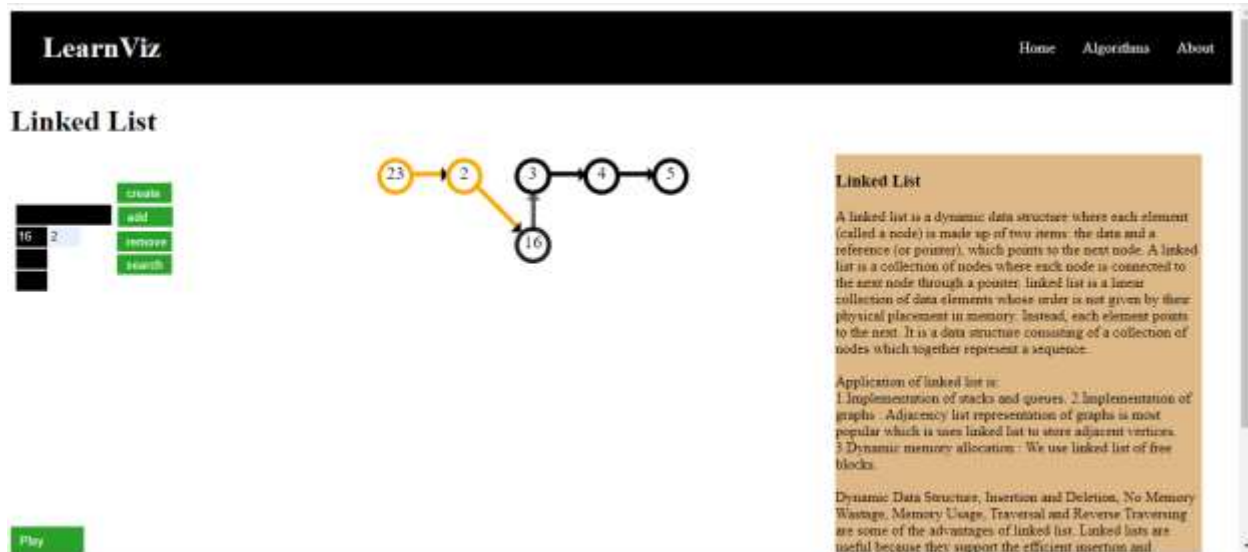This page contains the some information and visualization about Linked List.

Fig-5: Linked List page

4.4 Stack

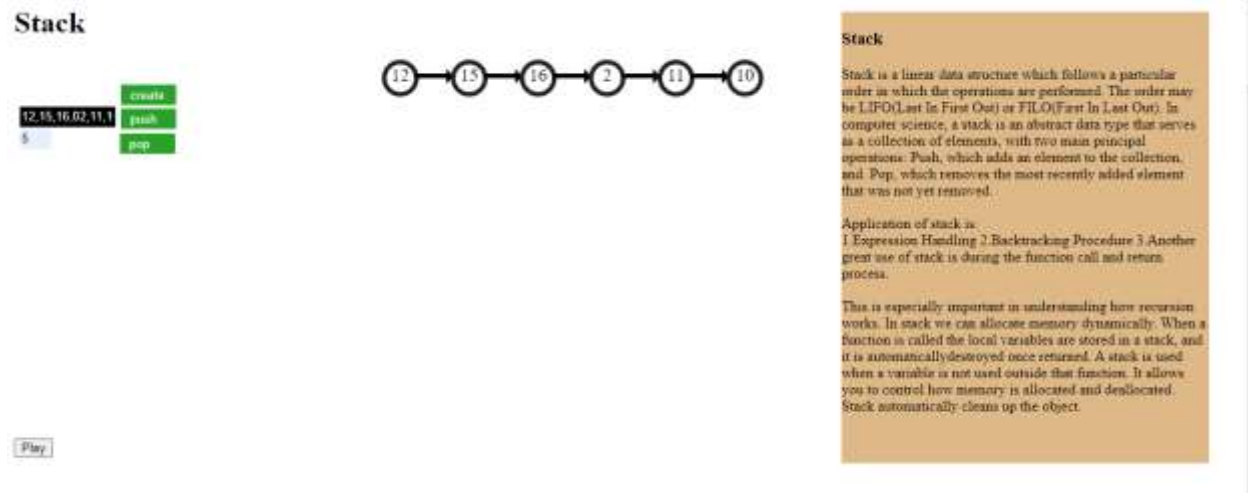This page contains the some information and visualization about Stack.

