

E-ALGOVIS

User Guide and Release Notes

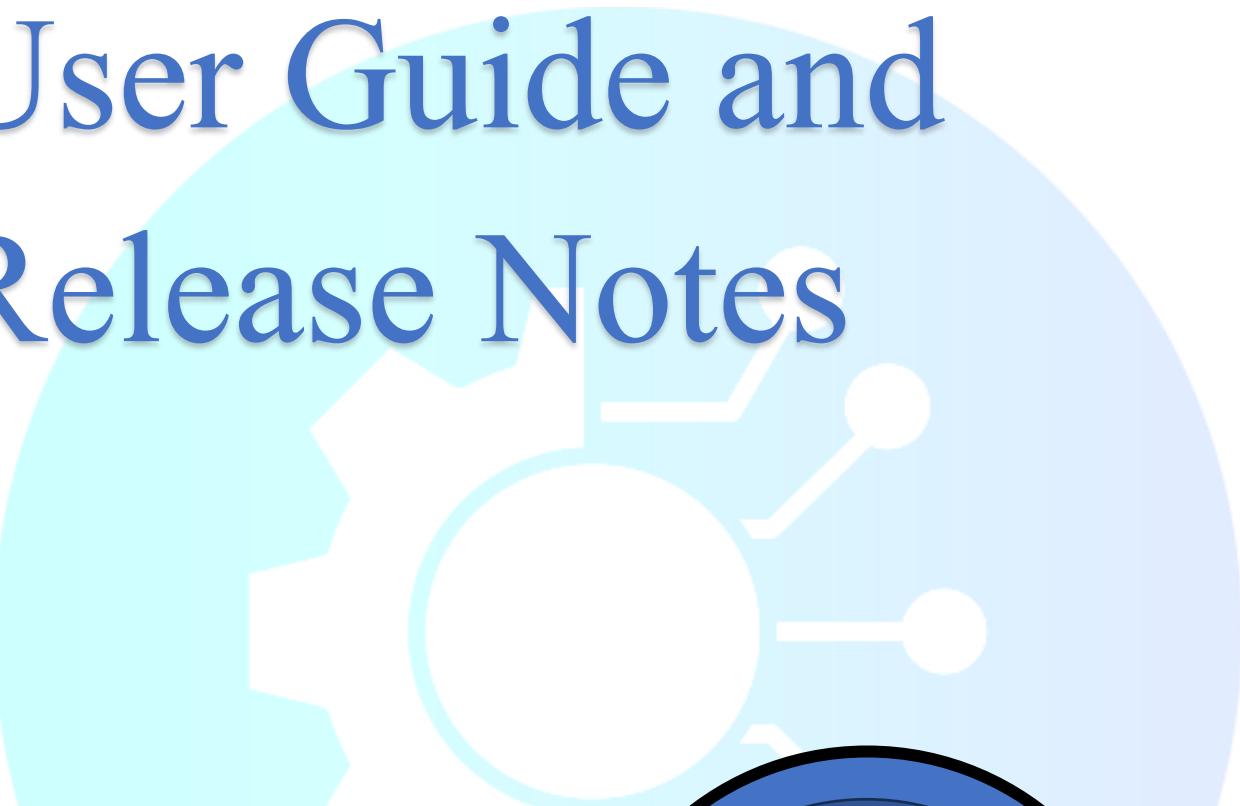
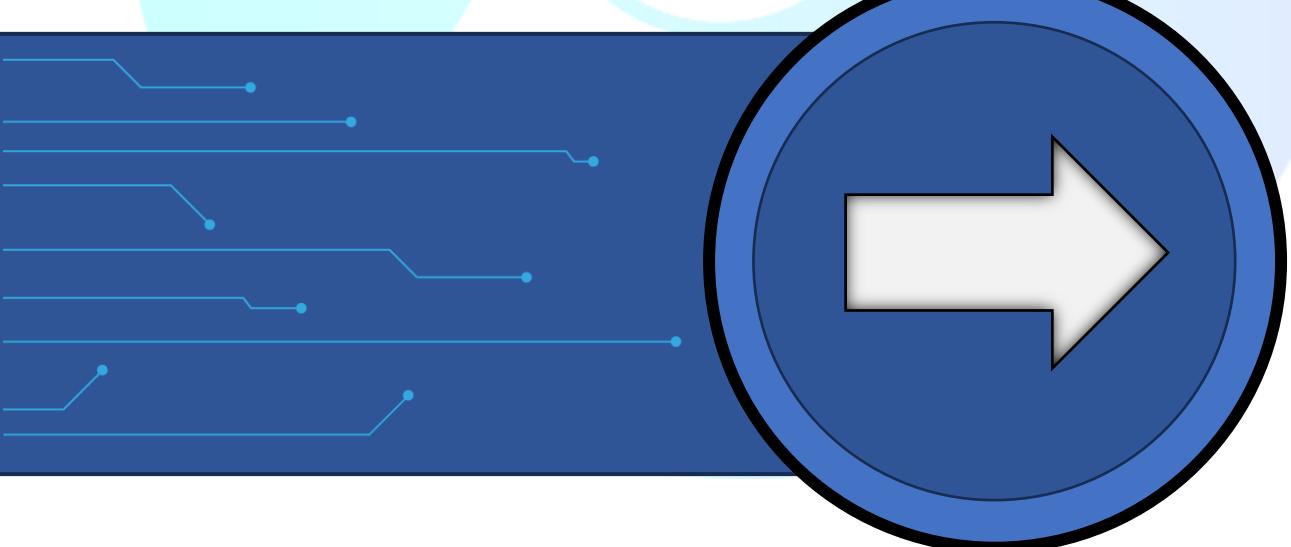
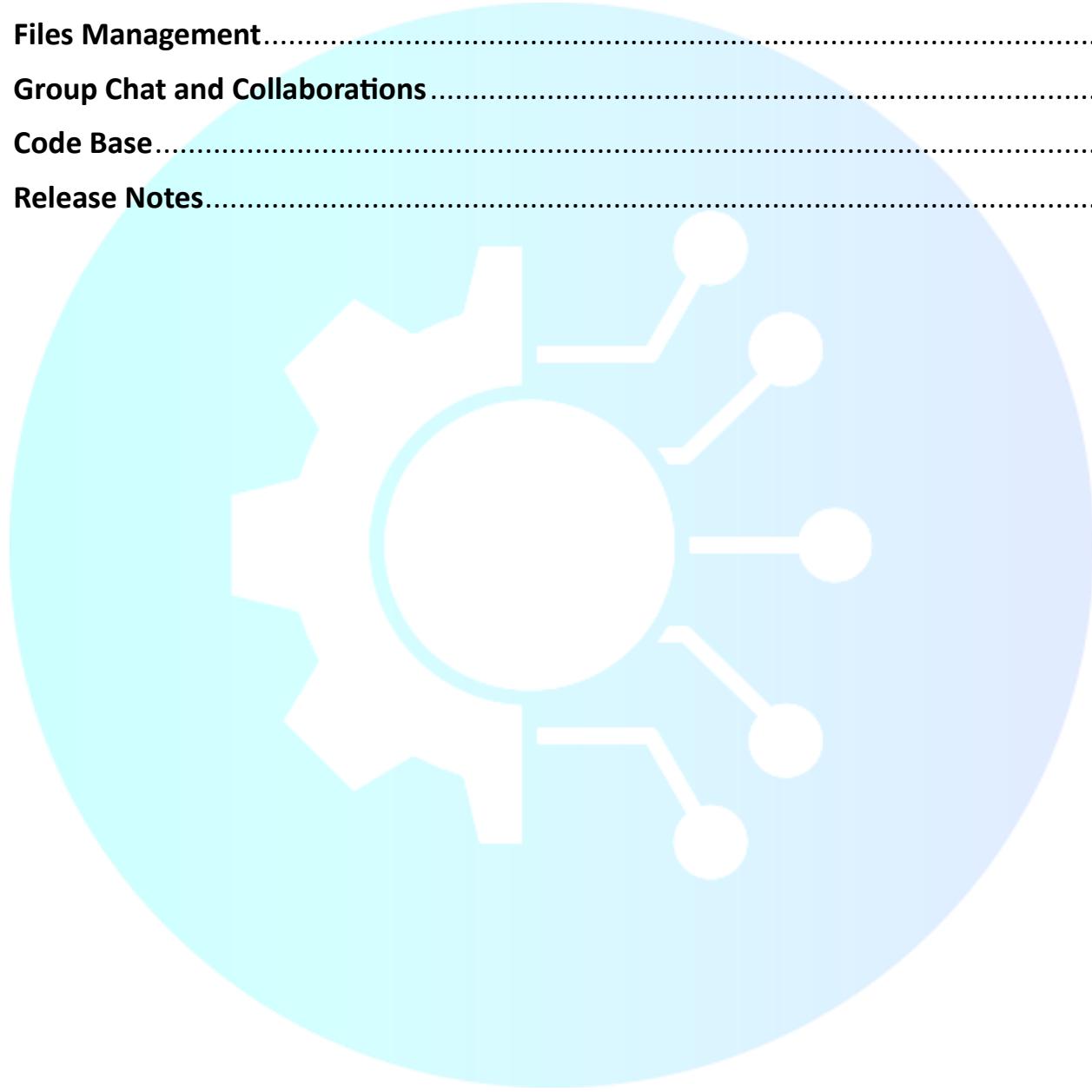


