

MILK DISTRIBUTION PROBLEM

A PROJECT REPORT

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ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our teacher Prof. Swati Sharda who gave us the golden opportunity to do this wonderful project on the topic:- Milk Distribution Problem.

This project helped us in understanding graphs concepts better and we learnt about many new things. We would also like to thank our university, Delhi Technological University for giving us this opportunity to explore and research. We would also like to thank our peers and teacher for making this subject interesting and fun to learn. Thanking you,

Anshul Aggarwal (2K19/IT/026)

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CERTIFICATE

I hereby certify that the Project Dissertation titled “MILK DISTRIBUTION PROBLEM” which is submitted by Anshul Aggarwal(2K19/IT/026) and Apoorva Aggarwal(2K19/IT/026); INFORMATION TECHNOLOGY, Delhi Technological University, Delhi , is a record of the project work carried out by the students under my supervision.

Place: Delhi

Date: 30-12-2020

ABSTRACT

Milk Distribution Problem is a web-d based project which allows milk man to see the best paths to distribute milk to his customers. This system focuses on graph and its algorithms for finding best path.

This project allow users to create profiles, and to act either as single milk man or as a factory and accordingly give paths with Floyd's and prism's algorithm respectively with visualisation and live recognition.

The objective of this Social Networking Site project is to explain and elaborate the real-world milk man problem and the use of graph theory in real world problems. To provide attractive and secure access to the users. To make the application user-friendly.

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INTRODUCTION

Milk distribution has become one of the major problems that the dairy companies and milk men are now facing, especially when it comes to transporting the milk. The milk collection, its transportation to the dairy plants and its cost depends on the logistics infrastructure of the dairy company. Therefore, it is necessary to implement good algorithms and theory in order to reduce cost.

The problem statement becomes:

"Given a list of customers and the distances between each pair of customers, what is the shortest possible route that visits each city exactly once and returns to the origin place?"

We use Floyd Warshall algorithm for acting as a single milkman as well as Prism Algorithm for acting as a factory.

Prim's algorithm is to find the minimum cost spanning tree (as Kruskal's algorithm) or shortest distance spanning tree for our problem. Prim's algorithm shares a similarity with the shortest path first algorithm.

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PURPOSE

The Milk Distribution problem is a popular mathematics problem that asks for the most efficient trajectory possible given a set of points and distances that must all be visited.

In computer science, the problem can be applied to the most efficient route for data to travel between various nodes.

In terms of input, the problem takes a list of physical locations or system nodes, along with distance information. Algorithms and equations work on the process of identifying the most efficient paths possible between the locations. Computer programs can do this through the process of elimination or through a process called heuristics that provides probability outcomes for this type of equation.

In the early days of computers, this problem was one example of the many tasks that computers could do more efficiently than humans. A simple computer program written in almost any programming language can provide excellent and actual results for solving this problem with any reasonable amount of complexity.

In modern IT, the equation itself has applications in identifying network or hardware optimization methods.

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SYSTEM DESCRIPTION

3.1 TECHNOLOGIES USED :

3.1.1 JAVASCRIPT :

JavaScript (JS) is a lightweight, interpreted, or just-in-time compiled programming language with first-class functions. JavaScript is a prototype-based, multi-paradigm, single-threaded, dynamic language, supporting object-oriented, imperative, and declarative (e.g. functional programming) styles. JavaScript can function as both a procedural and an object oriented language. Objects are created programmatically in JavaScript.

3.1.2 HTML:

HTML (Hypertext Markup Language) is a text-based approach to describing how content contained within an HTML file is structured. This markup tells a web browser how to display text, images and other forms of multimedia on a webpage.

3.1.3 CSS:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, and enable multiple web pages to share formatting.

3.1.4 NODE-JS:

Node.js is an open source, cross-platform runtime environment for developing server-side and networking applications. Node.js applications are written in JavaScript, and can be run within the Node.js runtime on OS X, Microsoft Windows, and Linux. Node.js also provides a rich library of various JavaScript modules which simplifies the development of web applications using Node.js to a great extent.