Fig-6: Stack Page

4.5 Queue

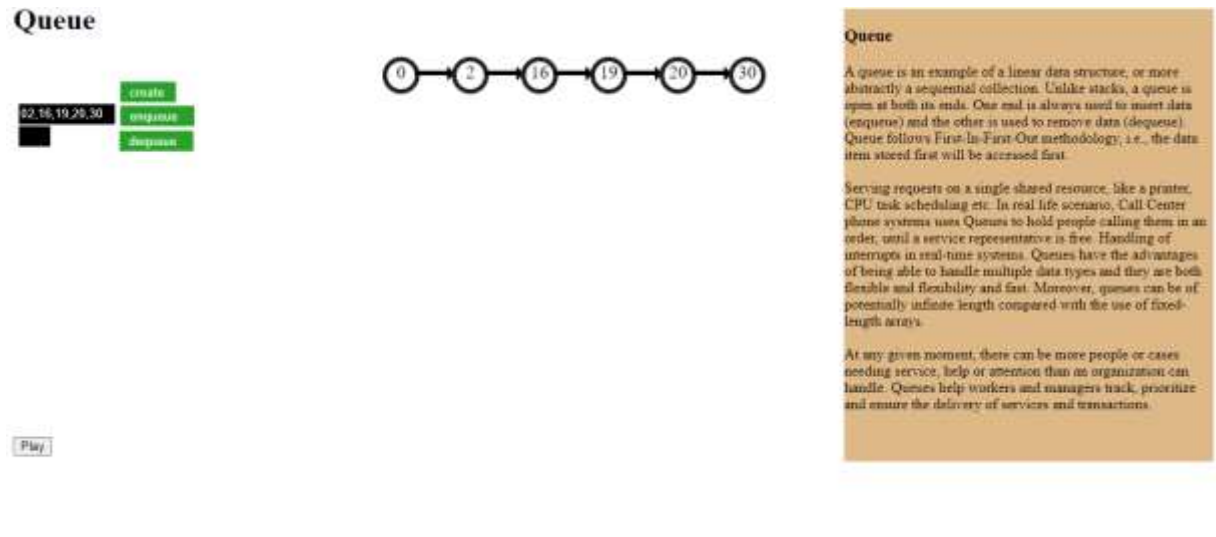This page contains the some information and visualization about Queue.

Fig-7: Queue Page

4.6 Tree

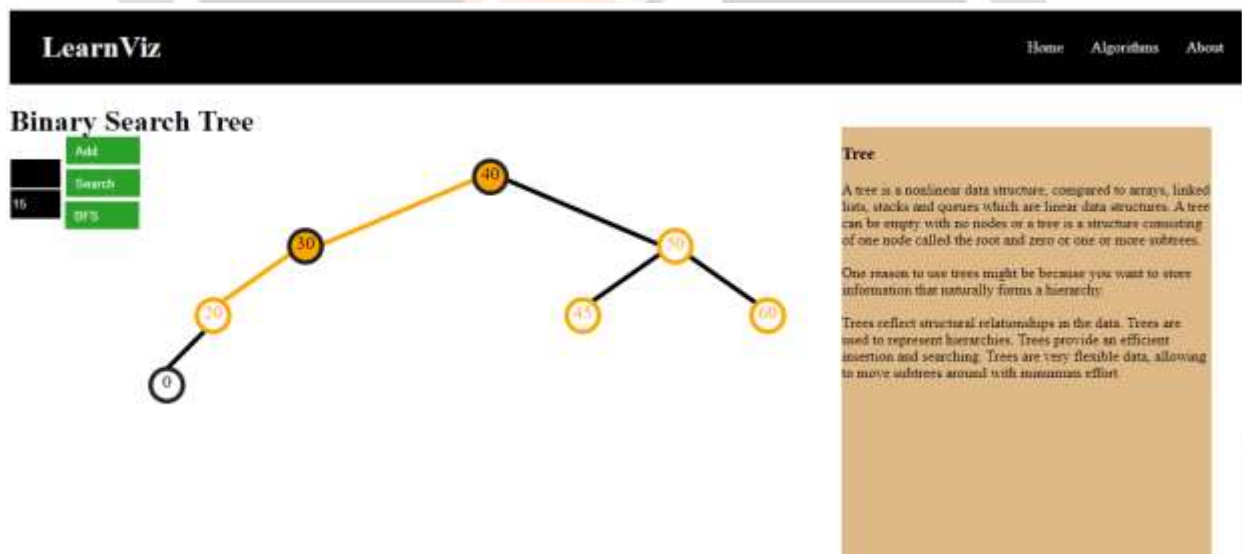This page contains the some information and visualization about Tree.

