

Project 2

Sunanda Tummala

Part 1: I have written three API removeNode(String label) , removeNodes (String [] label) and removeEdge(String srcLabel, String dstLabel).

```
commit 9871087af2fffcaa833f7ee7e68fa09f1d7e2f6f (HEAD -> main, origin/main, origin/HEAD)
Author: sunanda2004 <stumma10@asu.edu>
Date:   Fri Mar 14 15:59:19 2025 -0700

    Completed the 3 new API: removeNode, removeNodes and removeEdge

commit c972c51280cf83786da708261ae6235ac9c21b7
Author: sunanda2004 <stumma10@asu.edu>
Date:   Mon Mar 3 20:09:07 2025 -0700

    Updated the README.pdf file with screenshot

commit 3251d38f68ac23c26fce462dbb4b50efbc8e4104
Author: sunanda2004 <stumma10@asu.edu>
Date:   Mon Mar 3 19:45:16 2025 -0700

    Removed README.txt from outside Project1 directory

commit aa4ed20c91d1922646ac1c076e69e6db0a57098d
Author: sunanda2004 <stumma10@asu.edu>
Date:   Mon Mar 3 19:44:02 2025 -0700

    Feature 4: added the Unit test for outputDotGraph

commit 89f085322713687017217c27a79add37ca9ac096
Author: sunanda2004 <stumma10@asu.edu>
Date:   Mon Mar 3 18:53:38 2025 -0700

    Feature 3: addEdge completed with Unit test written

commit 788d2fa9d54667f2eb841808a9f92e17a4d3d733
Author: sunanda2004 <stumma10@asu.edu>
Date:   Mon Mar 3 18:38:24 2025 -0700

    Feature 2: Completed and unit test is also written for it
:|
```

Figure 1: Git status log after committing three Graph API

```

s/t/j/MyGraphTest.java+ buffers
105    }
106
107    @Test
108 +--- 10 lines: public void testRemoveNodePositiveCase() throws IOException {-----
118
119    @Test
120 +--- 11 lines: public void testRemoveNodeNegativeCase() throws IOException {-----
131
132    @Test
133 +--- 10 lines: public void testRemoveNodesPositiveCase() throws IOException {-----
143
144    @Test
145 +--- 9 lines: public void testRemoveNodesNegativeCase() throws IOException {-----
154
155    @Test
156 +--- 10 lines: public void testRemoveEdgePositiveCase() throws IOException {-----
166
167    @Test
168 +--- 10 lines: public void testRemoveEdgeNegativeCase() throws IOException {-----
178

```

Figure 2: Test Cases written to test 3 Graph API

```

↳ Project1 git:(main) ✘ mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< asu-cse-464:CSE-464-Project1 >-----
[INFO] Building CSE-464-Project1 1.0-SNAPSHOT
[INFO]   from pom.xml
[INFO] ----- [ jar ]-----
[INFO]
[INFO] --- resources:3.3.0:resources (default-resources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/
src/main/resources
[INFO]
[INFO] --- compiler:3.10.1:compile (default-compile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/cl
asses
[INFO]
[INFO] --- resources:3.3.0:testResources (default-testResources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/
src/test/resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/te
st-classes
[INFO]
[INFO] --- surefire:2.22.2:test (default-test) @ CSE-464-Project1 ---
[INFO]
[INFO] ----- T E S T S -----
[INFO]
[INFO] Running MyGraphTest
Edge from c -> b doesn't exist in Graph
Label i doesn't exist in Graph
[INFO] Tests run: 14, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.155 s - in MyGraphTest
[INFO] Results:
[INFO]
[INFO] Tests run: 14, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- jar:3.3.0:jar (default-jar) @ CSE-464-Project1 ---
[INFO] Building jar: /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/CSE-464-Project
1-1.0-SNAPSHOT.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] ----- Total time: 2.289 s
[INFO] Finished at: 2025-03-17T11:37:43-07:00
[INFO]
[INFO] -----
↳ Project1 git:(main) ✘

