

Fall 2019

CSE-5321-002 - Software Testing

Homework Assignment 4

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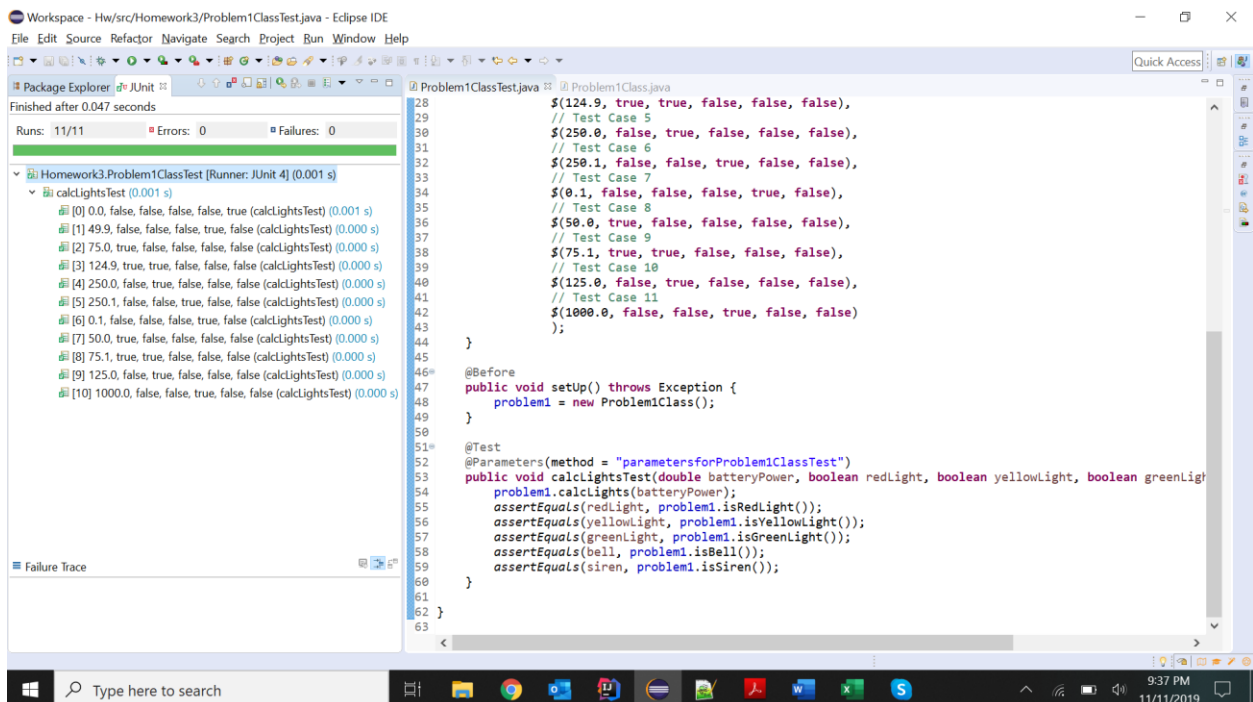
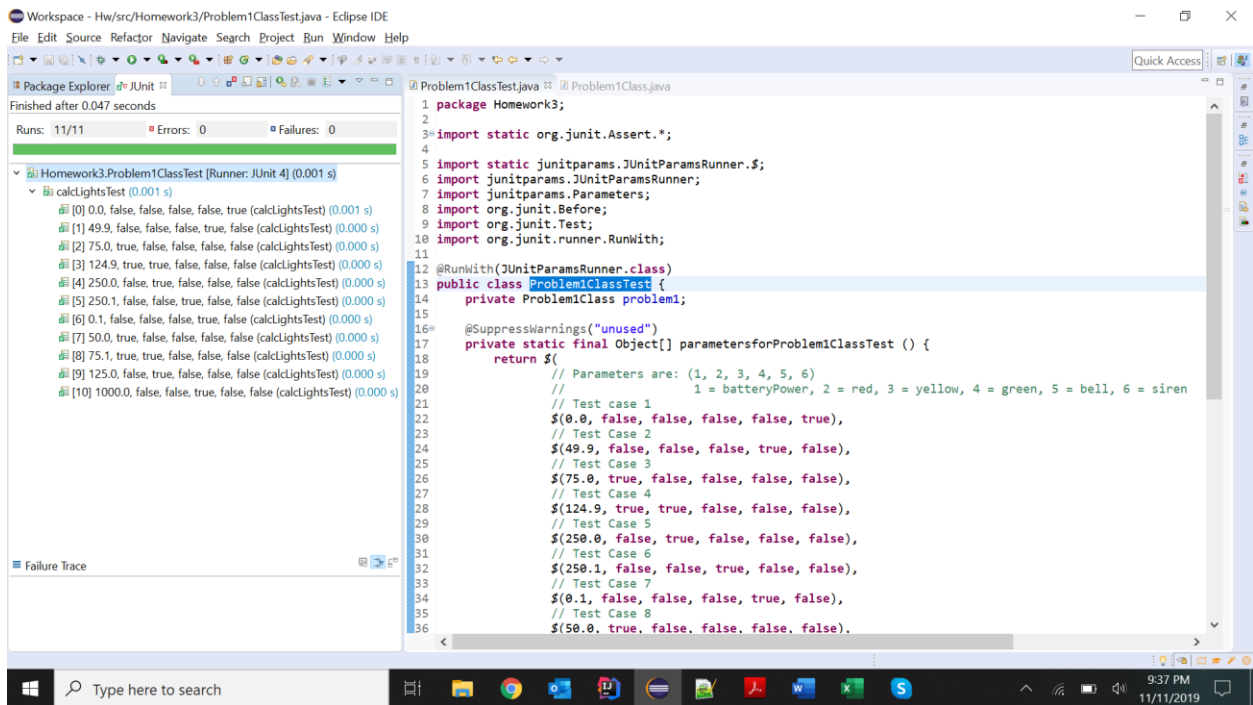
Please find the CSV files I used for testing (/CsvTestCaseTables) and Junit test files (/JUnit Test Files), attached to the zip file I submitted.