3.1.5 MYSQL, SQLITE:

MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language. A relational database organizes data into one or more data tables in which data types may be related to each other; these relations help structure the data. SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database.

3.2 TOOLS USED :

3.2.1 VS-CODE:

Visual Studio Code is a free source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

3.2.2 EDGE BROWSER:

Microsoft Edge is a cross-platform web browser developed by Microsoft. It was first released for Windows 10 and Xbox One in 2015, then for Android and iOS in 2017, for macOS in 2019, and as a preview for Linux in October 2020. Edge includes integration with Cortana and has extensions hosted on the Microsoft Store. Unlike Internet Explorer, Edge does not support the legacy ActiveX and BHO technologies.

CHAPTER-4

MODULE DESCRIPTION

4.1 CREATE ACCOUNT :

The project should have a functionality such that all the users can create their account by sign up by giving their username, password and other information. We are doing this by using an express-session library and storing the information in the database using sqlite(like mysql) which is the form of object oriented programming.

4.2 ACCESS ACCOUNT:

After the creation of an account, the information of the user is stored in a test.db file and users can easily access their account simply by logging in i.e by entering their username and password.

4.3 ADD NEW GRAPH FOR A ROUTE :

Once logged in (/ sign in), users will be able to add new customers along the way, for the new route which will create a new graph. The user (milkman) is required to first enter the number of customers along his route, after that the distances between each pair of customers are added. Finally this information is fetched, in order to create a new graph.

4.4 VISUALIZE PREVIOUS ADDED GRAPHS:

User can view his previous graphs (if added previously) and visualize them. This is done by cytoscape library which helps us to visualize graph. User can click the graph he/she wanted to open and once clicked all the nodes with the edges connecting them will be shown on the page.

4.5 ACT AS SINGLE MILKMAN :

Clicking on the button 'Act as single milkman', the graph using Floyd Warshall Algorithm for the same will be visible. As we keep clicking over the 'Done' button, the next nodes to be traversed will be shown with darkened edges as well as the nodes' names to be traversed next will also be visible below the graph. The Floyd Warshall Algorithm calculates the shortest path using the weighted edges (distances between a pair of customers) of the graph.

4.6 ACT AS A FACTORY:

Clicking on the button 'Act as a factory', then the user will be able to see the minimum spanning tree made using Prim's algorithm as the factory can hire as many employees as needed and that would be equal to the leaf nodes. Moreover the next path will be seen after 2 sec to the previous one, we have done this using set-time-interval.

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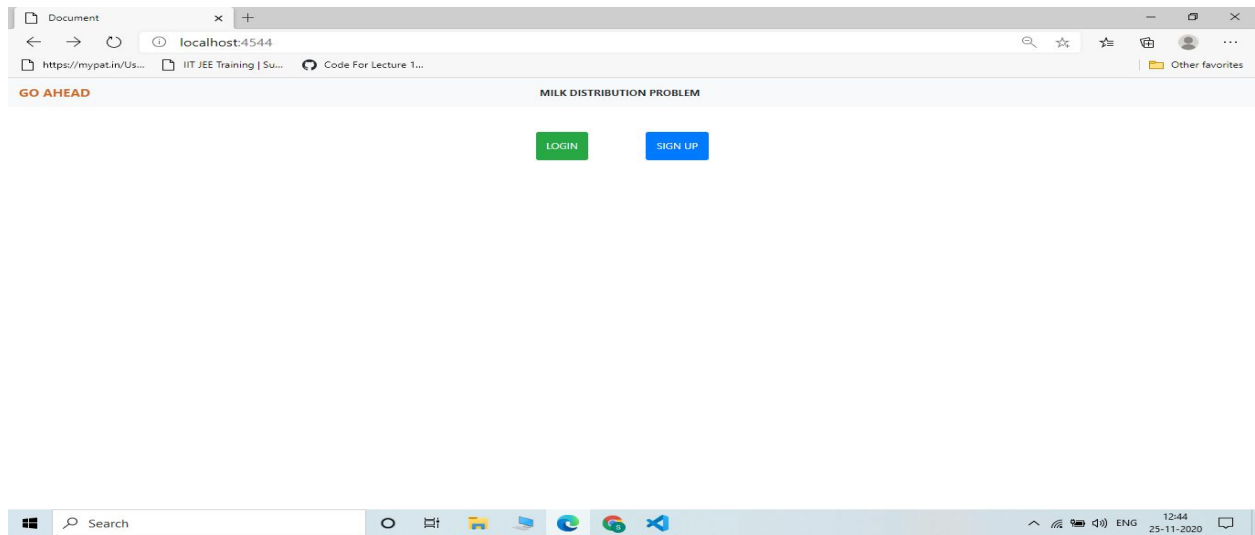
CODE

