DSME

Data Structures Made Easy
User Manual

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Preface

Data Structures Made Easy is a learning site for beginner programmers to learn the fundamentals of Data Structures and Algorithms

All good programmers must master the essentials of Data Structures and Algorithms before they can apply themselves in the field of Computer Science. Basic concepts such as linked nodes, and sorting algorithms like quick sort are integral parts of Data Structures and Algorithms (DSA).

What is Data Structures Made Easy?

The site is created for the use of those who already have a basic grasp of programming and Object Orientated principles. It provides all the necessary information and more in order for the user to learn the essential concepts and ideas behind popular Algorithms and Data Structures.

Data Structures Made Easy (DSME) provides in depth articles on the most popular Data Structures such as Stacks, Linked Lists and Algorithms such as Quick Sort and Merge Sort. Each article contains validated research, easy to understand examples, and interactive diagrams which make the learning process even easier. We believe that the key to learning DSA is being able to form a mental model of how they work. Our animations do just that. Furthermore, the user can view screencasts on each Algorithm or Data Structure to get a better understanding of them. Sometimes hearing the information come from someone else can be the line between understanding something and not understanding it. The screencasts discuss everything included in the written articles, along with guidelines for implementing the Algorithms and Data Structures in a Java program.

Chapter 1

Our goal in creating Data Structures Made Easy

As two students who recently just completed the Data Structures and Algorithms module, we understand how it can be quite difficult at times. So we decided to create a site which acts as a second source of information, and which may be what the student needs in order to grasp a particular Algorithm or Data Structure. The site can also be used by someone who is learning Data Structures and Algortihms from home.

Where to Begin

The homepage of DSME gives the user a brief introduction to the site, and what if offers. When the user navigates to the Data Structures site, they will read information on what a Data Structures is, and also the best way to use the site features in order to Learn DSA. We highlight certain known problem areas in DSA which students generally find difficult. Likewise with the Algorithms page, we have background information on what an Algorithm actually is, and known areas of difficulty. The navigation links on the sidebar are structured specifically so that the user will instinctively follow them in order. The first link under the Data Structures heading is Linked List. We put this link first because we believe the users should grasp the idea of Linked Nodes and amster it before moving on to Stacks or Binary Search Trees.
Similarly with the Algorithms links, we put Bubble Sort first as we believe it to be the easiest one for users to learn.

How to get the most out of DSME

As mentioned above, we out a lot of effort into structuring DSME so the user can benefit from it as best as possible. There are in depth articles which the user should read first in order to get a basic grasp of a particular Data Structure or Algorithm. Within the articles are the animations which help the user form a mental model of how something works. After reading the articles and studying the animations, the user can view the screencasts which re enforce what they learned from the articles.

Chapter 2

Navigating the Site

When you first visit DSME, you will notice the are two main navigation areas. In the header, we have the universal navigations links. These are the links which bring you to the screencasts page, a downloads page, and general information Data Structures and Algorithms. The other set of navigation links are in the sidebar. Here is where you find your way to a specific Data Structure like a Stack or Algorithm like Quick Sort. We think it is easier for the user to have two separate, yet simplistic navigation menus, rather than one over complicated one.

Chapter 3

Data Structures

The Data Structures covered by DSME are Linked List (Singly and Linked), Stack and Queue (Bounded and Unbounded) and a Binary Search Tree. Each article covers what that particular Data Structure is, the basic idea of how it works. Followed by how it works when being implemented in a program. There are easy to understand examples and interactive animations which help the user visualize how a Data Structure works. The articles also cover the complexity of Data Structures, and their respective Advantages and Disadvantages. Finally the articles go through the process of implementing a Data Structure for use in a program – this includes each function and its use, followed by pseudocode for that function.

Algorithms

The Algorithms covered by DSME are Bubble Sort, Selection Sort, Insertion Sort, Quick Sort and Merge Sort. Each article for these Algorithms covers what that particular Algorithm does, and how exactly it does it. We provide guidelines on implementing the algorithms for use in programs also. In order for the user to understand the Algorithms as best as possible, we have easy to use animations and easily understandable examples. The article also covers the complexity of the Algorithms and their respecive Advantages and Disadvantages. Finally each article discusses the individual functions which make up a sorting algorithm including pseudocode for each function.

Chapter 4

Screencasts

DSME provide screencasts which cover each Data Structure and Algorithm also covered in the written articles.These screencasts reinforce what the articles already cover. However hearing the information come from someone else can sometimes help the user understand something better. The screencasts also go through the process of implementing a particular Data Structure or Algorithm in a Java program.

Documentation

DSME provides the user with downloadable (PDF) versions of the content covered in the written articles. We provided these because sometimes if a user cannot gain internet access but would like to read up on something in particular, they can refer to the PDF versions instead. These PDFs also include working implementations of all Data Structures and Algorithms covered on the site.

Issues

We understand that when using the site some users may have an issue with the content, design, or may just have a general query on something they don't quite understand. So we have provided a Contacts page for users to get in touch with us and discuss and issues theyt may have.