| **Data Structures and Algorithms** |
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| SNAPCHAT |
| **Course Project Report** |

| **School of Computer Science and Engineering**  **2021-22** |
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**Contents**

| **Si. No.** | **Topics** |
| --- | --- |
| 1. | Course and Team Details |
| 2. | Introduction |
| 3. | Problem Definition |
| 4. | Functionalities |
| 5. | Tools and Techniques |
| 6. | Learning and Takeaway |
| 7. | References |

**1. Course and Team Details**

**1.1 Course details**

| **Course Name** | Data Structures and Algorithms  (Theory and Lab) |
| --- | --- |
| **Course Code** | 20ECSC205 and 19ECSP201 |
| **Semester** | III |
| **Division** | B |
| **Year** | 2021-22 |
| **Instructor** | Prakash Hegade |

**1.2 Team Details**

| **Si. No.** | **Roll No.** | **Name** |
| --- | --- | --- |
| 1. | 231 | Parag Hegde |
| 2. | 234 | Pranav Jadhav |
| 3. | 253 | Pranavi P Kulkarni |

**2. Introduction**

Today’s world has been completely computerized. For such a computerized world, the data structures and algorithms are something that a skeleton is for human body. Without them, it’s never possible for the modern world to exist. Some of the most essential data structures and algorithms have been included as a part of our syllabus under the course named ‘Data Structures and Algorithms’. The application aspect of this course is realised through the project and, working on this project has given us an idea on how the algorithms learnt in this course/lab are applied in real-time. Knowing the real-time application becomes important as it gives a purpose and satisfaction of studying this course.

**3. Problem Statement**

Snapchat, a widely used social media application has lured its users with the interesting features it has. It is used by the millions of users across the globe, every day. The magic behind its amazing features is none other than the data structures and algorithms. The motive here is to try and implement those features using the algorithms which we have studied in this course.

**4. Functionalities**

| **SI. No.** | **Function Name** | **Description** | **DS and Algorithm Used** |
| --- | --- | --- | --- |
|  | Streak | The count of how many consecutive days two people have been sending snaps to each other. | A counter variable |
|  | Mutuals | Displays the users who can be shown in add friends page because they are mutual friends. | Warshall’s algorithm. |
|  | Search | Searches whether any user with that name or user name exists in friends and contact list. | Brute force substring search. |
|  | Quick Add | Displays the names in the contacts who aren’t our friends on snapchat. | Files and array |
|  | Send message | Displays the person whom we text recently at the top, every time when we send message. | Linked List |
|  | Remove Friend | Removes a person from friend list. | Linked List |
|  | Display saved Messages | Shows the messages which are saved. | Array |
|  | Sort By Name | Arranges list of friends in alphabetical order. | Bubble Sort |
|  | Display Contacts | Displays the contact names. | Array and Files. |
|  | Display Friends | Displays the friends. | Array and Files |

**5. Tools and Techniques**

**5.1 Data Structures and Algorithms**

**ARRAY:** It is a data structure which is a collection of data in a contiguous manner. We have used array in multiple functions in our course project. Major part of arrays here is loading the data from files, storing them in arrays and accessing the same.

**BRUTE FORCE SUBSTRING SEARCH**: This algorithm is a simple yet effective algorithm. It searches for the pattern in the text present. The ‘Search’ feature in our project is powered by this algorithm. Based on the input by the user, this feature displays all names wherein the input pattern is present. Time complexity for brute force is O(mn).

**BUBBLE SORT**: It is a sorting algorithm. In this project, this algorithm has been used to sort the names in alphabetical order, so that it would be easy for the user to spot the required person easily. Time complexity for bubble sort is O(n2).

**LINKED LIST**: Linked lists are one of the important data structures. The data is stored in the form of lists, which can be subjected to various operations such as insertion and deletion. The ‘Send Message’ and ‘Remove Friend’ features of this project have been realized using linked list data structure.

**FILES:** A data structure with a lot of benefits. To load large data into the structure array(here) it becomes much easier with this, than statically initialising the same. Here two files have been used. One for the contact list and the other for friends list.

**WARSHALLS:** We have used Warshall’s algorithm to find the mutual friends. It gives output as those people who are mutual to at least 2 of our friends. Hence we can use it to show the suggestion of friends who are mutual friends of our friends.

**5.2 Project Statistics**

| **Si. No.** | **Measure** | **Value** |
| --- | --- | --- |
|  | Total Functions in Project | 10 |
|  | Total number of lines of code  (Including comments, newlines etc.) | 922 |
|  | Number of Errors | 0 |
|  | Number of Warnings | 1 |
|  | Team Satisfaction about Project | 96 |

1. **Learning and Takeaway**

* **Application of Data Structures to The Real-World Scenario.**

This project enabled us to closely relate and apply our classroom knowledge to the real-world scenario such as snapchat. We were able to appreciate the role of data structures and algorithms in making the tasks much simpler.

* **Ignition of New Ideas**

This course project ignited new ideas in our minds as we simulated the real-world application in our own way. We were able to think in multidirectional perspective and were able to apply the same in simulating it.

* **Sharpened Our Problem-Solving Skills**

While completing this project, we encountered several problems. We as a team tackled those problems and were able to complete the project successfully.

**7. References**

DSA class notes.

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