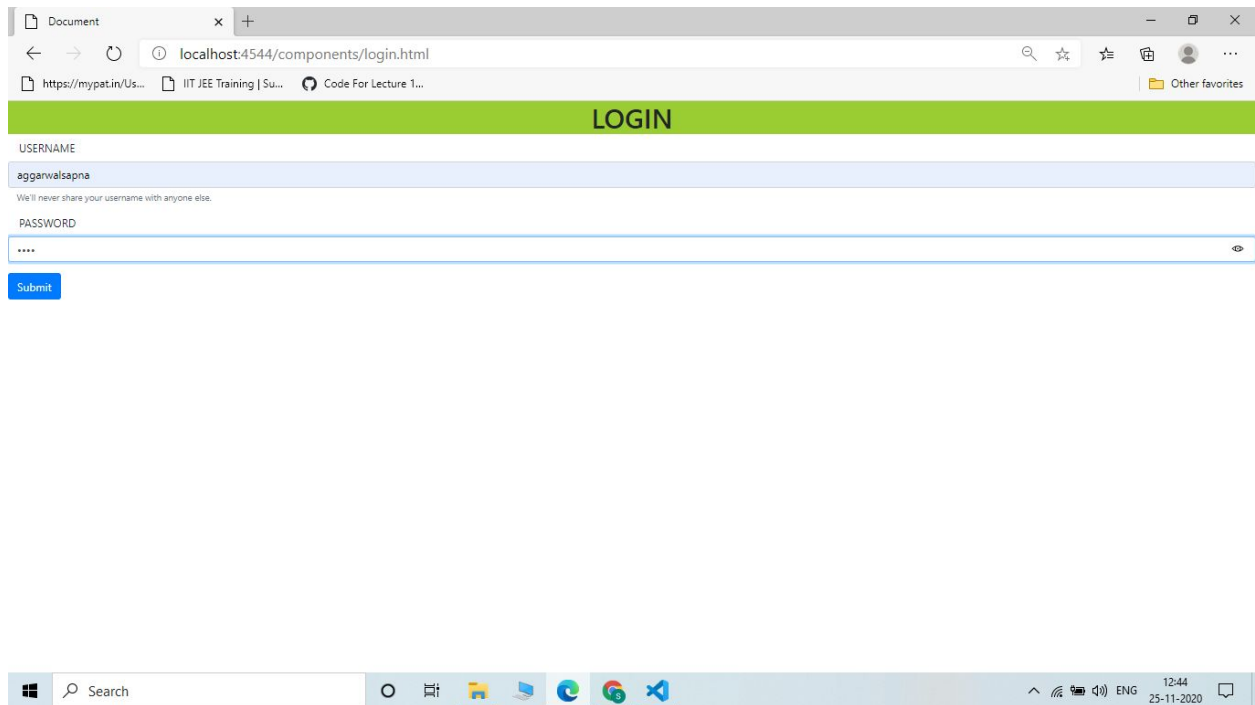
GITHUB LINK:

<https://github.com/aggarwalanshul01/DST-PROJECT>

CHAPTER-6

SCREENSHOTS





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localhost:4544/loggedin.html

https://mypatin/Us... IIT JEE Training | Su... Code For Lecture 1...