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1. Introduction

- **About E-Algo Vis**

Welcome to E-Algo Vis, your comprehensive Algorithms Visualizer Application designed to demystify complex algorithms through engaging and interactive visualizations. Whether you're a student, developer, or just someone curious about algorithms, our application is your gateway to understanding and mastering these fundamental building blocks of computer science.

E-Algo Vis is committed to making learning algorithms not only educational but also enjoyable. By offering a rich collection of visualizers, a powerful code base, and various other features, we aim to provide you with the tools and resources needed to grasp these intricate concepts in a fun and approachable way.

- **System Requirements**

Before you begin, ensure that your system meets the following requirements:

- **Operating System:** Window x64, MacOS.
- **Internet Connection:** Wi-Fi, Mobile Internet (Please make sure you are connected to the internet).

- **Installation**

Given the non-commercial nature of this product, it is not associated with any certification. To initiate the application, simply execute the '.exe' application file by double-clicking on it.

2. Getting Started

• Registering a User Account

To access the features of E-Algo Vis, you must create a user account. Follow these steps to register:

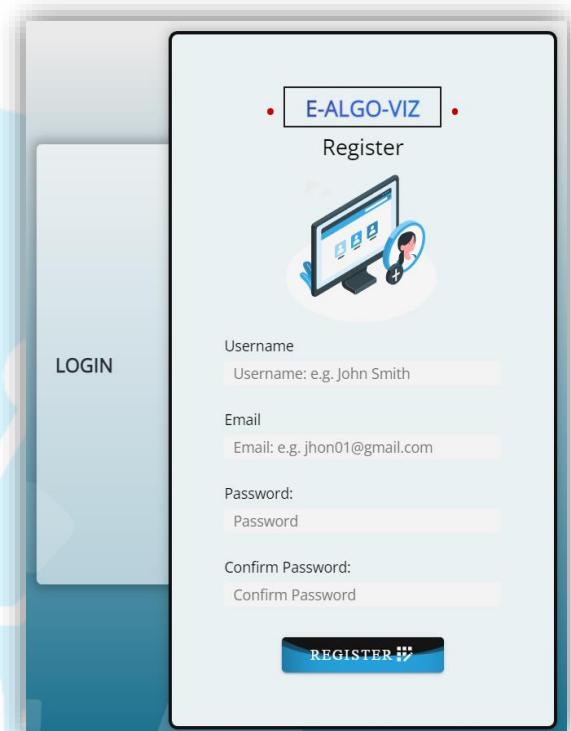
- 1) Open the application.
- 2) Click on the "Register" tab slider button.
- 3) Fill in the required information in the register form , such as your username, email, and password.
- 4) Confirm your password.
- 5) Click "Register" to create your account.
- 6) Confirm your details again and click 'Proceed'.
- 7) An email verification link is sent to your registered email address. Click on the verification link to complete the registration process.
- 8) Once you have an account, properly verified, you can log in:

NOTE: If you can't find the email verification link in your 'Spam/Junk' folder.

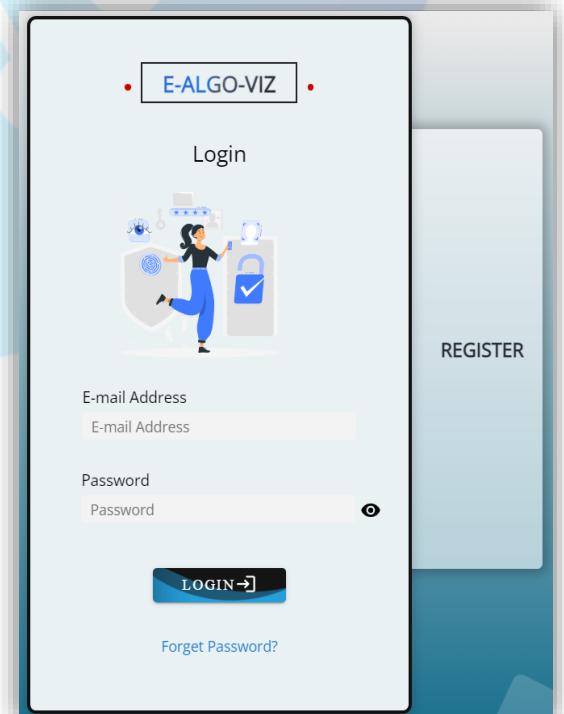
• Logging In

Once you have an account, you can log in:

- 1) Open the application or If you still inside the application just toggle to login form by clicking 'LOGIN' slider button.
- 2) Enter your email and password.
- 3) Click "Login" or press 'Enter key' to log in to E-AlgoVis application.



