FAST NUCES LAHORE

HAFIZ AHMAD MOAZ AWAN

19L-1316 19L-1367

DATA STRUCTURES AND ALGORITHUM

PROJECT REPORT

PROBLEM STATMENT:

You have to develop an online Library Management System where the system should not only be able to manage its books but also cater for online delivery of books to borrowers registered within the library’s system.

INTRODUCTION:

Data Structures & Algorithums plays a very important role in reducing the time complexity of the code. A problem might have several approaches, but you must pick the optimized one in order to stand out of the crowd. You must be able to write a code which takes less time to execute for any problem statement given.Our project is also based on these and we solve all problem by keeping that thing in mind.

OBJECTIVE:

File Handeling

Use following Data Structures: Binary Search Tree , Graphs , Shortest Path Algorithum , Heap , Stack , Queue etc.

DESIGN SOLUTION:

graph:





edges:



matrix:



APPLICATIONS:

Array, Linked Lists, Stack, Queues, Trees, Graphs, Sets, Hash Tables. Data Structure used in following places.

1. You have to store social network “feeds”. You do not know the size, and things may need to be dynamically added.

2. You need to store undo/redo operations in a word processor.

3. You need to evaluate an expression (i.e., parse).

4. You need to store the friendship information on a social networking site. I.e., who is friends with who.

5. You need to store an image (1000 by 1000 pixels) as a bitmap.

6. To implement printer spooler so that jobs can be printed in the order of their arrival.

7. To implement back functionality in the internet browser.

8. To store the possible moves in a chess game.

9. To store a set of fixed key words which are referenced very frequently.

10. To store the customer order information in a drive-in burger place. (Customers keep on coming and they have to get their correct food at the payment/food collection window.)

11. To store the genealogy information of biological species.

ISSUES:

We face issue first in first part as how to mannage insert but we rsolve it but decalring the root as cnic and then thy insertion is basically on inserting a cnic as root.

Second issue face for chossing which data structure is used to find the shortest path after making graph on paper as undirected graph and have no negative weight so we use dijkstra algorithum for finding the shortest path.

Third is solve and mannge the third path we should use many data structures to solve this problem but i attempt to heap for this part and in insertion deletion and update we have many ways to solve them by stack queue linked list as in all cases it manages with constant time. We also do the same problem with AVL trees but its too much long such as red black and code is difficult but i use simple and easy data structure for solving part 3.In this part i have face issue while in time complexity to afer edditing the book data its shift all into others so now i try to change into the arrays and solve problem using heap by using of array then i handel my problem.After solving my problem its not acess in big-oh(1) such as we solve this bu usiing linked list hasing technique and bst then we find the appropriate solution of solving ths problem in given mentioned time.mostly problem and issues are resolved by using link list as it reduces the time complexity and and perform moslty task in O(1) and O(log n).

CONCLUSION:

After solving the problem by using data structures and algorithms can easily perform the tasks related to data processing, automated reasoning, or calculations. Data structure and algorithm is significant for developers as it shows their problem-solving abilities amongst the prospective employers. We are able to manage large amounts of data efficiently for uses such as large databases and internet indexing services. Usually, efficient data structures are key to designing efficient algorithms.In this project we learn how to solve real life problem by using its appropriate data structure.

CODE: