



CSE 464: Software QA and Testing

Project Part #2

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Introduction:

Part 2 of the project was built using **IntelliJ** as the IDE, **Java 8** as the Java Development Kit, **Maven** for Dependency Manager, and the **graphviz-java** library shared by the professor. The **graphviz-java** was used to parse the **.dot** file into objects in java and vice versa. Custom classes such as Graph, Node, Edge, and Path were written to perform operations (such as adding or removing nodes or edges, searching source to destination path using DFS or BFS) on the given graph.

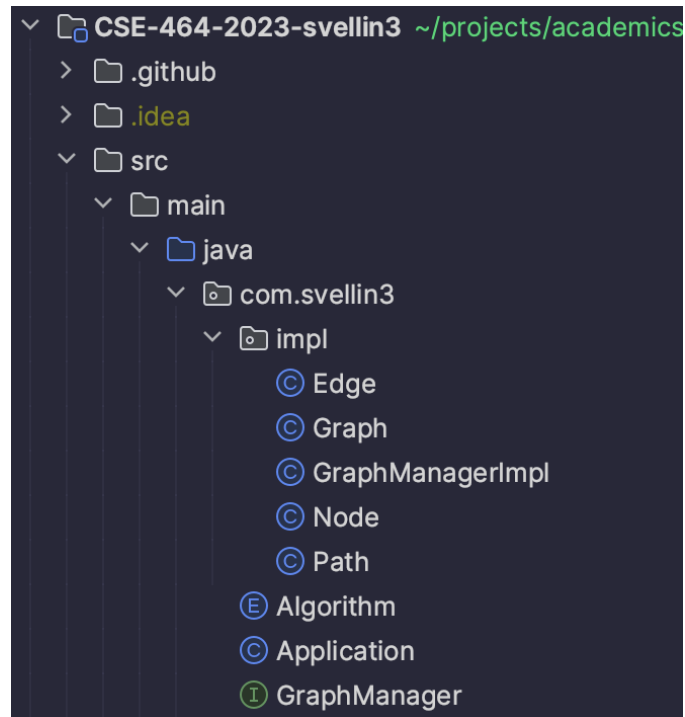
If there are any dependency issues, please resolve them using **mvn package** in the command line terminal or resolve them using maven in IntelliJ.

All the features required in part 1 and part 2 are added into an Interface named **"GraphManager.java"** which is in the folder: **src/main/java/com/svellin3**. The implementation of all these features is implemented in **"GraphManagerImpl.java"** which resides in the folder: **src/main/java/com/svellin3/impl**.

GitHub Link: <https://github.com/sabthagirivasanv/CSE-464-2023-svellin3.git>

How to run the application:

To run the application, run the main function that resides in the **Application.java** which can be located inside the folder: **src/main/java/com/svellin3**



The Command Line Terminal can be used to interact with the application. Initially, the application will ask for a **.dot** file to parse the graph. I have added my input file: **testInput.dot** to the project folder.

```
please enter the dot file to parse the graph:  
testInput.dot
```

Once the dot file was parsed, the application will display a list of options to perform on the parsed graph. The screenshot of the options is attached below.

```
please enter the dot file to parse the graph:
testInput.dot

press the below options to perform actions:
1. print the graph
2. output to file
3. add a new node
4. add a list of new nodes
5. remove a node
6. remove a list of nodes
7. add an edge
8. remove an edge
9. output as DOT graph
10. output into graphics
11. search nodes by BFS
12. search nodes by DFS
13. exit
```

You can manipulate the graph using the options developed in Phase-1.

Option 11: Search the path from source to destination using BFS

Now, enter the source node and destination node between which you want to find the path using BFS. Our algorithm will return the optimum path using the BFS algorithm. If no such path exists, it will return null.

```
11
Please enter the source node:
a
Please enter the destination node:
g
The path is :
a -> b -> c -> d -> e -> f -> g
```

Option 12: Search the path from source to destination using DFS

Now, enter the source node and destination node between which you want to find the path using DFS. Our algorithm will return the optimum path using the DFS algorithm. If no such path exists, it will return null.

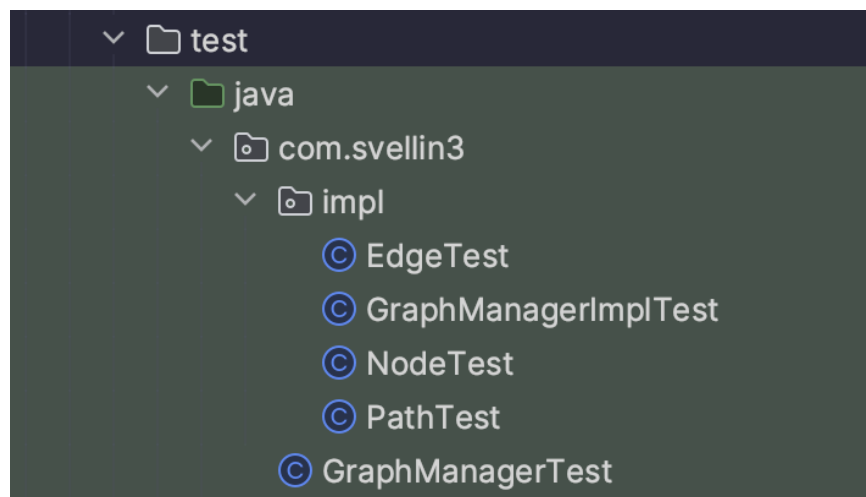
```
12
Please enter the source node:
d
Please enter the destination node:
g
The path is :
d -> e -> f -> g
```