The screenshot shows the 'Register' tab selected in the top right corner. The form includes fields for 'Username' (example: e.g. John Smith), 'Email' (example: e.g. jhon01@gmail.com), 'Password', and 'Confirm Password'. A 'REGISTER' button is at the bottom.



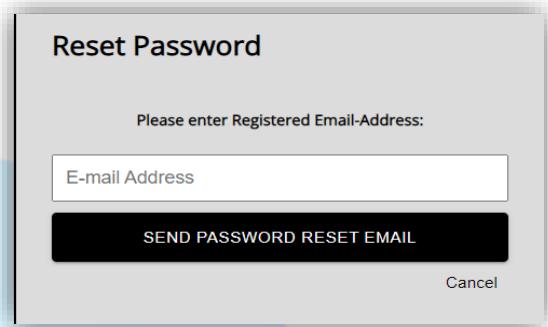
The screenshot shows the 'Login' tab selected in the top right corner. The form includes fields for 'E-mail Address' and 'Password'. A 'LOGIN' button is at the bottom, and a 'Forget Password?' link is at the bottom right.

- **Resetting Your Password**

If you forget your password:

- 1) Click on the "Forgot Password" link on the login page.
- 2) Enter your registered email address.
- 3) You will receive an email with instructions to reset your password.
- 4) Navigating the Dashboard

NOTE: If you can't find the email verification link in your 'Spam/Junk' folder.



A screenshot of a 'Reset Password' dialog box. It contains a label 'Please enter Registered Email-Address:' above a text input field labeled 'E-mail Address'. Below the input field is a black button labeled 'SEND PASSWORD RESET EMAIL'. In the bottom right corner of the dialog box, there is a small 'Cancel' link.

Explore the E-Algo Vis dashboard, where you can access the main features of the application.

3. Visualizers

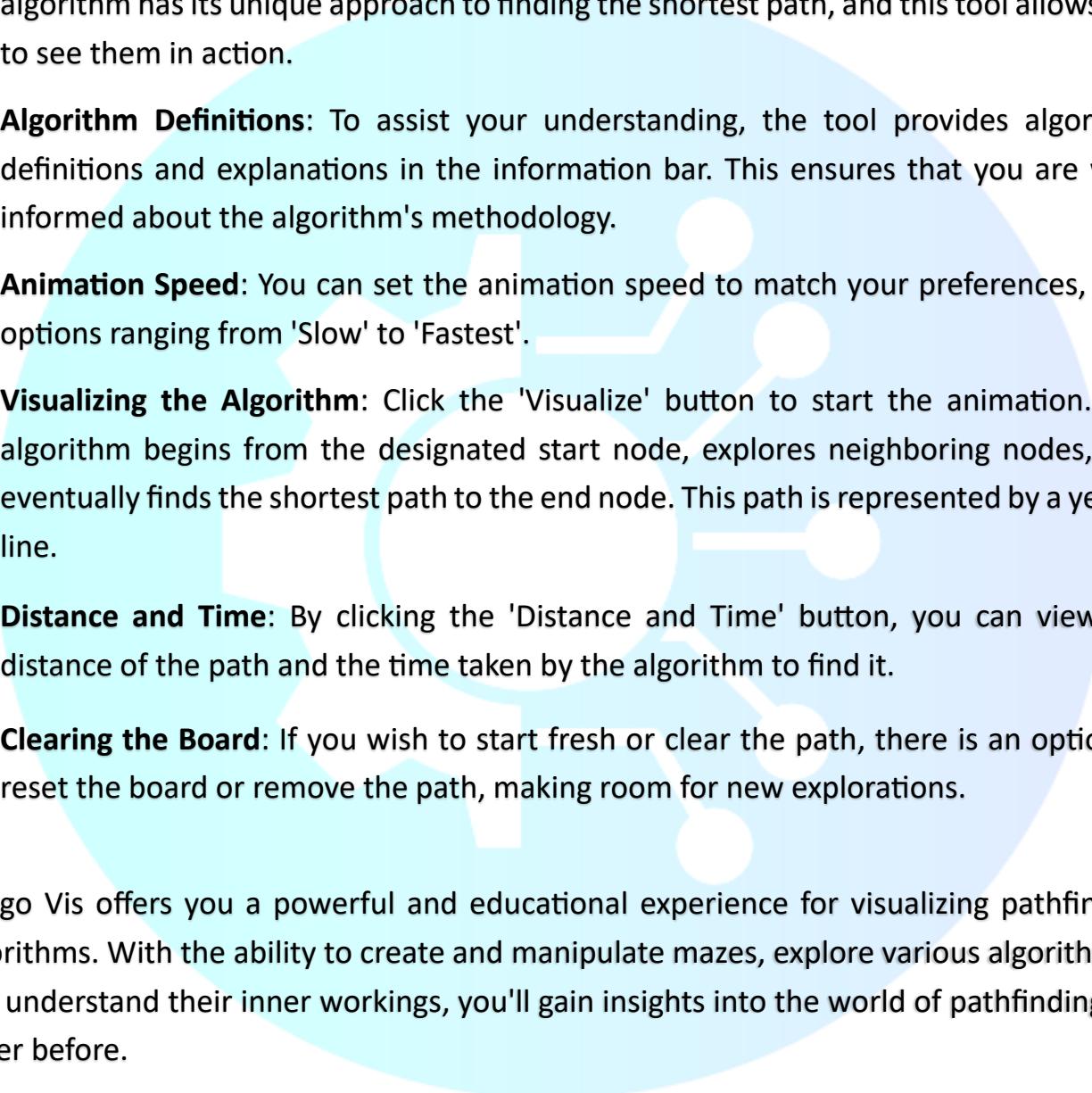
E-Algo Vis offers four main visualizers to help you understand algorithms visually.

