

bfs()

"Explores the edges of the graph that is reachable from the root"

```
{pre: Graph != null && root != null}
```



```
{post: String graph root distances}
```

getIndex()

"Returns an index of the Node graph"

```
{pre: Graph != null}
```



```
{post: int value}
```

dfs()

"Explores all the nodes of the graph in an order"

```
{pre: Graph != null && root != null}
```



```
{post: String graph time Stamp}
```



marshall()

"Recursive Search of the minimum road length between pair of vertices"

```
{pre: Graph != null}
```



```
{post: String array of distance between pair of vertices}
```

k	j
1	0 -1 -2 0
2	4 0 2 4
3	5 1 0 2
4	3 -1 1 0

CreateGraph()

"Creates an empty graph"

```
{pre: n/a}
```



```
{post: Graph}
```

*Not accurate Image

TAD GRAPH

$G = (V, A)$

[inv: Abstract data type Graph; V > 1 && A % 2]

+createGraph(): n/a --> Graph
+AddDirectedEdge(): Node, Node --> n/a
+addNotDirectedEdge(): Node, Node
+addVertex(): Node --> n/a
+deleteEdge(): Node, Node --> n/a
+deleteVertex(): Node --> n/a
+isEmpty(): Graph --> Boolean
+getIndex(): T value --> int
+bfs(): rootVertex Node --> n/a
+dfs(): Vertex --> n/a
+dijkstra(): Graph --> n/a
+marshall(): Graph --> n/a

addDirectedEdge()

"adds a directed relation between two nodes"

```
{pre: Graph != null}
```



```
{post: Directed edge}
```

dijkstra()

"Searchs the minimum road length in a graph"

```
{pre: Graph != null}
```



```
{post: String array of distance}
```

$a^{-2}, c^{-1}, b^{-5}, d^{-2}, e^{-3}, z$

addNotDirectedEdge()

"adds a notDirected relation between two nodes"

```
{pre: Graph != null}
```



```
{post: ND edge}
```

addVertex()

"adds a Vertex Node in the Graph"

```
{pre: Graph != null}
```



```
{post: Vertex Node}
```

deleteVertex()

"deletes a vertex node and its edges of the graph"

```
{pre: Graph != null}
```



```
{post: n/a}
```

isEmpty()

"Checks if a graph does not contain any Vertexs"

```
{pre: Graph != null}
```



```
{post: boolean}
```

deleteEdge()

"deletes an edge of the Graph"

```
{pre: Graph != null}
```



```
{post: n/a}
```