Fig-8: Tree Page

4.7 Searching Technique

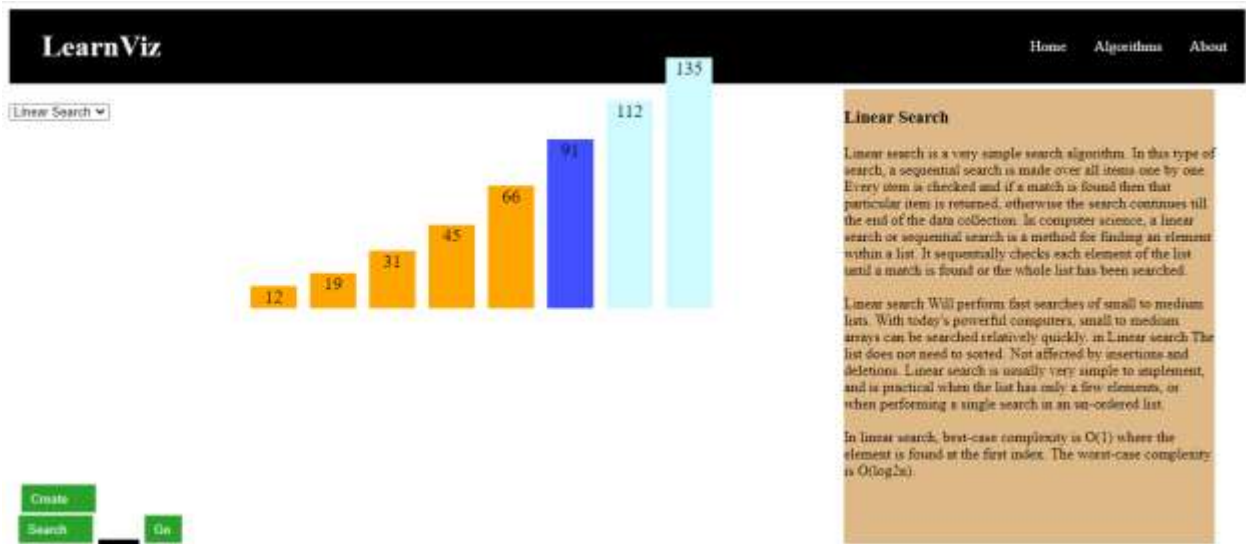This page contains the some information and visualization about both searching techniques.

Fig-9: Linear Search Technique Page

4.8 About Page

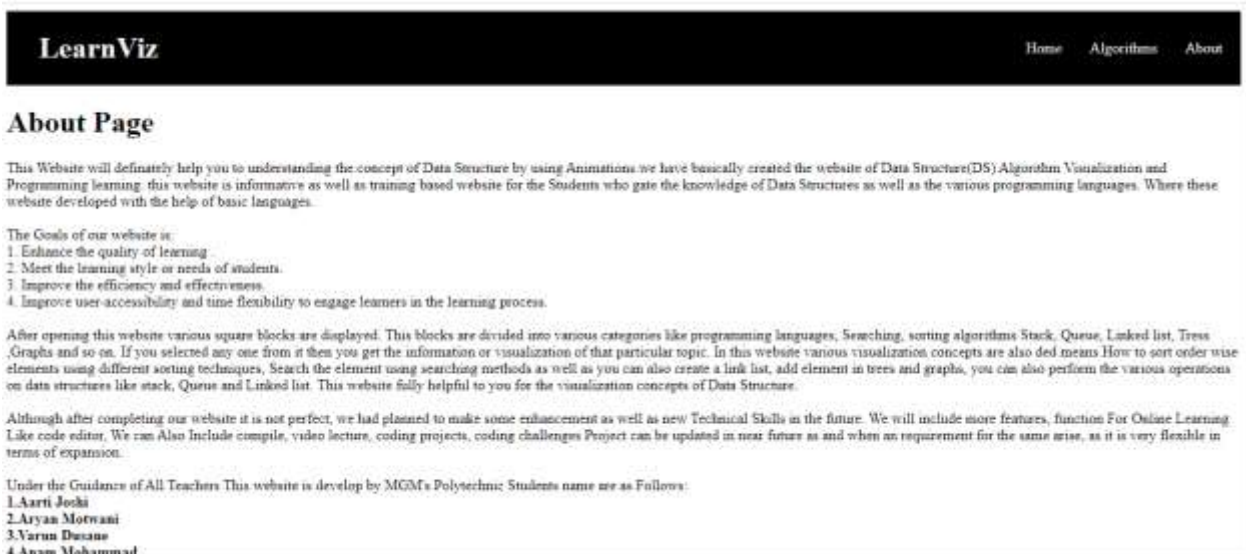This page contains the some information related to our website.

Fig-10: About Page

5. CONCLUSION

Online education is here and is highly likely to stay and grow. The review of its history clearly shows online education has developed rapidly, fueled by Internet connectivity, advanced technology, and a massive market. The Internet has made online learning possible, and many researchers and educators are interested in online learning to

enhance and improve student learning outcomes. This website Gives Overview and Visualization of a Each and every Data Structure which we will including in that Website Online Education Brought a Positive Impact in the Lives of Student and Working Professionals. In future this website can get updated as per the requirement of the Student with new ideas and also different Programming concepts and all other languages. We can Also Include compile, video lecture, coding projects, coding challenges. We will include more features, function For Online Learning Like code editor, We can Also Include compile, video lecture, coding projects, coding challenges.

6. REFERENCES

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