- **Pathfinding Visualizer**

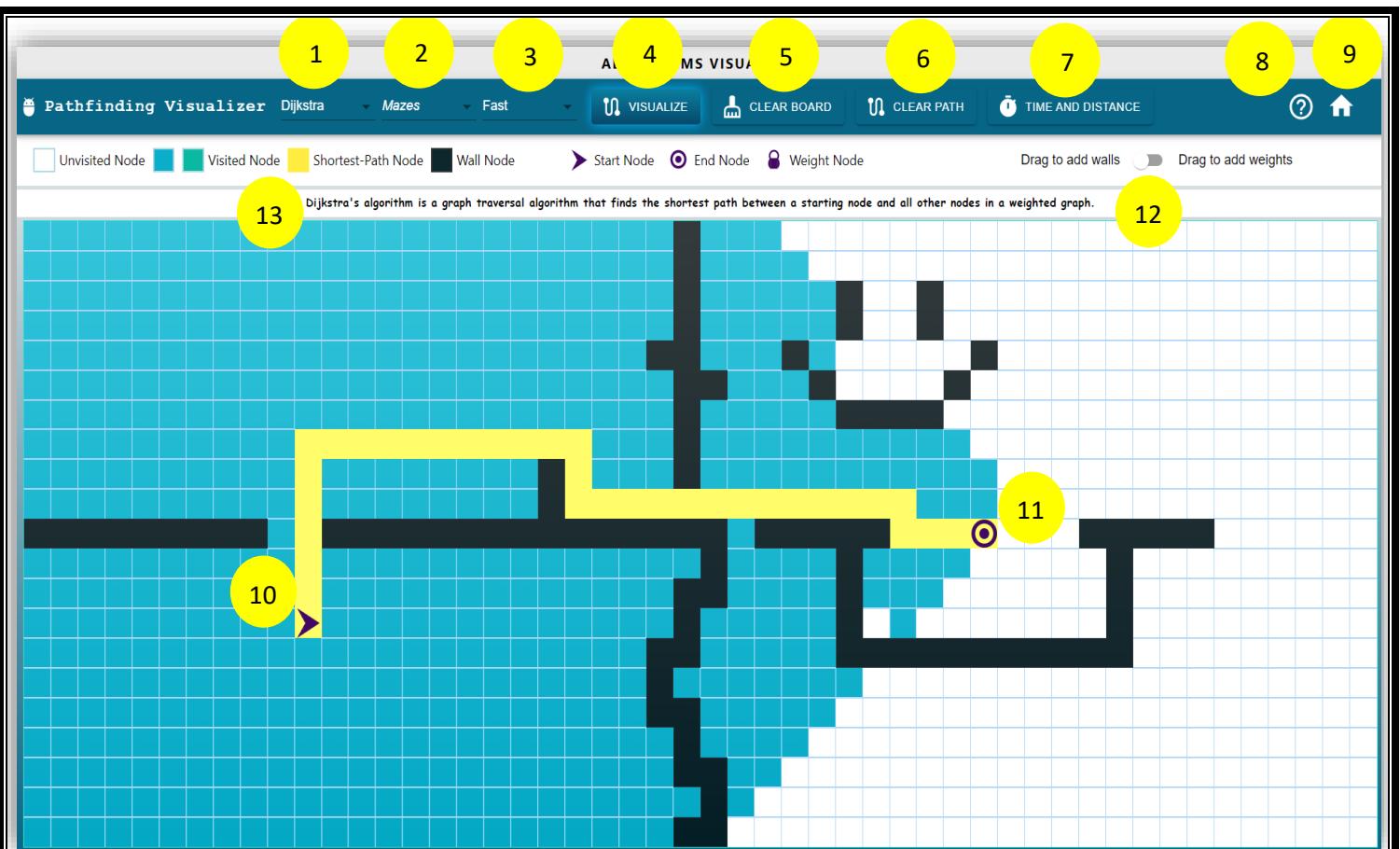
Welcome to the Pathfinding Algorithms visualizer in E-Algo Vis. Pathfinding algorithms are a fundamental part of computer science and artificial intelligence, used to find the shortest path from one point to another in a maze or grid. In this interactive tool, you can explore and understand pathfinding algorithms through engaging visualizations and real-time demonstrations.

Key Features:

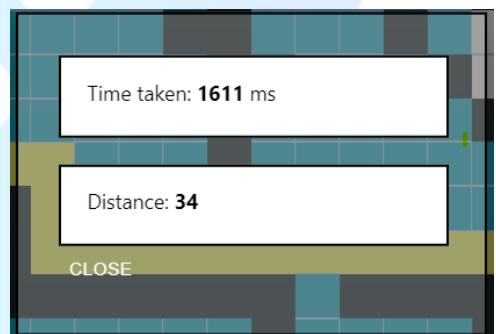
- 1) **Building Mazes:** You have the power to create your own mazes. Simply drag your mouse and right-click to define walls on the grid. The maze you create can be as intricate or as straightforward as you desire. You can also switch to add weight and add weight to the grid.

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- 2) **Selecting Pre-Made Mazes:** If you prefer to work with pre-existing mazes, you can choose from a selection of mazes that are automatically animated. You can also customize these mazes to suit your needs.
 - 3) **Algorithm Selection:** Pick the pathfinding algorithm you wish to visualize. Each algorithm has its unique approach to finding the shortest path, and this tool allows you to see them in action.
 - 4) **Algorithm Definitions:** To assist your understanding, the tool provides algorithm definitions and explanations in the information bar. This ensures that you are well-informed about the algorithm's methodology.
 - 5) **Animation Speed:** You can set the animation speed to match your preferences, with options ranging from 'Slow' to 'Fastest'.
 - 6) **Visualizing the Algorithm:** Click the 'Visualize' button to start the animation. The algorithm begins from the designated start node, explores neighboring nodes, and eventually finds the shortest path to the end node. This path is represented by a yellow line.
 - 7) **Distance and Time:** By clicking the 'Distance and Time' button, you can view the distance of the path and the time taken by the algorithm to find it.
 - 8) **Clearing the Board:** If you wish to start fresh or clear the path, there is an option to reset the board or remove the path, making room for new explorations.

E-Algo Vis offers you a powerful and educational experience for visualizing pathfinding algorithms. With the ability to create and manipulate mazes, explore various algorithms, and understand their inner workings, you'll gain insights into the world of pathfinding like never before.



- 1 : Select any algorithm from the provided list.
- 2 : Select any maze from the provided list.
- 3 : Select speed of the visualizer -> Fastest, Fast, Medium and Slow.
- 4 : Visualize the algorithm: System will animate to visualize the shortest path.
- 5 : Select to clear the grid.
- 6 : Select to clear the path (Yellow Line only).
- 7 : Select to view the Time take and Distance covered.
- 8 : Select to open the Instructions page.
- 9 : Select to return to 'Home' page.
- 10 : Start Node: There this where system start visualizing.
You can drag the start node anywhere on the grid.
- 11 : End Node: There is where the system stop visualizing.
You can drag the end node as well anywhere on the grid.
- 12 : You can switch to add weight node instead of walls on the grid.
- 13 : Algorithms definitions. You can visualize every available algorithm one line definition.



- **Sorting Visualizer**

Welcome to the Sorting Algorithms Visualizer in E-Algo Vis, your window into the world of sorting algorithms. Sorting is a fundamental operation in computer science, used to organize data efficiently. This tool allows you to witness the inner workings of various sorting algorithms, making the process both informative and visually engaging.