Problem 1

1.Test Case Table:

Test Case Number	Inputs	Expected Outputs					Basis Path
	batteryPower (watts)	red	yellow	green	bell	siren	
1	0.0	FALSE	FALSE	FALSE	FALSE	TRUE	15-16-32
2	49.9	FALSE	FALSE	FALSE	TRUE	FALSE	15-18-19-32
3	75.0	TRUE	FALSE	FALSE	FALSE	FALSE	15-18-21-22-32
4	124.9	TRUE	TRUE	FALSE	FALSE	FALSE	15-18-21-24-25-32
5	250.0	FALSE	TRUE	FALSE	FALSE	FALSE	15-18-21-24-27-28-32
6	250.1	FALSE	FALSE	TRUE	FALSE	FALSE	15-18-21-24-27-30-32
7	0.1	FALSE	FALSE	FALSE	TRUE	FALSE	-
8	50.0	TRUE	FALSE	FALSE	FALSE	FALSE	-
9	75.1	TRUE	TRUE	FALSE	FALSE	FALSE	-
10	125.0	FALSE	TRUE	FALSE	FALSE	FALSE	-
11	1,000.0	FALSE	FALSE	TRUE	FALSE	FALSE	-

2.Junit Pass Indicator:



3. JaCoCo Statement Coverage:

Workspace - Hw/src/Homework3/Problem1Class.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer

Runs: 11/11 Errors: 0 Failures: 0

Finished after 0.058 seconds

Homework3.Problem1ClassTest [Runner: JUnit 4] (0.000 s)

- calcLightsTest (0.000 s)
- [0] 0.0, false, false, false, true (calcLightsTest) (0.000 s)
- [1] 49.9, false, false, false, true, false (calcLightsTest) (0.000 s)
- [2] 75.0, true, false, false, false, false (calcLightsTest) (0.000 s)
- [3] 124.9, true, true, false, false, false (calcLightsTest) (0.000 s)
- [4] 250.0, false, true, false, false, false (calcLightsTest) (0.000 s)
- [5] 250.1, false, true, false, false, false (calcLightsTest) (0.000 s)
- [6] 0.1, false, false, false, true, false (calcLightsTest) (0.000 s)
- [7] 50.0, true, false, false, false, false (calcLightsTest) (0.000 s)
- [8] 75.1, true, true, false, false, false (calcLightsTest) (0.000 s)
- [9] 125.0, false, true, false, false, false (calcLightsTest) (0.000 s)
- [10] 1000.0, false, false, true, false, false (calcLightsTest) (0.000 s)