```

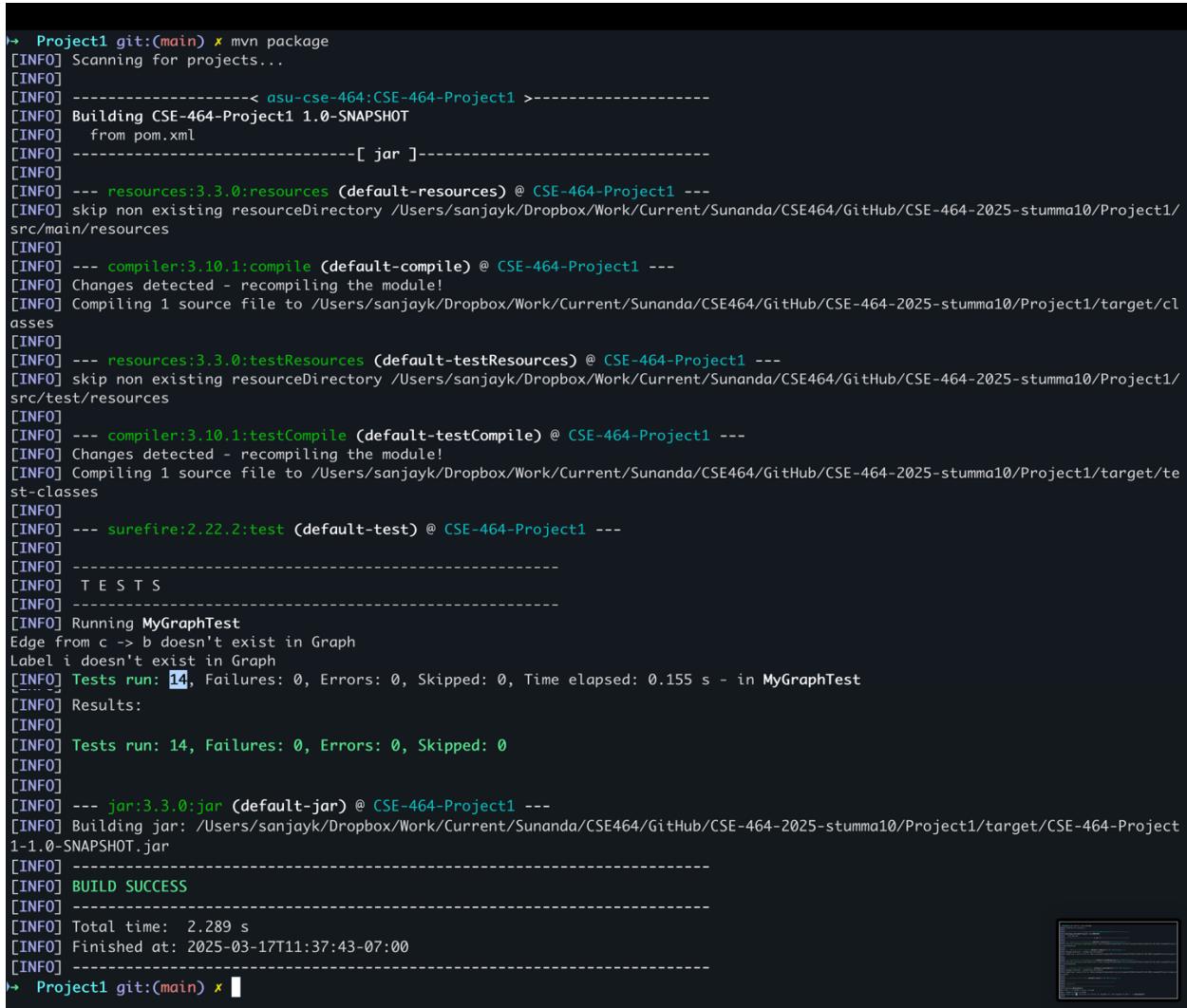


Figure 3: mvn package for main Branch

Part 2: I have written code for iterative Breadth for Search (BFS) Path GraphSearch(String srcLabel, String dstLabel). It will return the Path if found both the vertex in the graph, else return null.

```
commit 65cc77a493c25da2677b1d7b97d6e1d1098ee020 (HEAD -> bfs, origin/bfs)
Author: sunanda2004 <stumma10@asu.edu>
Date:   Sun Mar 16 15:15:06 2025 -0700

    Updated bfs branch for understanding of exploring node

commit 2d2d46c9a2f4b2dd24160df91d6e786835b82e4d
Author: sunanda2004 <stumma10@asu.edu>
Date:   Sun Mar 16 12:19:58 2025 -0700

    Breadth for search for Graph and wrote two test Cases

commit 9871087af2ffffcaa833f7ee7e68fa09f1d7e2f6f (origin/main, origin/HEAD, main)
Author: sunanda2004 <stumma10@asu.edu>
Date:   Fri Mar 14 15:59:19 2025 -0700

    Completed the 3 new API: removeNode, removeNodes and removeEdge
```