Key Features:

- 1) **Adjust Array Size:** Tailor the experience to your needs by changing the size of the array you want to sort. Whether it's a small array or a large one, you're in control.
- 2) **Speed Control:** Customize the animation speed to your liking. Whether you want a leisurely visualization or a rapid one, the choice is yours with options to adjust the speed.
- 3) **Algorithm Selection:** Explore a range of sorting algorithms provided in the list. From bubble sort to quicksort, you can choose the one you wish to visualize.
- 4) **Randomize the Array:** If you want to shuffle your array for a fresh start, you can do so with the randomize feature.
- 5) **Reset to Original State:** At any point, you can reset the entire visualizer to its original state, allowing you to begin anew.
- 6) **Sort and Visualize:** When you're ready to see sorting in action, click the 'Sort' button. The array is visualized on the board as it gets sorted, and the animation makes the process come to life.
- 7) **Status Indicators:** Below the array board, you can track the status of the sorting process. It will show whether the array is 'Unsorted,' 'Sorting,' or 'Sorted,' keeping you informed at all times.
- 8) **Iteration Count:** See the number of iterations it takes to sort the visualizer effectively. This provides insights into the efficiency of the chosen sorting algorithm.

The Sorting Algorithms Visualizer empowers you with a dynamic and educational tool to witness sorting algorithms in action. By providing control over array size, animation

speed, and algorithm selection, you can gain a deeper understanding of how these algorithms work and the trade-offs between them.



- 1 : Select any algorithm from the provided list.
- 2 : Visualize the algorithm: System will start animating the algorithm on the array.
- 3 : Select to Randomize the array on board. It will shuffle the array in random order.
- 4 : Select to Reset the entire visualizer.
- 5 : Select to open the Instructions page.
- 6 : Select to return to 'Home' page.
- 7 : Move the slider to change the speed of the visualizer.
- 8 : Move the slider right or left to increase or decrease the number of blocks in array.
- 9 : Algorithms definitions. You can visualize every available algorithm one line definition.
- 10 : You can visualize the number of iteration visualizer took to sort the array on selected algorithm.
- 11 : You can visualize the status of the visualizer to be Unsorted , Sorting or Sorted.

- **Prime Number Visualizer**

Welcome to the Prime Number Search Algorithms Visualizer in E-Algo Vis, a simple yet powerful tool designed to help you explore and understand prime numbers through the use of the Sieve algorithm. Prime numbers, as fundamental mathematical entities, hold a special place in the world of number theory and computing. This visualizer makes the search for prime numbers both interactive and enlightening.

Key Features:

- 1) **Speed Control:** You can fine-tune the animation speed by adjusting the slider. Whether you prefer a leisurely pace or a quicker search, the choice is at your fingertips.
- 2) **Array Size Customization:** Tailor the visualizer to your requirements by either increasing the number of blocks on the board through the slider or specifying a custom range for your prime number search.
- 3) **Visualization:** Initiate the search by clicking 'Visualize.' The algorithm begins the search process, and at the end, prime numbers are revealed in vibrant green, making them easy to spot.
- 4) **Refresh:** If you wish to start anew or explore a different range of numbers, a 'Refresh' option is available to reset the visualizer.

The Prime Number Search Algorithms Visualizer offers a straightforward yet educational experience, highlighting the application of the Sieve algorithm for prime number identification. Whether you're an enthusiast or a student of mathematics, this tool provides a clear and engaging path to explore the fascinating world of prime numbers.



- 1 : Select to Refresh the visualizer.
- 2 : Visualize the algorithm: System will start animating to search for the prime number on provided block number.
- 3 : Select to open the Instructions page.
- 4 : Select to return to 'Home' page.
- 5 : Move slider forward to increase the speed of visualizer OR Move the slider backwards to decrease the speed of the visualizer.
6. Move slider forward to increase the number of blocks on visualizer board OR Move the slider backwards to decrease the number of blocks on visualizer board.
7. Toggle between slider and select range.
8. Range Selector. You can input any range of numbers you want to find prime numbers of. E.g.: If you want to find the prime numbers between 11 – 15 only.

