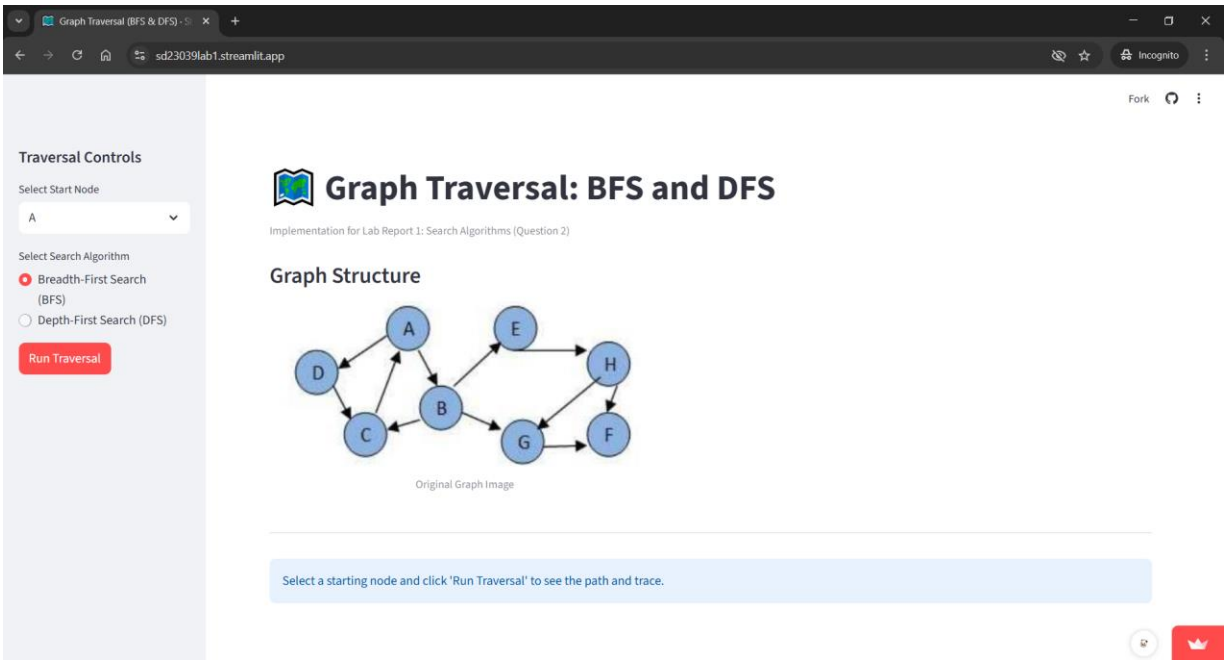
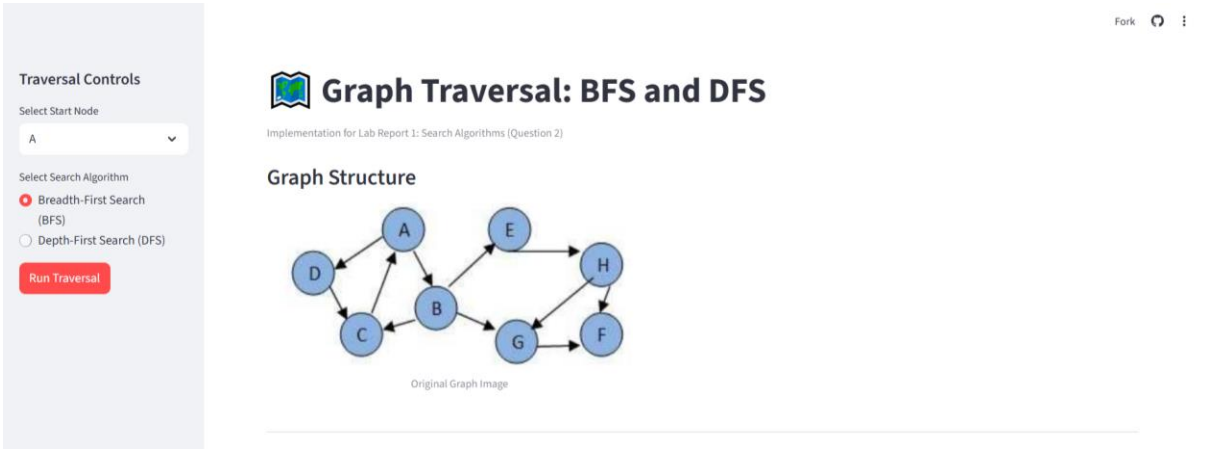
Instructions & Screenshots

1. Figure below shows a screenshot of the app immediately after it loads, which shows the title, the sidebar controls, the graph structure, and the initial information message: Select a starting node and click 'Run Traversal' to see the path and trace. So, you may select a starting node and choose a search algorithm between BFS or DFS. Then, click 'Run Traversal'.