Figure 4: Git status log after committing GraphSearch for BFS

```
s/t/j/MyGraphTest.java+
178
179     @Test
180 --- 11 lines: public void testGraphSearchPositiveCase() throws IOException {-----
191
192     @Test
193 ---  9 lines: public void testGraphSearchNegativeCase() throws IOException {-----
202
203 }
```

Figure 5: 2 test cases to test the positive and negative search in BFS

```

↳ Project1 git:(bfs) ✘ mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< asu-cse-464:CSE-464-Project1 >-----
[INFO] Building CSE-464-Project1 1.0-SNAPSHOT
[INFO]   from pom.xml
[INFO]           [ jar ]-----
[INFO]
[INFO] --- resources:3.3.0:resources (default-resources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/
src/main/resources
[INFO]
[INFO] --- compiler:3.10.1:compile (default-compile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 2 source files to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/c
lasses
[INFO]
[INFO] --- resources:3.3.0:testResources (default-testResources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/
src/test/resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/te
st-classes
[INFO]
[INFO] --- surefire:2.22.2:test (default-test) @ CSE-464-Project1 ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running MyGraphTest
Edge from c -> b doesn't exist in Graph
Label i doesn't exist in Graph
[INFO] Tests run: 16, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.215 s - in MyGraphTest
[INFO]
[INFO] --- jar:3.3.0:jar (default-jar) @ CSE-464-Project1 ---
[INFO] Building jar: /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/CSE-464-Project
1-1.0-SNAPSHOT.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 2.892 s
[INFO] Finished at: 2025-03-17T12:01:13-07:00
[INFO]
-----
```



Figure 6: mvn package for bfs Branch

Part 3: I have written code for iterative Depth for Search (DFS) Path GraphSearch(String srcLabel, String dstLabel). It will return the Path if found both the vertex in the graph, else return null.

```

commit 52ca90350ff7e651d59735d8fce4ec1f438d3d8b (HEAD -> dfs, origin/dfs)
Author: sunanda2004 <stumma10@asu.edu>
Date: Sun Mar 16 15:13:03 2025 -0700

Depth first search completed with test case for positive and negative case

commit 9871087af2ffffcaa833f7ee7e68fa09f1d7e2f6f (origin/main, origin/HEAD, main)
Author: sunanda2004 <stumma10@asu.edu>
Date: Fri Mar 14 15:59:19 2025 -0700

Completed the 3 new API: removeNode, removeNodes and removeEdge
```

Figure 7: DFS branch commit for GraphSearch Function

```
+ 182
183     @Test
184     --- 12 lines: public void testGraphSearchPositiveCase() throws IOException {-----
196
197     @Test
198     --- 9 lines: public void testGraphSearchNegativeCase() throws IOException {-----
207
+ 208
```

Figure 8: 2 test cases are written for DFS

```
↳ Project1 git:(dfs) ✘ mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< asu-cse-464:CSE-464-Project1 >-----
[INFO] Building CSE-464-Project1 1.0-SNAPSHOT
[INFO]   from pom.xml
[INFO] ----- [ jar ] -----
[INFO]
[INFO] --- resources:3.3.0:resources (default-resources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/src/main/resources
[INFO]
[INFO] --- compiler:3.10.1:compile (default-compile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 2 source files to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/classes
[INFO]
[INFO] --- resources:3.3.0:testResources (default-testResources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/src/test/resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/test-classes
[INFO]
[INFO] --- surefire:2.22.2:test (default-test) @ CSE-464-Project1 ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running MyGraphTest
Path: a->e->g->h
Edge from c -> b doesn't exist in Graph
Label i doesn't exist in Graph
[INFO] Tests run: 16, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.134 s - in MyGraphTest
```

```
↳ Project1 git:(dfs) ✘ mvn package
[INFO] Results:
[INFO]
[INFO] Tests run: 16, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] --- jar:3.3.0:jar (default-jar) @ CSE-464-Project1 ---
[INFO] Building jar: /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/CSE-464-Project1-1.0-SNAPSHOT.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 1.967 s
[INFO] Finished at: 2025-03-17T12:36:27-07:00
[INFO] -----
```



