HamiltonianCycle.java

```
1   package GraphAlgorithmsTesting;
2
3   public class HamiltonianCycle {
4
5           private int V, pathCount;
6           private int[] cycle;
7           private int[][] graph;
8
9           public int[] findHamiltonianCycle(int[][] graph) {
10                  this.V = graph.length;
11 1                this.cycle = new int[this.V + 1];
12
13 2                for (int i = 0; i < this.cycle.length; i++) {
14                          this.cycle[i] = -1;
15                  }
16
17                  this.graph = graph;
18                  this.cycle[0] = 0;
19                  this.pathCount = 1;
20 1                if (!isPathFound(0)) {
21 2                        for (int i = 0; i < this.cycle.length; i++) {
22                                  this.cycle[i] = -1;
23                          }
24                  } else {
25 1                        this.cycle[this.cycle.length - 1] = this.cycle[0];
26                  }
27
28 1                return cycle;
29          }
30
31          public boolean isPathFound(int vertex) {
32 2                if (this.graph[vertex][0] == 1 && this.pathCount == this.V) {
33 1                        return true;
34                  }
35
36 1                if (this.pathCount == this.V) {
37 1                        return false;
38                  }
39
40 3                for (int v = 0; v < this.V; v++) {
41 1                        if (this.graph[vertex][v] == 1) {
42 1                                this.cycle[this.pathCount++] = v;
43
44                                  this.graph[vertex][v] = 0;
45                                  this.graph[v][vertex] = 0;
46
47 1                                if (!isPresent(v)) {
```

```
48 2                                        return isPathFound(v);
49                                      }
50
51                                      this.graph[vertex][v] = 1;
52                                      this.graph[v][vertex] = 1;
53
54 1                                    this.cycle[--this.pathCount] = -1;
55                                  }
56                          }
57 1                        return false;
58                  }
59
60                  public boolean isPresent(int vertex) {
61 4                        for (int i = 0; i < pathCount - 1; i++) {
62 1                                if (cycle[i] == vertex) {
63 1                                        return true;
64                                  }
65                          }
66 1                        return false;
67                  }
68  }
```

Mutations

11	1. Replaced integer addition with subtraction → KILLED
13	1. changed conditional boundary → KILLED 2. negated conditional → SURVIVED
20	1. negated conditional → KILLED
21	1. changed conditional boundary → KILLED 2. negated conditional → KILLED
25	1. Replaced integer subtraction with addition → KILLED
28	1. replaced return value with null for GraphAlgorithmsTesting/HamiltonianCycle::findHamiltonianCycle → KILLED
32	1. negated conditional → KILLED 2. negated conditional → KILLED
33	1. replaced boolean return with false for GraphAlgorithmsTesting/HamiltonianCycle::isPathFound → KILLED
36	1. negated conditional → KILLED
37	1. replaced boolean return with true for GraphAlgorithmsTesting/HamiltonianCycle::isPathFound → NO_COVERAGE
40	1. changed conditional boundary → KILLED 2. Changed increment from 1 to -1 → KILLED 3. negated conditional → KILLED
41	1. negated conditional → KILLED
42	1. Replaced integer addition with subtraction → KILLED
47	1. negated conditional → KILLED
48	1. replaced boolean return with false for GraphAlgorithmsTesting/HamiltonianCycle::isPathFound → KILLED 2. replaced boolean return with true for GraphAlgorithmsTesting/HamiltonianCycle::isPathFound → KILLED
54	1. Replaced integer subtraction with addition → KILLED
57	1. replaced boolean return with true for GraphAlgorithmsTesting/HamiltonianCycle::isPathFound → KILLED

61	1. changed conditional boundary → KILLED 2. Changed increment from 1 to -1 → KILLED 3. Replaced integer subtraction with addition → KILLED 4. negated conditional → KILLED
62	1. negated conditional → KILLED
63	1. replaced boolean return with false for GraphAlgorithmsTesting/HamiltonianCycle::isPresent → KILLED
66	1. replaced boolean return with true for GraphAlgorithmsTesting/HamiltonianCycle::isPresent → KILLED

Active mutators

- BOOLEAN_FALSE_RETURN
- BOOLEAN_TRUE_RETURN
- CONDITIONALS_BOUNDARY_MUTATOR
- EMPTY_RETURN_VALUES
- INCREMENTS_MUTATOR
- INVERT_NEGS_MUTATOR
- MATH_MUTATOR
- NEGATE_CONDITIONALS_MUTATOR
- NULL_RETURN_VALUES
- PRIMITIVE_RETURN_VALS_MUTATOR
- VOID_METHOD_CALL_MUTATOR

Tests examined

- GraphAlgorithmsTesting.AllGraphTesting.[engine:junit-jupiter]/[class:GraphAlgorithmsTesting.AllGraphTesting]/[method:test()] (26 ms)
- GraphAlgorithmsTesting.AllGraphTesting.[engine:junit-jupiter]/[class:GraphAlgorithmsTesting.AllGraphTesting]/[method:testHamiltonianCycle()] (10 ms)

Report generated by PIT 1.6.8