Failure Trace

Problems 19 errors, 0 warnings, 0 others

Description Resource Path Location Type

The input bytecode cannot be loaded

```
1 package Homework3;
2
3 public class Problem1Class {
4
5     boolean redLight, yellowLight, greenLight, bell, siren;
6
7     public void calcLights (double batteryPower) {
8         boolean greenTable [] = {false, false, false, false, false, true};
9         boolean yellowTable [] = {false, false, false, true, true, false};
10        boolean redTable [] = {false, false, true, true, false, false};
11        boolean bellTable [] = {false, true, false, false, false, false};
12        boolean sirenTable [] = {true, false, false, false, false, false};
13        int index;
14
15        if (batteryPower < 0.1)
16            index = 0;
17        else
18            if (batteryPower < 50.0)
19                index = 1;
20            else
21                if (batteryPower <= 75.0)
22                    index = 2;
23                else
24                    if (batteryPower < 125.0)
25                        index = 3;
26                    else
27                        if (batteryPower <= 250.0)
28                            index = 4;
29                        else
30                            index = 5;
31    }
```

Workspace - Hw/src/Homework3/Problem1Class.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer

Runs: 11/11 Errors: 0 Failures: 0

Finished after 0.058 seconds

Homework3.Problem1ClassTest [Runner: JUnit 4] (0.000 s)

- calcLightsTest (0.000 s)
- [0] 0.0, false, false, false, true (calcLightsTest) (0.000 s)
- [1] 49.9, false, false, false, true, false (calcLightsTest) (0.000 s)
- [2] 75.0, true, false, false, false, false (calcLightsTest) (0.000 s)
- [3] 124.9, true, true, false, false, false (calcLightsTest) (0.000 s)
- [4] 250.0, false, true, false, false, false (calcLightsTest) (0.000 s)
- [5] 250.1, false, true, false, false, false (calcLightsTest) (0.000 s)
- [6] 0.1, false, false, false, true, false (calcLightsTest) (0.000 s)
- [7] 50.0, true, false, false, false, false (calcLightsTest) (0.000 s)
- [8] 75.1, true, true, false, false, false (calcLightsTest) (0.000 s)
- [9] 125.0, false, true, false, false, false (calcLightsTest) (0.000 s)
- [10] 1000.0, false, false, true, false, false (calcLightsTest) (0.000 s)

