Jaypee Institute of Information Technology

Batch:F1

Department of CSE

DATA STRUCTURES LAB

(15B17CI371)

Project Based Learning

Path Finder (College Map)

Submitted to: Prof. Dr. Varsha Garg

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Prateek Srivastva 9921103194 Hrishit Pandey 9921103198

(November 2022)

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ACKNOWLEDGEMENT

With the deepest sense of gratitude and indebtedness, we wish to thank all the professors of the CSE department at JIIT Noida; especially thank our DS ma'am, Mrs. Varsha Garg for guiding us regarding our project selection and teaching us how our projects can be used to solve day to day problems. Additional acknowledgments can be made about our friends, those with experience in this domain for providing us their continuous support.

But we are grateful the most for letting our group team up and together try our luck in this project. We wish our project will fulfil the expectations of the department.

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Problem Statement

Problem Statement for our project is:

Many students in JIIT daily face difficulty while finding classrooms as room numbers and LT numbers are very random and rooms have multiple names which create confusion in students. We are given a task to solve this problem by finding a way of helping these students using data structures so that they can reach easily to their desired classrooms. We are required to find shortest or best path between two locations and should be implemented in way that will user friendly, interactive and reusable.

INTRODUCTION TO PROJECT

Data Structures used in the project-

(@) Graphs

(@) Priority-Ques using heaps

What we aimed to achieve-

Our team wanted to make a web visualiser for finding the shortest path within the domain of our college. We wanted to make it such that anyone can look for directions to the classrooms, or their respective destinations in our college.
Considering the recent induction of the 1st years in our college, we felt that our project could help us make a difference and make life a little easier for our juniors considering the chaos we have experienced from our experience from last year.

What we tried-

The project was of Data Structures, but we knew that the project would be development heavy, with CSS and JS doing most of the heavy lifting, all due to the presentation in the form of map and then directions.

So, the algo that we have used for finding the shortest path is- Dijkstra, that we chose among the various other available options (BFS, DFS, Greedy). The reason for choosing is purely based on the idea that the topic was recently mentioned a lot in the class. So, we went for it.

How was the process-

While doing the project, if there is anything that we understood well is that we must THINK before choosing a topic. We had not reached even the mid when we all had realised that the topic though extremely thoughtful, was difficult to implement. We have used CSS and the JS throughout the project and for most of it, we are still clueless how it ended up the way it is. But we managed somehow to implement what we were thinking.

THE IMPLEMENTATION

We have used CSS, JS for visualisation of map of JIIT and we have used java script for implementation of data structures and some searching algorithms (Such as Dijkstra).

For implementation of these algorithms the data structures that we used are Priority queue using heap and we implemented graph with table division (as adjacency matrix) carrying directions and weights.