2. The following figures show the successful execution of the BFS algorithm, where starting node is at A. You can explore the traversal path, process path, step-by-step frontier trace, and traversal visualization.



Fork

Traversal Controls

Select Start Node

A

Select Search Algorithm

- Breadth-First Search (BFS)
- Depth-First Search (DFS)

Run Traversal

Breadth-First Search (BFS) Results

Rule: Uses a **Queue** (FIFO - First-In, First-Out). **Tie-breaking:** Alphabetical.

Traversal Path (Expanded Order)

A → B → D → C → E → G → H → F

Process Path (Trace Table)

Step	Expanded Node	Process Path
1	A	A
2	B	A → B
3	D	A → B → D
4	C	A → B → D → C
5	E	A → B → D → C → E
6	G	A → B → D → C → E → G
7	H	A → B → D → C → E → G → H
8	F	A → B → D → C → E → G → H → F

Traversal Controls

Select Start Node

A

Select Search Algorithm

- Breadth-First Search (BFS)
- Depth-First Search (DFS)

Run Traversal

Step-by-Step Frontier Trace

Show detailed step-by-step trace

```
Step 1: Expanded Node: A
   Queue:
```

```
Step 2: Expanded Node: B
   Queue: D
```

```
Step 3: Expanded Node: D
   Queue: C, E, G
```

```
Step 4: Expanded Node: C
   Queue: E, G
```

```
Step 5: Expanded Node: E
   Queue: G
```

Traversal Controls

Select Start Node

A

Select Search Algorithm

- Breadth-First Search (BFS)
- Depth-First Search (DFS)

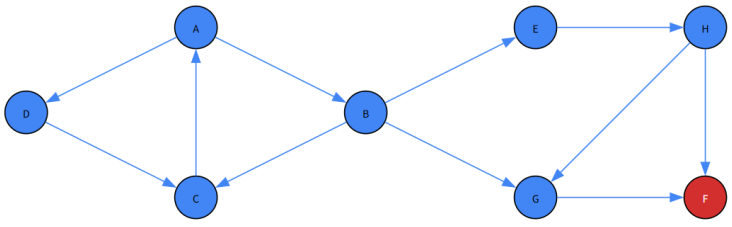
Run Traversal

```
Step 6: Expanded Node: G
   Queue: H
```

```
Step 7: Expanded Node: H
   Queue: F
```

```
Step 8: Expanded Node: F
   Queue:
```

Traversal Visualization



3. The following figures show the successful execution of the DFS algorithm, where starting node is at A. You can explore the traversal path, process path, step-by-step frontier trace, and traversal visualization.

Traversal Controls

Select Start Node

A

Select Search Algorithm

Breadth-First Search (BFS)

Depth-First Search (DFS)

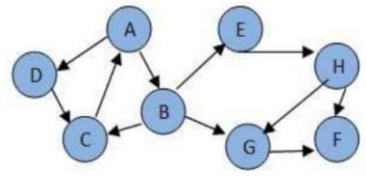
Run Traversal

Fork

Graph Traversal: BFS and DFS

Implementation for Lab Report 1: Search Algorithms (Question 2)

Graph Structure



Original Graph Image

Traversal Controls

Select Start Node

A

Select Search Algorithm

Breadth-First Search (BFS)

Depth-First Search (DFS)

Run Traversal

Depth-First Search (DFS) Results

Rule: Uses a **Stack** (LIFO - Last-In, First-Out). **Tie-breaking:** Alphabetical.

Traversal Path (Expanded Order)

A → B → C → E → H → F → G → D

Process Path (Trace Table)

Step	Expanded Node	Process Path
1	A	A
2	B	A → B
3	C	A → B → C
4	E	A → B → C → E
5	H	A → B → C → E → H
6	F	A → B → C → E → H → F
7	G	A → B → C → E → H → F → G
8	D	A → B → C → E → H → F → G → D

Traversal Controls

Select Start Node

A

Select Search Algorithm

Breadth-First Search (BFS)

Depth-First Search (DFS)

Run Traversal

Step-by-Step Frontier Trace

Show detailed step-by-step trace

```
Step 1: Expanded Node: A
   Stack (LIFO):
```

```
Step 2: Expanded Node: B
   Stack (LIFO): D
```

```
Step 3: Expanded Node: C
   Stack (LIFO): E, G, D
```

```
Step 4: Expanded Node: E
   Stack (LIFO): G, D
```

```
Step 5: Expanded Node: H
   Stack (LIFO): G, D
```

```
Step 6: Expanded Node: F
   Stack (LIFO): G, D
```

Traversal Controls

Select Start Node

A

Select Search Algorithm

- Breadth-First Search (BFS)
- Depth-First Search (DFS)

Run Traversal

```
Step 7: Expanded Node: G
   Stack (LIFO): D
```

```
Step 8: Expanded Node: D
   Stack (LIFO):
```

Traversal Visualization