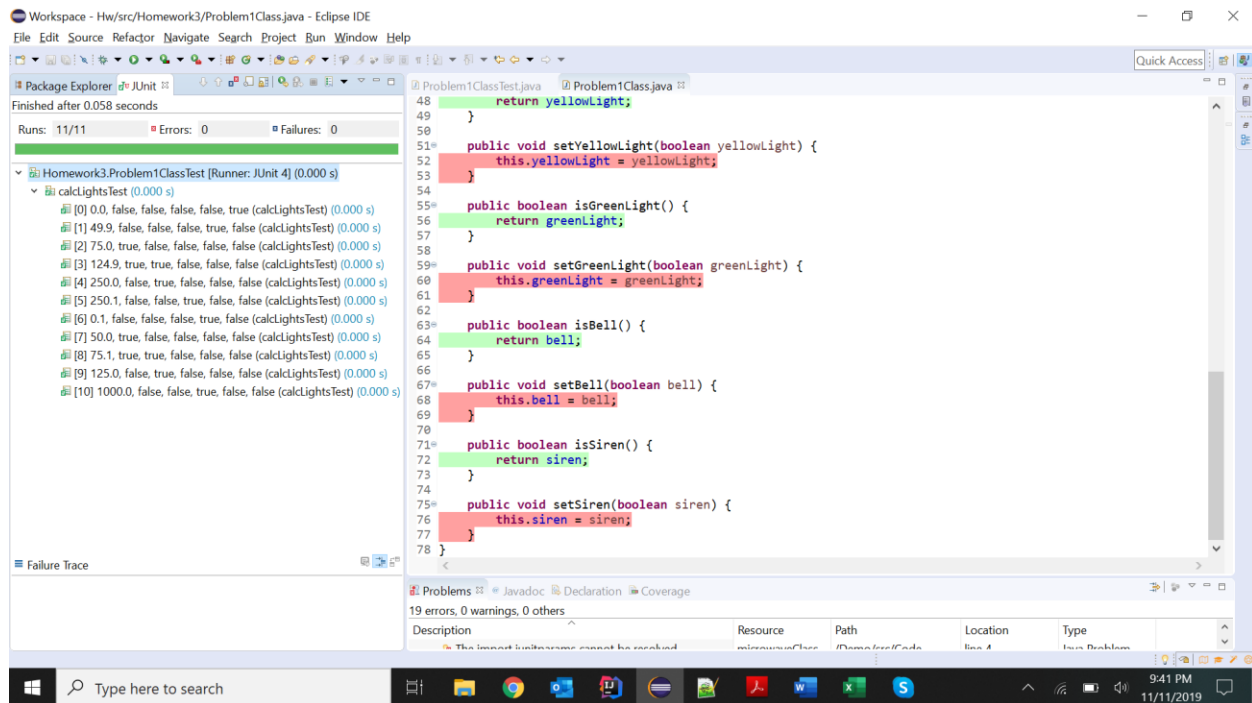
Failure Trace

Problems 19 errors, 0 warnings, 0 others

Description Resource Path Location Type

The input bytecode cannot be loaded

```
30        index = 5;
31
32        redLight=redTable[index];
33        yellowLight=yellowTable[index];
34        greenLight=greenTable[index];
35        bell=bellTable[index];
36        siren=sirenTable[index];
37    }
38
39    public boolean isRedLight() {
40        return redLight;
41    }
42
43    public void setRedLight(boolean redLight) {
44        this.redLight = redLight;
45    }
46
47    public boolean isYellowLight() {
48        return yellowLight;
49    }
50
51    public void setYellowLight(boolean yellowLight) {
52        this.yellowLight = yellowLight;
53    }
54
55    public boolean isGreenLight() {
56        return greenLight;
57    }
58
59    public void setGreenLight(boolean greenLight) {
60        this.greenLight = greenLight;
61    }
62 }
```