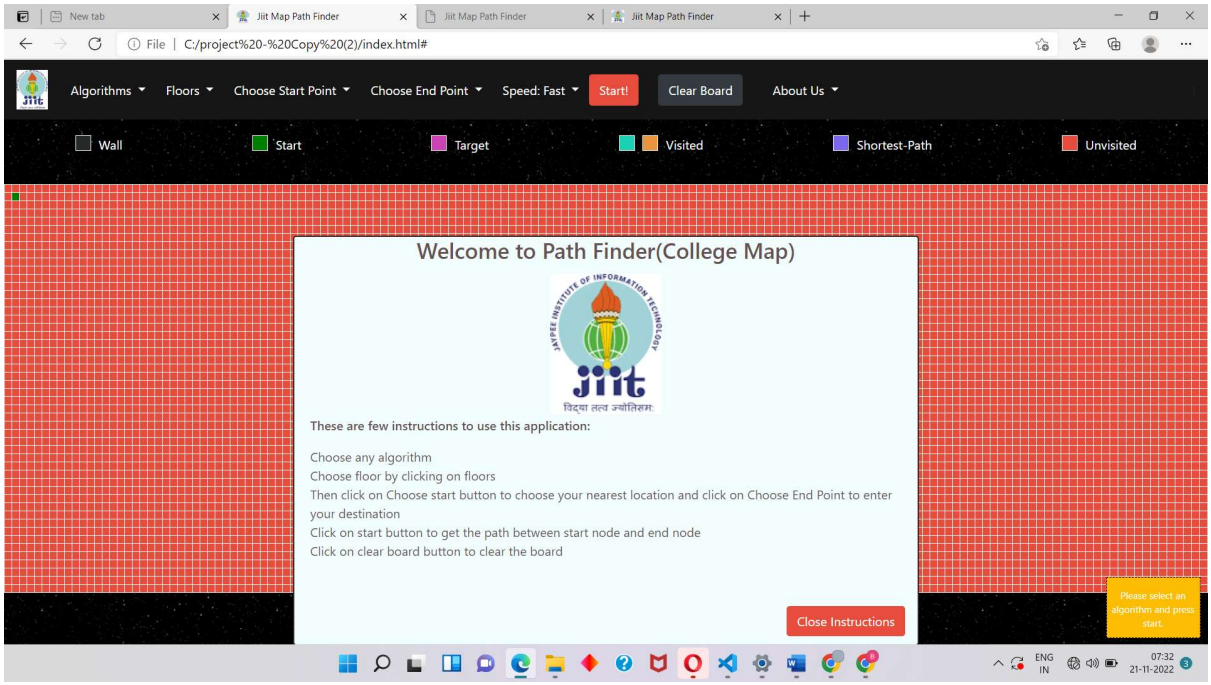
In Dijkstra's algorithm, all of the nodes in the graph (except the starting node) are initialized with a distance equal to 'infinity.' These distances represent the cost to get from the starting node to the current node, with the starting node having a distance of zero.

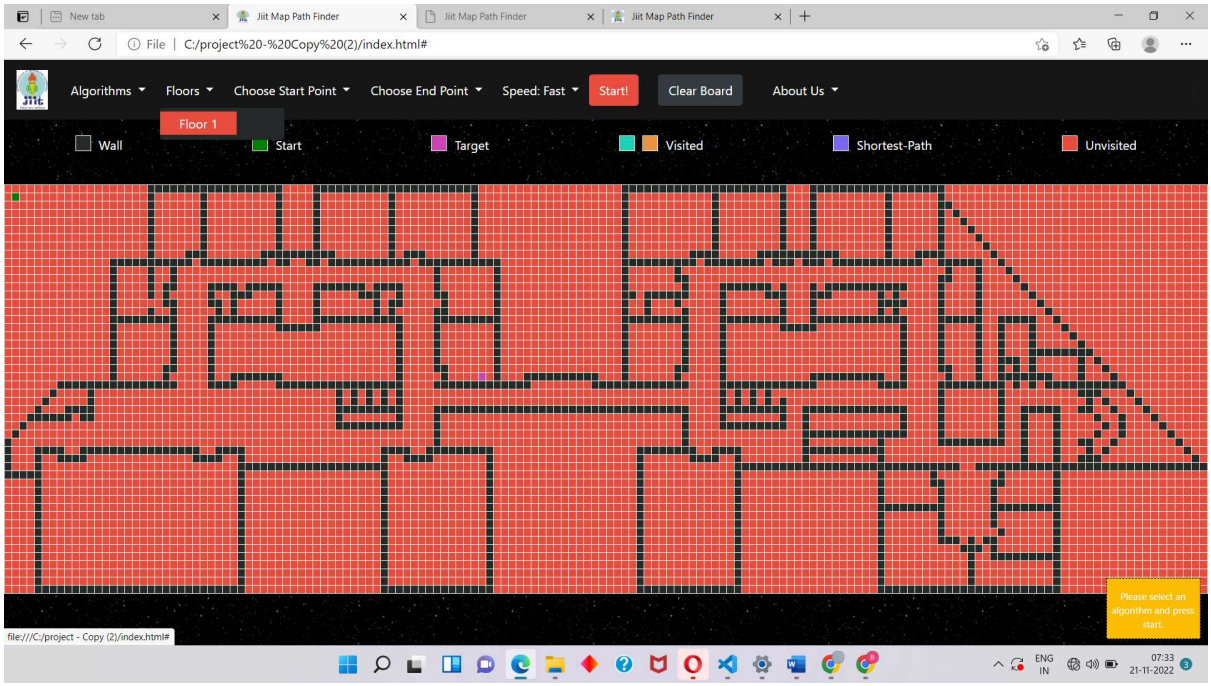
At the beginning of each iteration, the node with the smallest distance that hasn't been explored yet is visited. These nodes are stored in a min-heap data structure. When a node is visited, all of the neighbour’s distances are updated, and if any of the neighbour’s distances are lessened, then the algorithm pushes the node onto the min-heap.