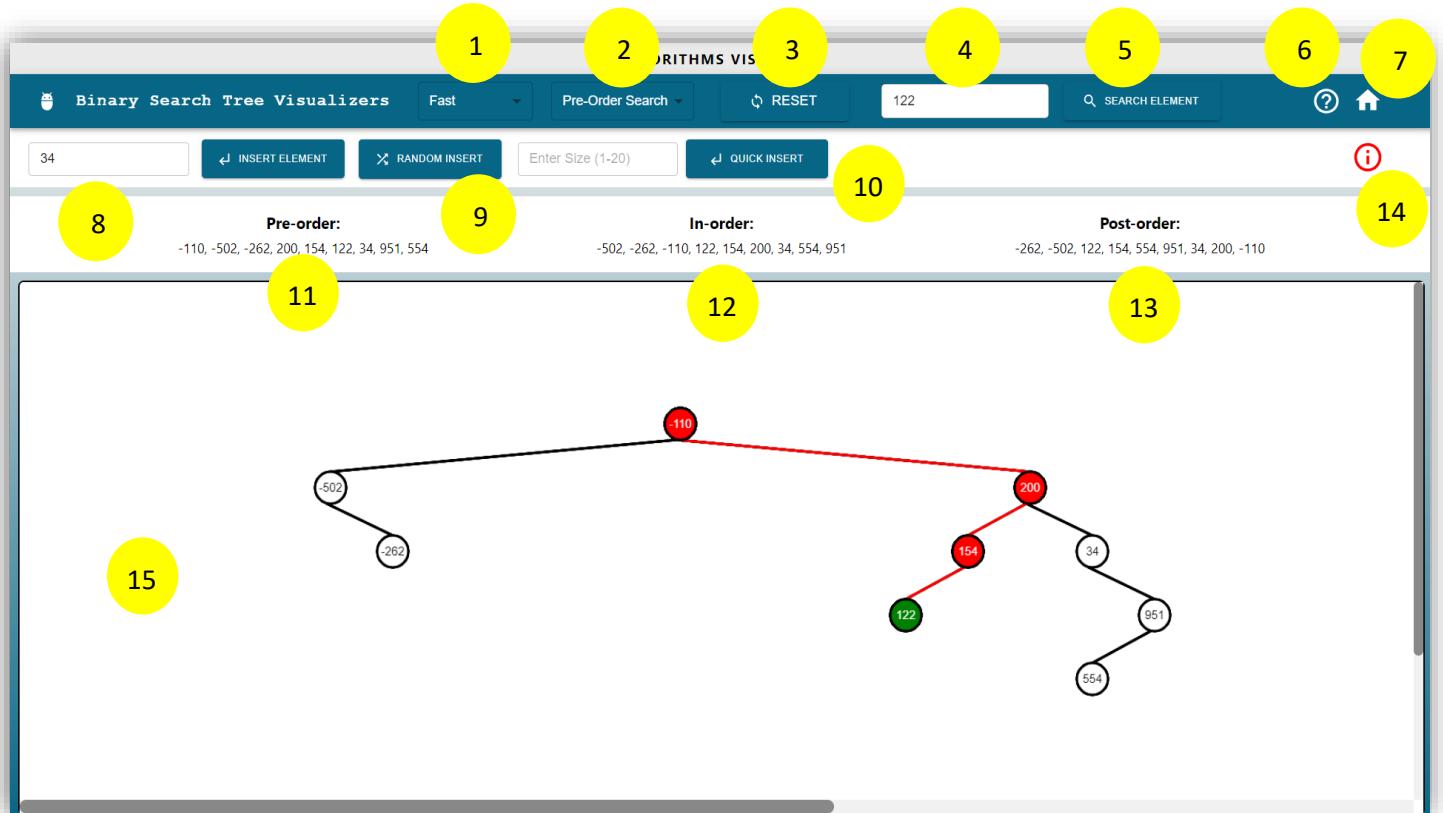
- **Binary Search Tree Visualizer**

Welcome to the Binary Search Tree (BST) Algorithms Visualizer in E-Algo Vis, a powerful tool designed to help you understand the structure and operations of binary search trees. Binary search trees are fundamental data structures used in computer science and offer efficient searching and sorting capabilities. With this visualizer, you can interactively explore and manipulate binary search trees to deepen your understanding.

Key Features:

- 1) **Insertion of Elements:** You can insert elements into the binary search tree. The visualizer animates the insertion process, ensuring you can see how elements are added in BST order. You have multiple options for insertion:
 - Manual Insertion: Add any number to the BST, one at a time.
 - Random Insert: Insert a random number between -1000 and +1000.
 - Bulk Insert: Insert a specified number of nodes (1-20) at once in BST order.
- 2) **Speed Control:** Adjust the animation speed to your preference, from slower to faster, to observe the BST operations at a comfortable pace.
- 3) **Order of Search:** Select the order in which the search operation will be performed, whether it's pre-order, in-order, or post-order.
- 4) **Search Function:** Enter an element (number) that exists in the BST into the search input box. Click 'Search,' and the visualizer will animate the search process within the BST.
- 5) **Board Adjustment:** You can customize the board/canvas to suit your needs by using the mouse wheel to adjust the tree's display or utilizing the scroll bars provided on the board.
- 6) **Reset:** At any point, you can reset the visualizer to its initial state, allowing you to start a new exploration or experiment.

The Binary Search Tree Algorithms Visualizer offers a dynamic and informative way to interact with binary search trees, making it an excellent resource for learning, teaching, or experimenting with BST operations and visualizations.

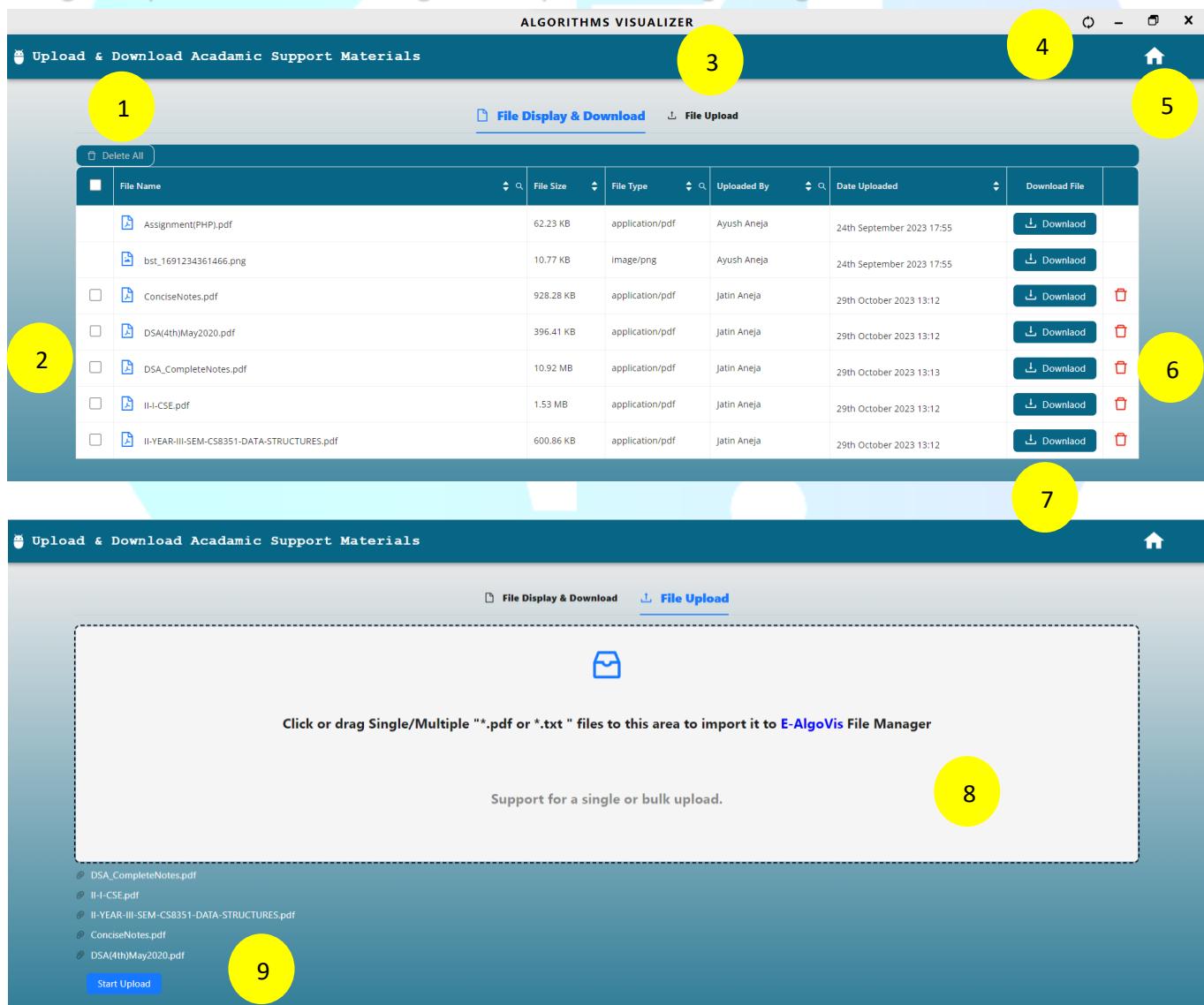


- 1 : Select speed of the visualizer -> Fastest, Fast, Medium and Slow.
- 2 : Select the order of search you want to do on your binary search tree.
- 3 : Select to Reset the entire visualizer.
- 4 : Input any node number that exists in your binary search tree to visualizer search.
- 5 : Click to begin search. The visualizer searches for the element entered in the search input. If it finds the element on your binary search tree it will present it as green else the node will be present as red node. Also search nodes are presented in red color.
- 6 : Select to open the Instructions page.
- 7 : Select to return to 'Home' page.
- 8 : Insert a node in binary search tree manually. Enter any number in input box and click in insert button next to it to add node in BST.
- 9 : Insert a random node in binary search tree. Click on the insert random number button which will insert a random node on your BST. The entered node is in the rand -1000 to 1000.
- 10 : Quick Insert your elements. You can quickly insert a limit number of elements in your binary search tree without doing it manually. The Visualizer will animate and insert all the elements in the BST canvas.