GO AHEAD

MILK DISTRIBUTION PROBLEM

aggarwalsapna

YOUR CUSTOMER GRAPHS

PREVIOUSLY ADDED GRAPHS

[ADD NEW](#)

THESE ARE YOUR ORDERWISE GRAPHS YOU HAVE MADE EARLIER

THIS IS YOUR 14th GRAPH

THIS IS YOUR 13th GRAPH

THIS IS YOUR 12th GRAPH

THIS IS YOUR 11th GRAPH

THIS IS YOUR 10th GRAPH

YOU CAN NOW USE YOUR PREVIOUS CUSTOMER GRAPHS OR CREATE NEW


[Back to top](#)

Document x +

localhost:4544/components/addone.html

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MILK DISTRIBUTION PROBLEM



[View Larger Map](#) | [Get Directions](#)

ENTER THE NUMBER OF CUSTOMERS INCLUDING YOUR POSITION

SUBMIT

YOU CAN USE GET DIRECTIONS FOR DISTANCES IN KM

[Back to top](#)

Document x +

localhost:4544/components/addone.html

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Other favorites

Bing

View Larger Map | Get Directions

ENTER THE NUMBER OF CUSTOMERS INCLUDING YOUR POSITION

3 SUBMIT

NAME OF 1th customer Anshul Aggarwal

NAME OF 2th customer Ansh

NAME OF 3th customer Apoorva

DONE

Distance between [Anshul Aggarwal] to [Ansh] 3

Distance between [Anshul Aggarwal] to [Apoorva] 5

Distance between [Ansh] to [Apoorva] 4

ADD THEM ALL

YOU CAN USE GET DIRECTIONS FOR DISTANCES IN KM

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localhost:4544/components/openGraph.html

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CURRENT CUSTOMERS GRAPHS

ACT AS SINGLE MILK MAN

ACT AS A FACTORY

Search

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CURRENT CUSTOMERS GRAPHS

SINGLE MILK DISTRIBUTION

Enter your Starting position

Search

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CURRENT CUSTOMERS GRAPHS

SINGLE MILK DISTRIBUTION

Enter your Starting position

Live Path Traversing (click done when you are on the last point)

Path is Ansd => Anshul Aggarwal => Ansh

Search

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CURRENT CUSTOMERS GRAPHS

FACTORY MILK DISTRIBUTION



Enter your Starting position

Search

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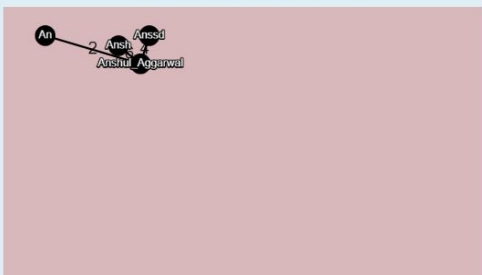
Document x +

localhost:4544/components/openGraph.html

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CURRENT CUSTOMERS GRAPHS

FACTORY MILK DISTRIBUTION



Enter your Starting position

CONGRATULATIONS, YOU ARE DONE WITH YOUR MILK DISTRIBUTION TO ALL THE CUSTOMERS
NUMBER OF EMPLOYEES REQUIRED WILL BE EQUAL TO THE LEAF NODES

Search

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CHAPTER-7

RESULT AND CONCLUSION

This Milk Distribution project is designed to meet the requirements of milk factories and single milkman.

The website is self contained, independent and accessible via any internet connection and web browser.()

Overall the project teaches us the essential skills like:

- Using system analysis and design techniques like data flow diagram designing the system.
- Understanding the database handling.
- Understanding graph theory and its various algorithms.
- Understanding the visualisation techniques.

CHAPTER-8

REFERENCES

- www.researchgate.net
- www.konstantinfo.com