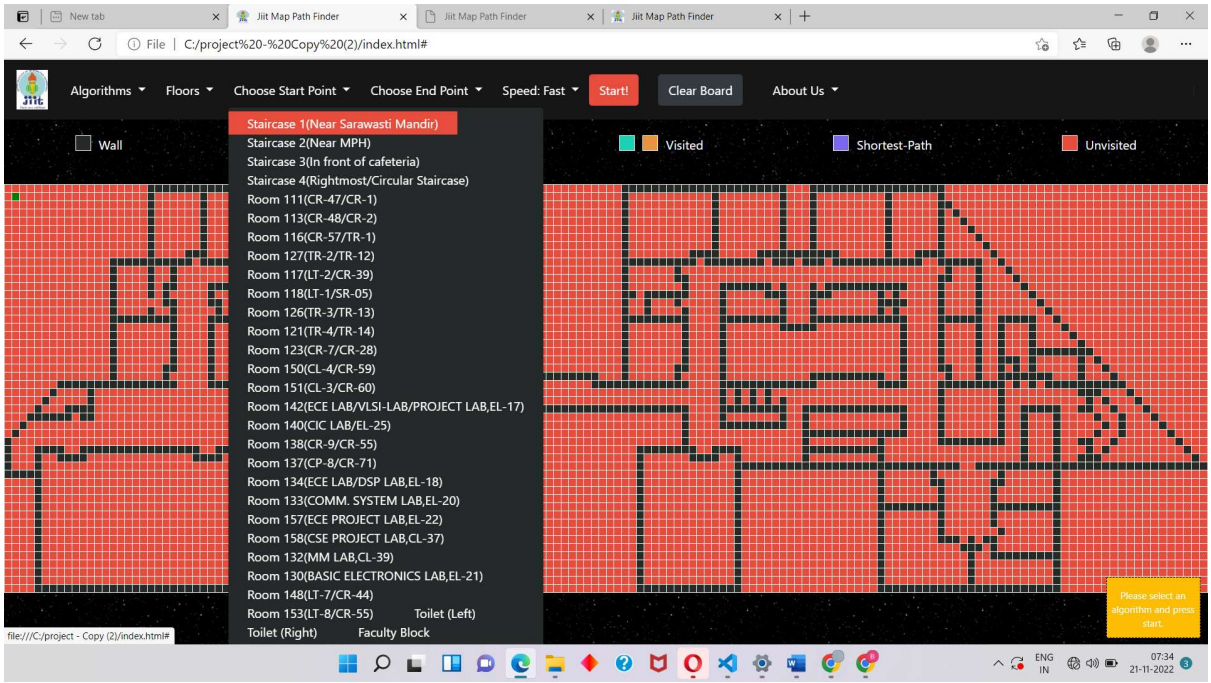
This continues until the end node has been reached. This is a ok algorithm for pathfinding.