Figure 9: mvn package for DFS

Part 4: I have merged the bfs branch to main branch. Then I have tried to merge the dfs branch with main branch, which gave me merge conflict. I have resolved it by the suggestion of using the algorithm name as third argument to the GraphSearch function. I have updated it and tested it as well.

```

commit f61f297821e0800f781ae35e4ca15d08d31d8af4 (HEAD -> main, origin/main, origin/HEAD)
Merge: 65cc77a 52ca903
Author: sunanda2004 <stumma10@asu.edu>
Date: Mon Mar 17 15:15:48 2025 -0700

    Resolved the DFS conflict and tested it

commit 65cc77a493c25da2677b1d7b97d6e1d1098ee020 (origin/bfs, bfs)
Author: sunanda2004 <stumma10@asu.edu>
Date: Sun Mar 16 15:15:06 2025 -0700

    Updated bfs branch for understanding of exploring node

commit 52ca90350ff7e651d59735d8fce4ec1f438d3d8b (origin/dfs, dfs)
Author: sunanda2004 <stumma10@asu.edu>
Date: Sun Mar 16 15:13:03 2025 -0700

    Depth first search completed with test case for positive and negative case

commit 2d2d46c9a2f4b2dd24160df91d6e786835b82e4d
Author: sunanda2004 <stumma10@asu.edu>
Date: Sun Mar 16 12:19:58 2025 -0700

    Breadth for search for Graph and wrote two test Cases

commit 9871087af2fffcaa833f7ee7e68fa09f1d7e2f6f
Author: sunanda2004 <stumma10@asu.edu>
Date: Fri Mar 14 15:59:19 2025 -0700

    Completed the 3 new API: removeNode, removeNodes and removeEdge

```

Figure 10: Git log for main branch after merge of dfs and bfs

```

s/t/j/MyGraphTest.java+
178
179     @Test
180 --- 11 lines: public void testGraphSearchBFSPositiveCase() throws IOException {-----
191
192     @Test
193 --- 9 lines: public void testGraphSearchBFSNegativeCase() throws IOException {-----
202
203     @Test
204 --- 11 lines: public void testGraphSearchDFSPositiveCase() throws IOException {-----
215
216     @Test
217 --- 9 lines: public void testGraphSearchDFSNegativeCase() throws IOException {-----
226 }
~
```

Figure 11: Each test cases for bfs and dfs is renamed

```
↳ Project1 git:(main) ✘ mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< asu-cse-464:CSE-464-Project1 >-----
[INFO] Building CSE-464-Project1 1.0-SNAPSHOT
[INFO]   from pom.xml
[INFO] ----- [ jar ]-----
[INFO]
[INFO] --- resources:3.3.0:resources (default-resources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/src/main/resources
[INFO]
[INFO] --- compiler:3.10.1:compile (default-compile) @ CSE-464-Project1 ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- resources:3.3.0:testResources (default-testResources) @ CSE-464-Project1 ---
[INFO] skip non existing resourceDirectory /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/src/test/resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ CSE-464-Project1 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /Users/sanjayk/Dropbox/Work/Current/Sunanda/CSE464/GitHub/CSE-464-2025-stumma10/Project1/target/test-classes
[INFO]
[INFO] --- surefire:2.22.2:test (default-test) @ CSE-464-Project1 ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running MyGraphTest
Edge from c -> b doesn't exist in Graph
Label i doesn't exist in Graph
[INFO] Tests run: 18, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.121 s - in MyGraphTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 18, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] -----
[INFO] --- jar:3.3.0:jar (default-jar) @ CSE-464-Project1 ---
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 1.899 s
[INFO] Finished at: 2025-03-17T15:17:58-07:00
[INFO] -----
```



Figure 12: Final mvn package screenshot after merge of dfs and bfs branch