- 11 : You can visualize how the elements are entered in Pre-Order format on a BST.
- 12: You can visualize how the elements are entered in In-Order format on a BST.
- 13 : You can visualize how the elements are entered in Post-Order format on a BST.
- 14: Important Information : When you insert node in the BST, the tree sometimes disappears as it take time to adjust on given space. You can quickly view the tree by adjusting the canvas using mouse wheel. With mouse wheel you can zoom in or zoom out on canvas and view the tree adjusted
- 15 : Board. You can adjust the board using mouse wheel or scroll bars provided.

4. Files Management

E-Algo Vis provides a file management system for organizing educational materials.



The screenshot shows the E-Algo Vis File Management system with two main sections:

File Display & Download (Top Section):

- 1:** Logo and 'Upload & Download Academic Support Materials' text.
- 2:** 'Delete All' button.
- 3:** Table header with columns: File Name, File Size, File Type, Uploaded By, Date Uploaded, and Download File.
- 4:** Home icon.
- 5:** 'File Display & Download' tab.
- 6:** Download and delete icons for each file row.
- 7:** 'File Display & Download' tab.

File Upload (Bottom Section):

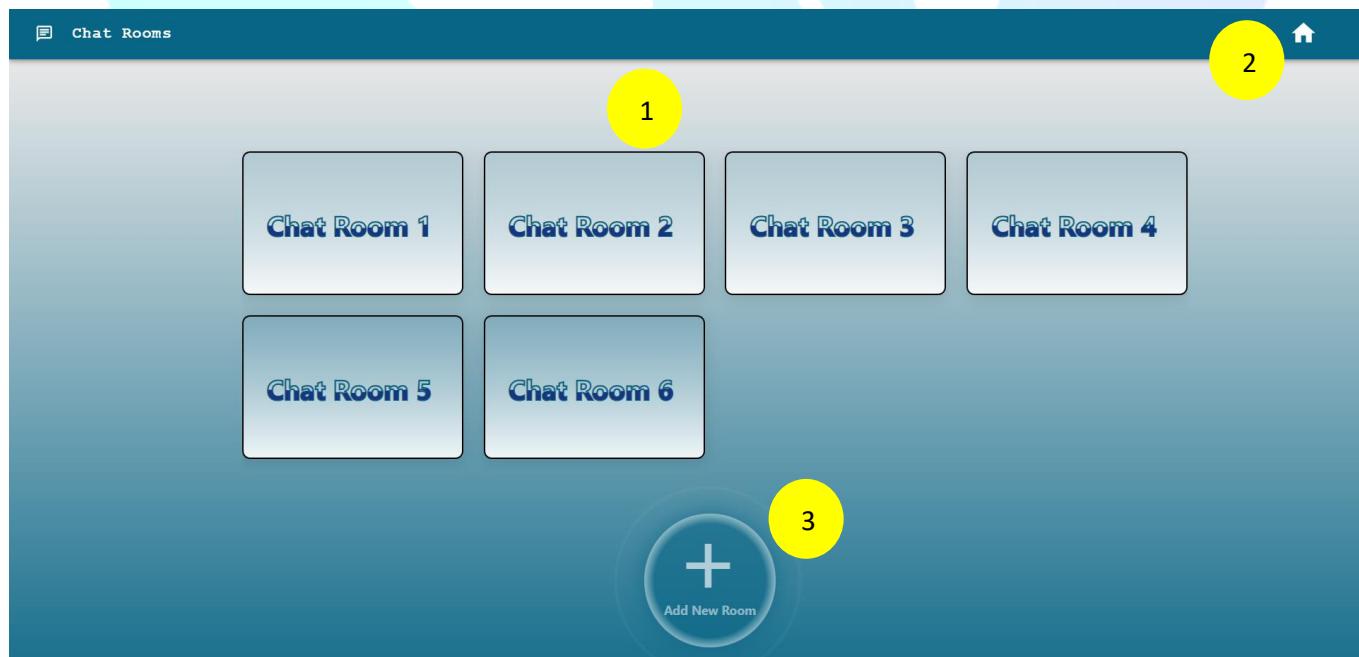
- 8:** 'File Upload' tab.
- 9:** 'File Upload' area with a dashed border and a blue folder icon.
- Text in the upload area:** 'Click or drag Single/Multiple *.pdf or *.txt files to this area to import it to E-AlgoVis File Manager'.
- Text below the upload area:** 'Support for a single or bulk upload.'
- File list:** DSA_CompleteNotes.pdf, II-I-CSE.pdf, II-YEAR-III-SEM-CS8351-DATA-STRUCTURES.pdf, ConciseNotes.pdf, DSA(4th)May2020.pdf.
- Buttons at the bottom:** 'Start Upload'.