SNAPSHOTS

Interface






Jiit Map Path Finder
File | C:/project%20-%20Copy%20(2)/index.html#
Algorithms
Floors
Choose Start Point
Choose End Point
Speed: Fast
Start!
Clear Board
About Us
Wall
Visited
Shortest-Path
Unvisited
Staircase 1(Near Sarawasti Mandir)
Staircase 2(Near MPH)
Staircase 3(In front of cafeteria)
Staircase 4(Rightmost/Circular Staircase)
Room 111(CR-47/CR-1)
Room 113(CR-48/CR-2)
Room 116(CR-57/TR-1)
Room 127(TR-2/TR-12)
Room 117(LT-2/CR-39)
Room 118(LT-1/SR-05)
Room 126(TR-3/TR-13)
Room 121(TR-4/TR-14)
Room 123(CR-7/CR-28)
Room 150(CL-4/CR-59)
Room 151(CL-3/CR-60)
Room 142(ECE LAB/VLSI-LAB/PROJECT LAB,EL-17)
Room 140(CIC LAB/EL-25)
Room 138(CR-9/CR-55)
Room 137(CP-8/CR-71)
Room 134(ECE LAB/DSP LAB,EL-18)
Room 133(COMM. SYSTEM LAB,EL-20)
Room 157(ECE PROJECT LAB,EL-22)
Room 158(CSE PROJECT LAB,CL-37)
Room 132(MM LAB,CL-39)
Room 130(BASIC ELECTRONICS LAB,EL-21)
Room 148(LT-7/CR-44)
Room 153(LT-8/CR-55)
Toilet (Left)
Toilet (Right)
Faculty Block
Please select an algorithm and press start.
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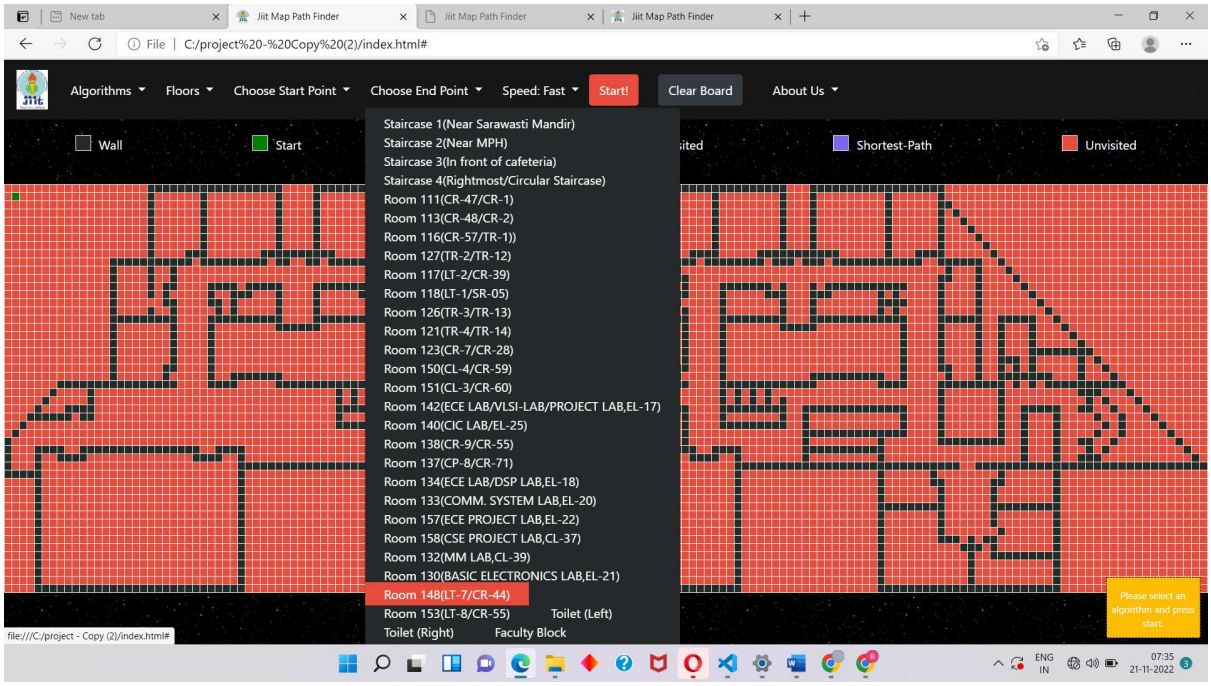
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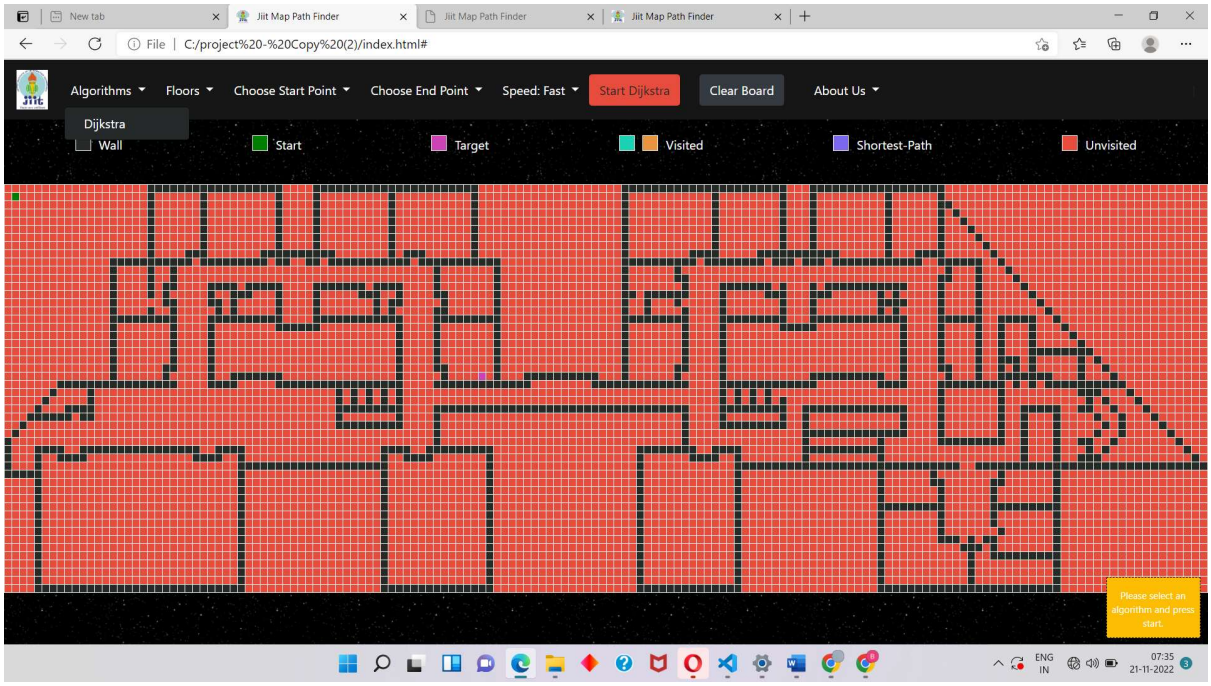
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Choose End Point
Speed: Fast
Start Dijkstra
Clear Board
About Us
Dijkstra
Wall
Start
Target
Visited
Shortest-Path
Unvisited
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Jiit Map Path Finder
File | C:/project%20-%20Copy%20(2)/index.html#
Algorithms
Floors
Choose Start Point
Choose End Point
Speed: Fast
Start Dijkstra
Clear Board
About Us
Wall
Start
Target
Visited
Shortest-Path
Unvisited
Duration: 41 ms
Length: 141

CONCLUSION

What we achieved-

We managed to get it done, but only for the 1st floor of our college. We got the map right, the shortest path visualisation takes a little time, but that too is reasonable. We can confidently say that we have achieved a part of our aim by covering one floor of the college. And now we have a prototype, which can be worked upon by us all after the project submission.

Besides, there are many other valuable lessons that we have learned, ranging from both personal levels to group level, from both moral level to technical level, also from private level to professional level. It all happened thanks to our group endeavour of doing this project.

We have learnt a lot!