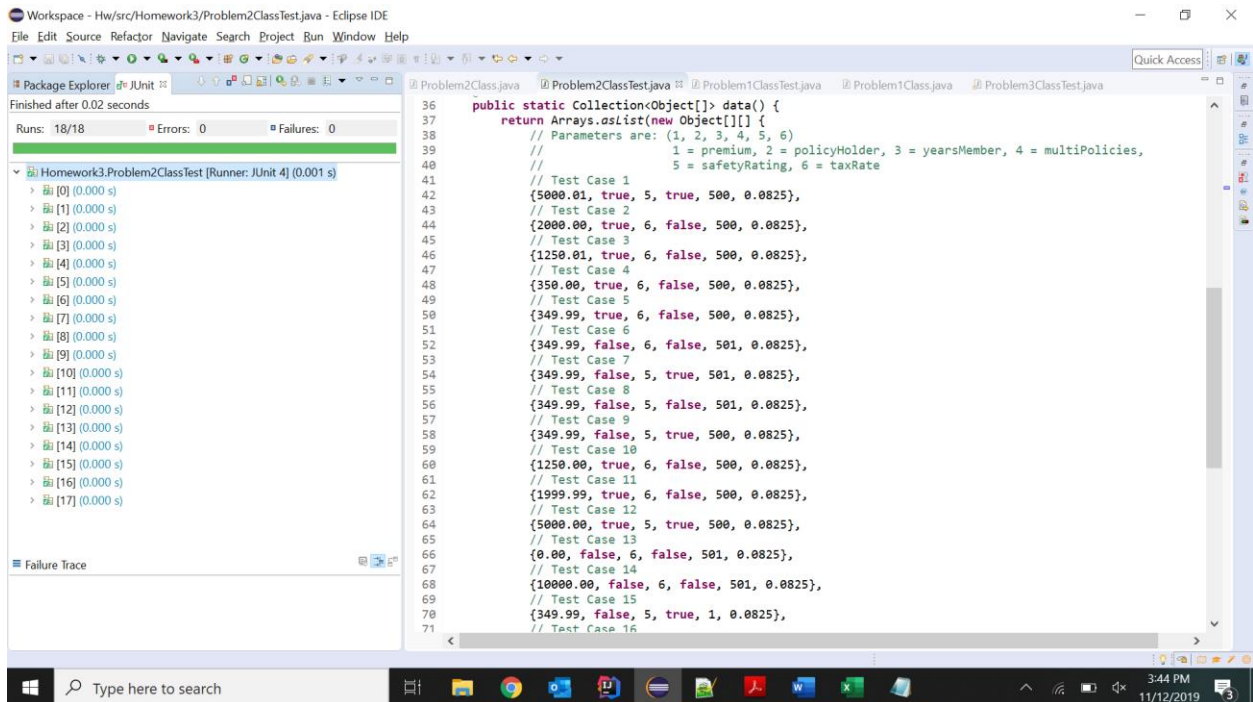
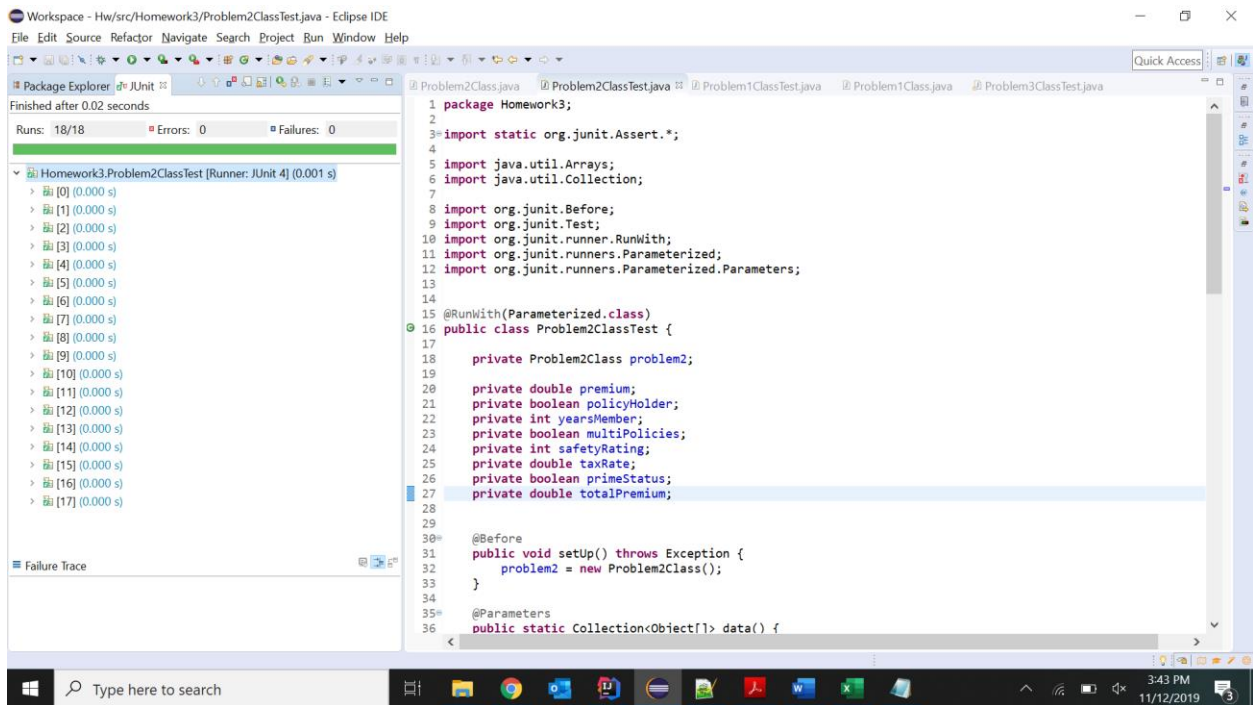