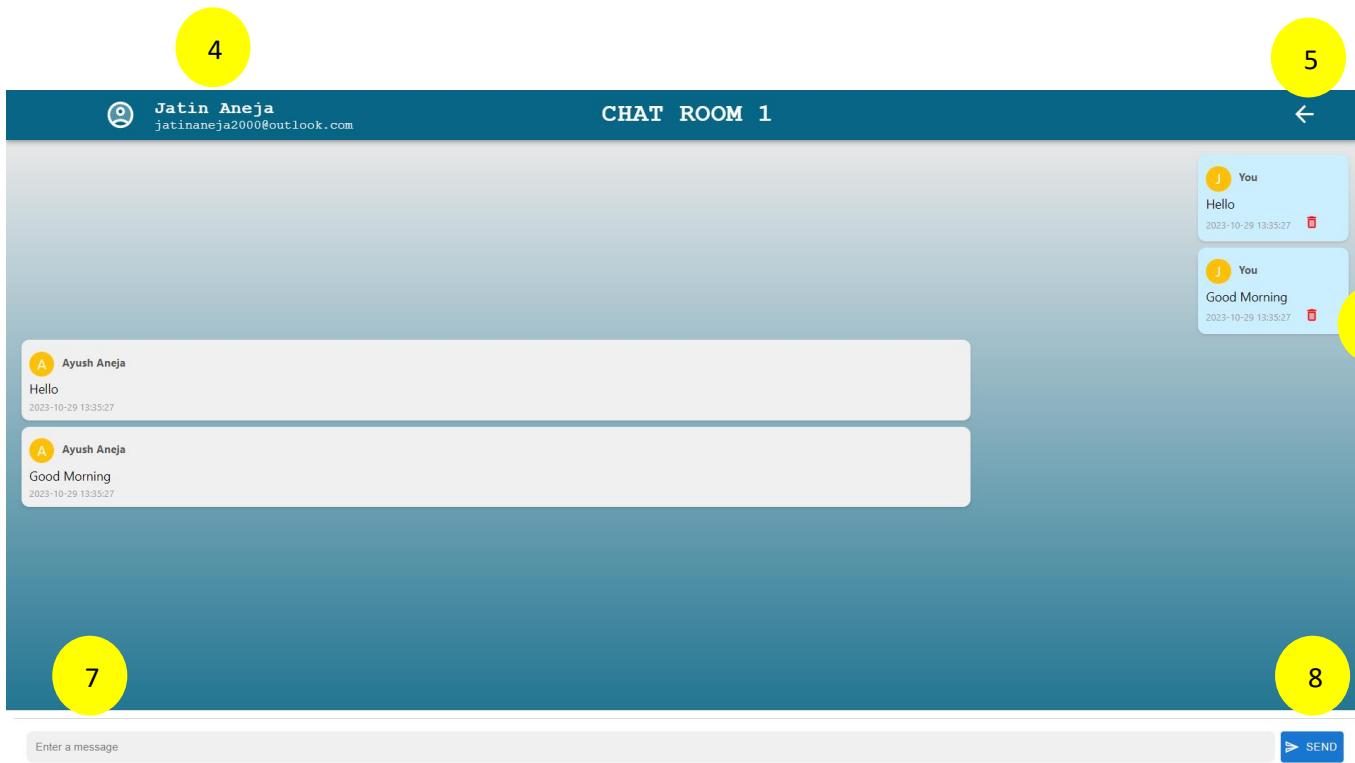
- 1 : Multi Delete Files : You can remove a collection of files from the files system. You can select the files to delete and the 'DeleteAll' button gets enabled.
- 2 : Use Check box to select files.
- 3 : You can toggle to File uploads page where you can upload new files. It could be a text, Zip, PNG, JPEG, PDF or Word File.
- 4 : You can refresh the application from this reload icon.
- 5 : Select to return to 'Home' page.
- 6 : Delete single file: You can remove file from the table. You can only remove the file that you have uploaded to the system and no other user can delete it.
- 7 : Download a file : You can download any file uploaded to the system.
- 8 : Upload space: Where you can upload a single file or a collection of files. Click on the upload space to open files explorer or directly drag the files from your device to the upload space.
- 9 : Select to begin uploading the files.

This area of the application helps in managing documents and images which can be downloaded by other users as well.

5. Group Chat and Collaborations

E-Algo Vis includes a group chat feature for collaboration and discussion.





1 : Flexible chat room : You can navigate to any available chat room by just clicking on ChatRoom buttons.

2 : Select to return to 'Home' page.

3 : Add new rooms : You can also start new rooms.

4 : You can see your details (Name and Email) on a navbar present inside the chat room area.

5 : You can navigate back to chat room home where you can move to other rooms.

6 : You can delete your message .

7 : A text space which you can use to type your message.

8 : Select to send your message in the group chat .

Add New Room

Please enter the title of the new Room.

Chat Room + No.

PROCEED CANCEL

This area of the application help you to collaborate with other users . You can go in any available group chat and message other users . You can also create your own group chat and use it other users.

6. Code Base

Explore a rich code base with algorithm explanations and examples in multiple programming languages.

The screenshot shows a web application for exploring algorithms. The top navigation bar has buttons numbered 1 through 12. Below the bar are tabs for 'PATHFINDING ALGORITHMS', 'SORTING ALGORITHMS', 'BINARY SEARCH TREE ALGORITHMS', and 'PRIME NUMBERS SEARCH ALGORITHMS'. The 'PATHFINDING ALGORITHMS' tab is selected. The sidebar on the left lists various algorithms: A* Search, Dijkstra, Greedy Best First Search, Breath First Search, Depth First Search, Bidirectional Breath First Search, Swarm, and Convergent Swarm. The main content area is titled 'A* Search' and contains a brief description of the algorithm. Below the description is a horizontal bar with numbered buttons 6 through 11, each corresponding to a different aspect of the algorithm: 'ALGORITHM EXPLANATION', 'PSEUDO CODE', 'PYTHON', 'JAVASCRIPT', 'JAVA', and 'C#'. The 'ALGORITHM EXPLANATION' button is highlighted. The central text area provides a step-by-step explanation of the A* algorithm, starting with initialization and moving through the main loop.

- 1 : Select to explore all available Pathfinding algorithms.
- 2 : Select to explore all available Sorting algorithms.
- 3 : Select to explore all available Binary Search Tree algorithms.
- 4 : Select to explore all available Prime Number Search algorithms.
- 5 : Select specific algorithm list to view the content related to the algorithm. By selecting specific algorithms, you can visualize algorithms explanation, pseudo code and code examples in computer languages like python, javascript, java and C#.
- 6 : Select to view selected algorithms explanation.
- 7 : Select to view selected algorithms pseudocode.
- 8 : Select to view selected algorithms example in Python programming language.
- 9: Select to view selected algorithms example in Javascript programming language.
- 10 : Select to view selected algorithms example in Java programming language.
- 11 : Select to view selected algorithms example in C# programming language.

7. Release Notes

- **Know Issues**

- 1) You cannot search for specific groups in group chat application.
- 2) You cannot make a group private yet.
- 3) After uploading files, the user have to reload the application to visualize all uploaded files in the table.
- 4) Pathfinding visualizer is bit slow while user tries to add walls on the grid.
- 5) In binary search tree visualizer, you might have to adjust the canvas to visualize the tree properly.

- **Upcoming Features**

- 1) New Visualizers: Exciting additions on the horizon include two fresh visualizers. One visualizer will delve into "Linked Lists," a pivotal component in computer science. The other will tackle the intricate "N-Queens" problem, allowing for in-depth exploration of various solutions and algorithms.
- 2) Private Chat: In order to facilitate more direct user-to-user communication, efforts are underway to implement a "Private Chat" feature. This feature will empower users with the ability to engage in one-on-one conversations, thereby enhancing collaborative knowledge sharing.
- 3) Multi-Media Support: In conjunction with the upcoming "Private Chat," users will have the capability to transmit both text and images to other users, enriching the depth and variety of interactions.
- 4) Group Chat Enhancement: Building upon the existing "Group Chat" feature, we aim to introduce enhancements that will provide users with an improved group communication experience, offering additional functionalities and a smoother interface.
- 5) Importing Existing Visualizers: In recognition of the importance of variety, we are actively developing a feature that will enable users to import external visualizers. This feature will significantly expand the range of algorithms and concepts available for exploration within our platform.

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