

## CSE464-GraphProject-2

### Overview

This project implements a directed graph in Java with various functionalities such as adding/removing nodes and edges, parsing DOT files, outputting DOT and PNG representations, and conducting graph searches using BFS and DFS. Continuous Integration (CI) has been set up using GitHub Actions to ensure that code changes are automatically tested.

### Features

1. Add and Remove Nodes/Edges: APIs for adding/removing single or multiple nodes and edges.
2. Graph Search (BFS/DFS): Find paths between nodes using BFS or DFS.
3. Parse and Export DOT Format: Import graphs from DOT files and export them to DOT or PNG formats.
4. Continuous Integration (CI): Automatically runs tests upon code changes in GitHub.

### Setup and Installation

1. Clone the Repository:  

```
git clone <your-github-repository-url>  
cd CSE464-GraphProject
```
2. Compile the Code:  

```
mvn package
```
3. Run Tests:  

```
mvn test
```

### Usage Examples

1. Adding and Removing Nodes and Edges

```
java
```

```
Graph graph = new Graph();
graph.addNode("A");
graph.addNode("B");
graph.addEdge("A", "B");

System.out.println(graph.toString()); // Outputs: A -> B
graph.removeNode("A");
```

## 2. Graph Search (BFS and DFS)

```
java
Path pathBFS = graph.GraphSearch("A", "C", Graph.Algorithm.BFS);
System.out.println(pathBFS);

Path pathDFS = graph.GraphSearch("A", "C", Graph.Algorithm.DFS);
System.out.println(pathDFS);
```

## 3. Exporting Graph to DOT and PNG

```
java
graph.outputDOTGraph("outputGraph.dot");
graph.outputGraphics("outputGraph", "png");
```

## Continuous Integration

CI is enabled through GitHub Actions. The CI pipeline automatically compiles, tests, and verifies code changes.

The screenshot shows the GitHub Actions interface for the repository `hsbadri / CSE-464`. The left sidebar contains navigation links: `Code`, `Issues`, `Pull requests`, `Actions` (selected), `Projects`, `Wiki`, `Security`, `Insights`, and `Settings`. Under the `Actions` tab, there are links for `All workflows`, `New workflow`, `Java CI`, `Management`, `Caches`, `Attestations`, and `Runners`. The main area displays `All workflows` with a search bar and a table of workflow runs.

Workflow	Event	Status	Branch	Actor	Time
updated versions of code	push	Success	main	hsbadri	19 minutes ago
Updated GraphSearch method to use Algorithm enum for BFS and DFS sele...	push	Failure	main	hsbadri	11 minutes ago
add Bfs Graphsearch API to find path b/w nodes	push	Failure	main	hsbadri	40 minutes ago
project2 additions	push	Success	main	hsbadri	1 hour ago
Update ci.yml	push	Success	main	hsbadri	1 hour ago
add README.pdf	push	Success	main	hsbadri	1 hour ago
Add files via upload	push	Failure	main	hsbadri	1 hour ago
Create ci.yml	push	Failure	main	hsbadri	1 hour ago

```
C:\Users\Haindavi badri\Downloads\Project 1\Project 1>mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.example:CSE464-GraphProject >-----
[INFO] Building CSE464-GraphProject 1.0-SNAPSHOT
[INFO] from pom.xml
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ CSE464-GraphProject ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory C:\Users\Haindavi badri\Downloads\Project 1\Project 1\src\main\resources
[INFO]
[INFO] --- compiler:3.8.1:compile (default-compile) @ CSE464-GraphProject ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ CSE464-GraphProject ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory C:\Users\Haindavi badri\Downloads\Project 1\Project 1\src\test\resources
[INFO]
[INFO] --- compiler:3.8.1:testCompile (default-testCompile) @ CSE464-GraphProject ---
[INFO] Changes detected - recompiling the module!
[WARNING] File encoding has not been set, using platform encoding UTF-8, i.e. build is platform dependent!
[INFO] Compiling 2 source files to C:\Users\Haindavi badri\Downloads\Project 1\Project 1\target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ CSE464-GraphProject ---
[INFO] Using auto detected provider org.apache.maven.surefire.junitplatform.JUnitPlatformProvider
[INFO]
[INFO] -----
[INFO] T E S T S
```

```
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running GraphTest
[INFO] Tests run: 13, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.136 s -- in GraphTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 13, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- jar:3.4.1:jar (default-jar) @ CSE464-GraphProject ---
[INFO] Building jar: C:\Users\Haindavi badri\Downloads\Project 1\Project 1\target\CSE464-GraphProject-1.0-SNAPSHOT.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 5.460 s
[INFO] Finished at: 2024-11-07T14:02:55-07:00
[INFO] -----
```

```
C:\Users\Haindavi badri\Downloads\Project 1\Project 1>java -cp target/classes GraphDemo
Example 1: Adding and Removing Nodes and Edges
Graph after adding A -> B:
Nodes: [A, B]
Edges:
A -> B

Graph after removing node A:
Nodes: [B]
Edges:

Example 2: Graph Search (BFS and DFS)
BFS path from A to C: A -> B -> C
DFS path from A to C: A -> B -> C

Example 3: Exporting Graph to DOT and PNG
Graph exported as outputGraph.dot and outputGraph.png.
```

# Commits

main

All users

All time

Commits on Nov 7, 2024

<b>updated versions of code</b> hsbadri committed 22 minutes ago · ✓ 1 / 1	453c988		
<b>Updated GraphSearch method to use Algorithm enum for BFS and DFS selection</b> hsbadri committed 34 minutes ago · ✗ 0 / 1	7692534		
<b>Add dfs GraphSearch API to find path b/w nodes</b> hsbadri committed 45 minutes ago	7f39498		
<b>add Bfs Graphsearch API to find path b/w nodes</b> hsbadri committed 49 minutes ago · ✗ 0 / 1	c9d7fc8		
<b>project2 additions</b> hsbadri committed 1 hour ago · ✓ 1 / 1	39Fa83b		
<b>Update ci.yml</b> hsbadri authored 1 hour ago · ✓ 1 / 1	26e1189		
<b>add README.pdf</b> hsbadri committed 1 hour ago · ✓ 1 / 1	a634ac4		
<b>Initial commit: Add CSE464 Graph Project</b> hsbadri committed 1 hour ago	6f048c2		
<b>Add files via upload</b> hsbadri authored 1 hour ago · ✗ 0 / 1	2f3f6ff		
<b>Create ci.yml</b> hsbadri authored 1 hour ago · ✗ 0 / 1	22c5219		

Commits on Oct 16, 2024

<b>Initial commit</b> hsbadri authored 3 weeks ago	36aa1c6		
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