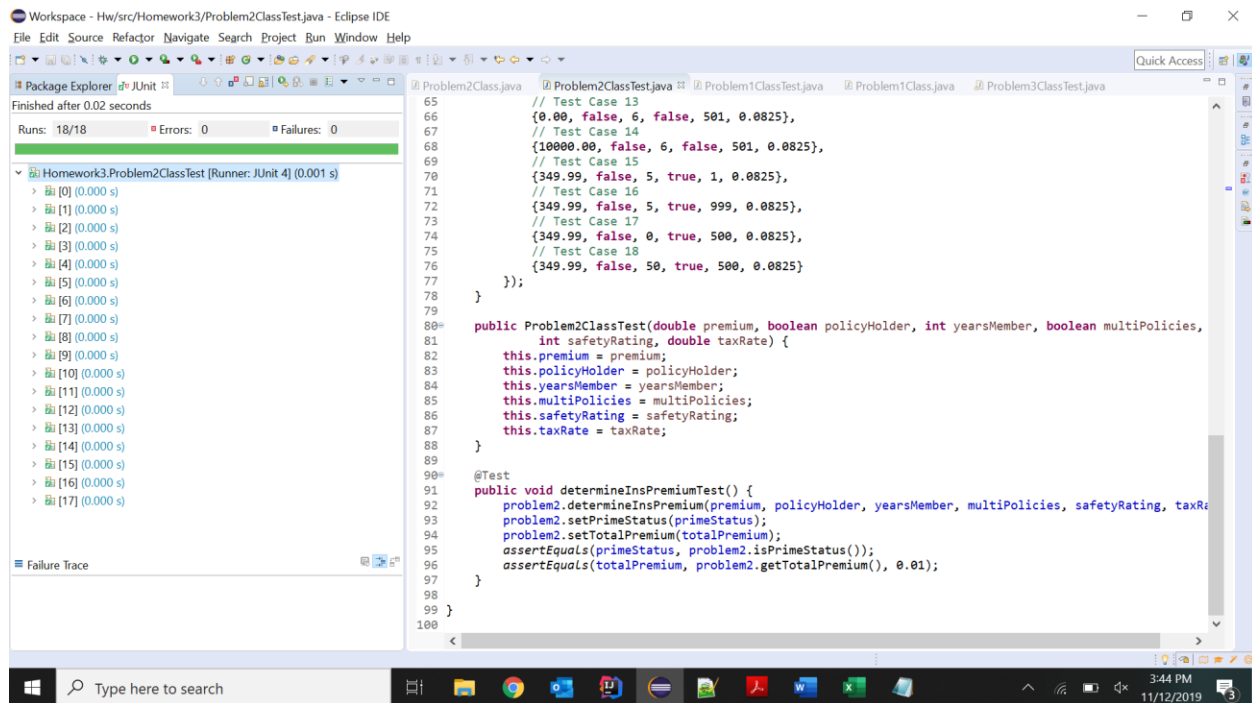
Problem 2

1. Test Case Table:

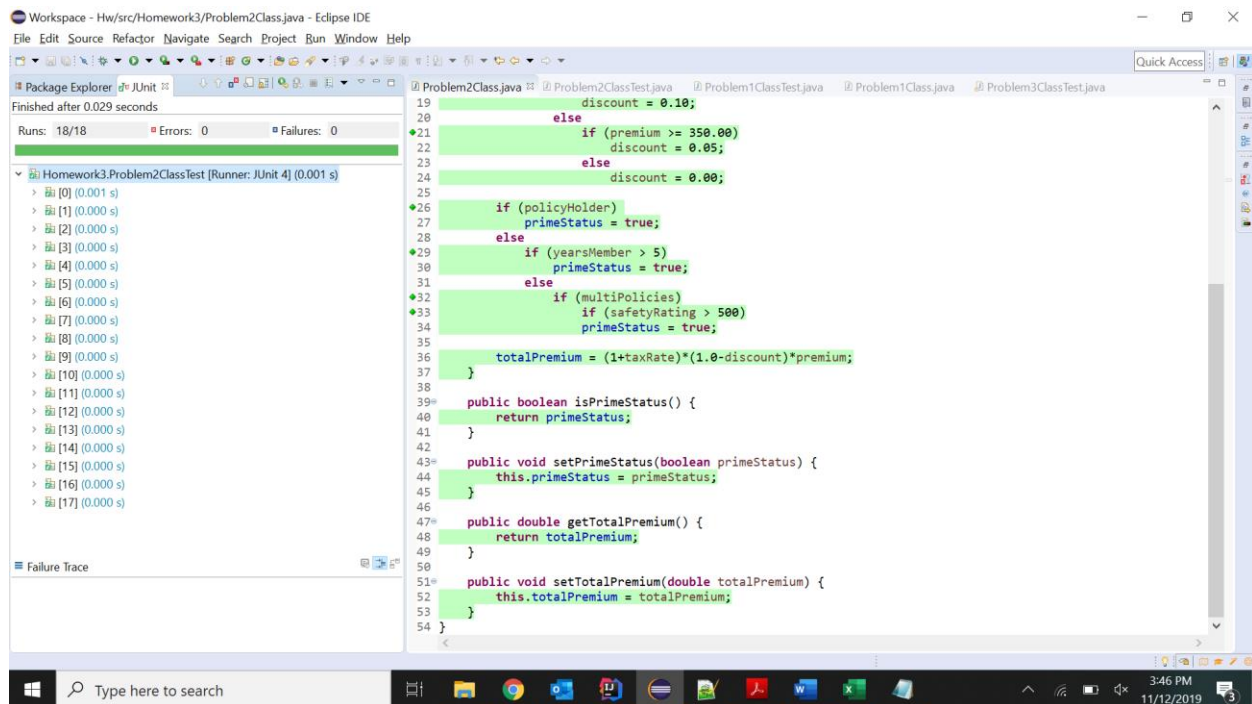
Test Case Number	Inputs						Expected Outputs		Basis Path	MCDC stmt 26-35
	premium	policyHolder	yearsMember	multiPolicies	safetyRating	taxRate	primeStatus	totalPremium		
1	\$5,000.01	TRUE	5	TRUE	500	8.25%	TRUE	\$4,330.01	12-13-26-27-36	TFTF
2	\$2,000.00	TRUE	6	FALSE	500	8.25%	TRUE	\$1,840.25	12-15-16-26-27-36	
3	\$1,250.01	TRUE	6	FALSE	500	8.25%	TRUE	\$1,217.82	12-15-18-19-26-27-36	
4	\$350.00	TRUE	6	FALSE	500	8.25%	TRUE	\$359.93	12-15-18-21-22-26-27-36	
5	\$349.99	TRUE	6	FALSE	500	8.25%	TRUE	\$378.86	12-15-18-21-24-26-27-36	
6	\$349.99	FALSE	6	FALSE	501	8.25%	TRUE	\$378.86	12-15-18-21-24-26-29-30-36	FTFT
7	\$349.99	FALSE	5	TRUE	501	8.25%	TRUE	\$378.86	12-15-18-21-24-26-29-32-33-34-36	FFTT