How to run the Test:

All the features required in part-1 and part-2 are added into an Interface named **"GraphManager.java"** which is in the folder: **src/main/java/com/svellin3**. The implementation of all these features is implemented in **"GraphManagerImpl.java"** which resides in the folder: **src/main/java/com/svellin3/impl**.

The unit test cases were written for all the features implemented in part-1 and part-2. The test class is added inside the folder **"src/test/java/com/svellin3"**. All the required features for part-1 and part-2 are exclusively tested in the java file named **"GraphManagerTest.java"** which is located in the folder **"src/test/java/com/svellin3"**. All other internal functions which are essential in achieving the required functionalities are tested in separate classes which reside inside **src/test/java/com/svellin3/impl**.

The test cases can be run using **IntelliJ** or **mvn test**. I am hereby attaching the folder structure for reference.



GitHub Commits:

I created two new branches: **bfs** and **dfs** to develop graph search using BFS and DFS respectively. I am hereby attaching all my commits in those branches and the **main** branch.

bfs branch commit link:

<https://github.com/sabthagirivasanv/CSE-464-2023-svellin3/commits/bfs>

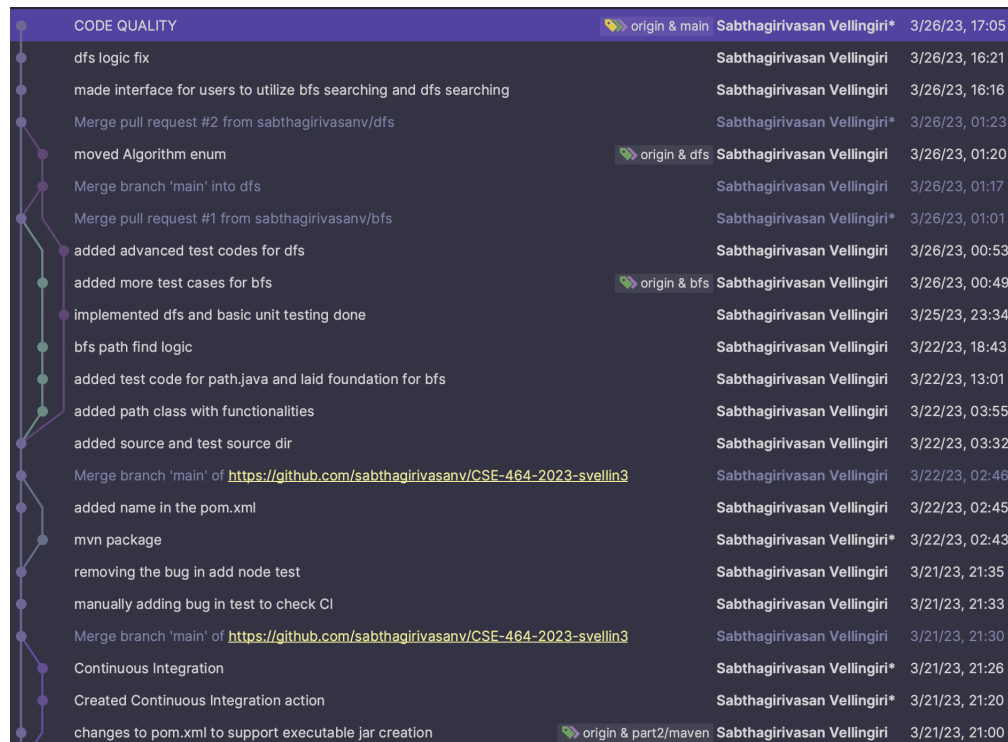
dfs branch commit link:

<https://github.com/sabthagirivasanv/CSE-464-2023-svellin3/commits/dfs>

main branch commit link:

<https://github.com/sabthagirivasanv/CSE-464-2023-svellin3/commits/main>

Git Commit Logs:



CODE QUALITY	origin & main	Sabthagirivasan Vellingiri*	3/26/23, 17:05
dfs logic fix		Sabthagirivasan Vellingiri	3/26/23, 16:21
made interface for users to utilize bfs searching and dfs searching		Sabthagirivasan Vellingiri	3/26/23, 16:16
Merge pull request #2 from sabthagirivasanv/dfs		Sabthagirivasan Vellingiri*	3/26/23, 01:23
moved Algorithm enum	origin & dfs	Sabthagirivasan Vellingiri	3/26/23, 01:20
Merge branch 'main' into dfs		Sabthagirivasan Vellingiri	3/26/23, 01:17
Merge pull request #1 from sabthagirivasanv/bfs		Sabthagirivasan Vellingiri*	3/26/23, 01:01
added advanced test codes for dfs		Sabthagirivasan Vellingiri	3/26/23, 00:53
added more test cases for bfs	origin & bfs	Sabthagirivasan Vellingiri	3/26/23, 00:49
Implemented dfs and basic unit testing done		Sabthagirivasan Vellingiri	3/25/23, 23:34
bfs path find logic		Sabthagirivasan Vellingiri	3/22/23, 18:43
added test code for path.java and laid foundation for bfs		Sabthagirivasan Vellingiri	3/22/23, 13:01
added path class with functionalities		Sabthagirivasan Vellingiri	3/22/23, 03:55
added source and test source dir		Sabthagirivasan Vellingiri	3/22/23, 03:32
Merge branch 'main' of https://github.com/sabthagirivasanv/CSE-464-2023-svellin3		Sabthagirivasan Vellingiri	3/22/23, 02:46
added name in the pom.xml		Sabthagirivasan Vellingiri	3/22/23, 02:45
mvn package		Sabthagirivasan Vellingiri*	3/22/23, 02:43
removing the bug in add node test		Sabthagirivasan Vellingiri	3/21/23, 21:35
manually adding bug in test to check CI		Sabthagirivasan Vellingiri	3/21/23, 21:33
Merge branch 'main' of https://github.com/sabthagirivasanv/CSE-464-2023-svellin3		Sabthagirivasan Vellingiri	3/21/23, 21:30
Continuous Integration		Sabthagirivasan Vellingiri*	3/21/23, 21:26
Created Continuous Integration action		Sabthagirivasan Vellingiri*	3/21/23, 21:20
changes to pom.xml to support executable jar creation	origin & part2/maven	Sabthagirivasan Vellingiri	3/21/23, 21:00

<https://github.com/sabthagirivasanv/CSE-464-2023-svellin3/actions/workflows/maven.yml>

<input type="checkbox"/>	0 Open	<input checked="" type="checkbox"/> 2 Closed	Author ▾	Label ▾	Projects ▾	Milestones ▾	Reviews ▾	Assignee ▾	Sort ▾
<input type="checkbox"/>	Dfs ✓	#2 by sabthagirivasanv was merged 3 days ago							
<input type="checkbox"/>	Bfs ✓	#1 by sabthagirivasanv was merged 3 days ago							

Pull Request of BFS branch:

Pull request link: <https://github.com/sabthagirivasanv/CSE-464-2023-svellin3/pull/1>

This screenshot shows a GitHub Pull Request interface for the 'bfs' branch. At the top, a purple 'Merged' badge is displayed. Below it, a summary line states 'sabthagirivasanv merged 4 commits into main from bfs 3 days ago'. A navigation bar includes tabs for 'Conversation' (0), 'Commits' (4), 'Checks' (1), and 'Files changed' (6). A comment from 'sabthagirivasanv' from last week explains that the branch contains logic for computing the path from source to destination using BFS and includes tests to validate the logic. Below the comment, a commit history is shown with four entries: 'added path class with functionalities' (dd2d13b), 'added test code for path.java and laid foundation for bfs' (2d3fb38), 'bfs path find logic' (9511275), and 'added more test cases for bfs' (12c9218). A status bar at the bottom indicates '1 check passed' and provides buttons for 'View details' and 'Revert'. A final message at the bottom states 'Pull request successfully merged and closed' and suggests that the 'bfs' branch can be safely deleted, with a 'Delete branch' button.

Pull Request of DFS branch:

Pull request link: <https://github.com/sabthagirivasanv/CSE-464-2023-svellin3/pull/2>

This screenshot shows a GitHub Pull Request interface for the 'dfs' branch. A purple 'Merged' badge is at the top, followed by the summary 'sabthagirivasanv merged 4 commits into main from dfs 3 days ago'. The navigation bar shows 'Conversation' (0), 'Commits' (4), 'Checks' (1), and 'Files changed' (6). A comment from 'sabthagirivasanv' from 3 days ago states that the branch contains code for DFS searching a destination node from a source node, along with unit testing code in the 'GraphManagerTest' class. The commit history lists four commits: 'implemented dfs and basic unit testing done' (f28dee8), 'added advanced test codes for dfs' (9bdd2a), 'Merge branch 'main' into dfs' (b46f035), and 'moved Algorithm enum' (5ede444). The status bar at the bottom shows '1 check passed' and includes 'View details' and 'Revert' buttons.