8	\$349.99	FALSE	5	FALSE	501	8.25%	FALSE	\$378.86	12-15-18-21-24-26-29-32-36	FFFT
9	\$349.99	FALSE	5	TRUE	500	8.25%	FALSE	\$378.86	12-15-18-21-24-26-29-32-33-36	FFTF
10	\$1,250.00	TRUE	6	FALSE	500	8.25%	TRUE	\$1,285.47	-	
11	\$1,999.99	TRUE	6	FALSE	500	8.25%	TRUE	\$1,948.49	-	
12	\$5,000.00	TRUE	5	TRUE	500	8.25%	TRUE	\$4,600.63	-	
13	\$0.00	FALSE	6	FALSE	501	8.25%	TRUE	\$0.00	Extreme range premium	
14	\$10,000.00	FALSE	6	FALSE	501	8.25%	TRUE	\$8,660.00	Extreme range premium	
15	\$349.99	FALSE	5	TRUE	1	8.25%	FALSE	\$378.86	Extreme range safety rating	
16	\$349.99	FALSE	5	TRUE	999	8.25%	TRUE	\$378.86	Extreme range safety rating	
17	\$349.99	FALSE	0	TRUE	500	8.25%	FALSE	\$378.86	Extreme range years member	
18	\$349.99	FALSE	50	TRUE	500	8.25%	TRUE	\$378.86	Extreme range years member	

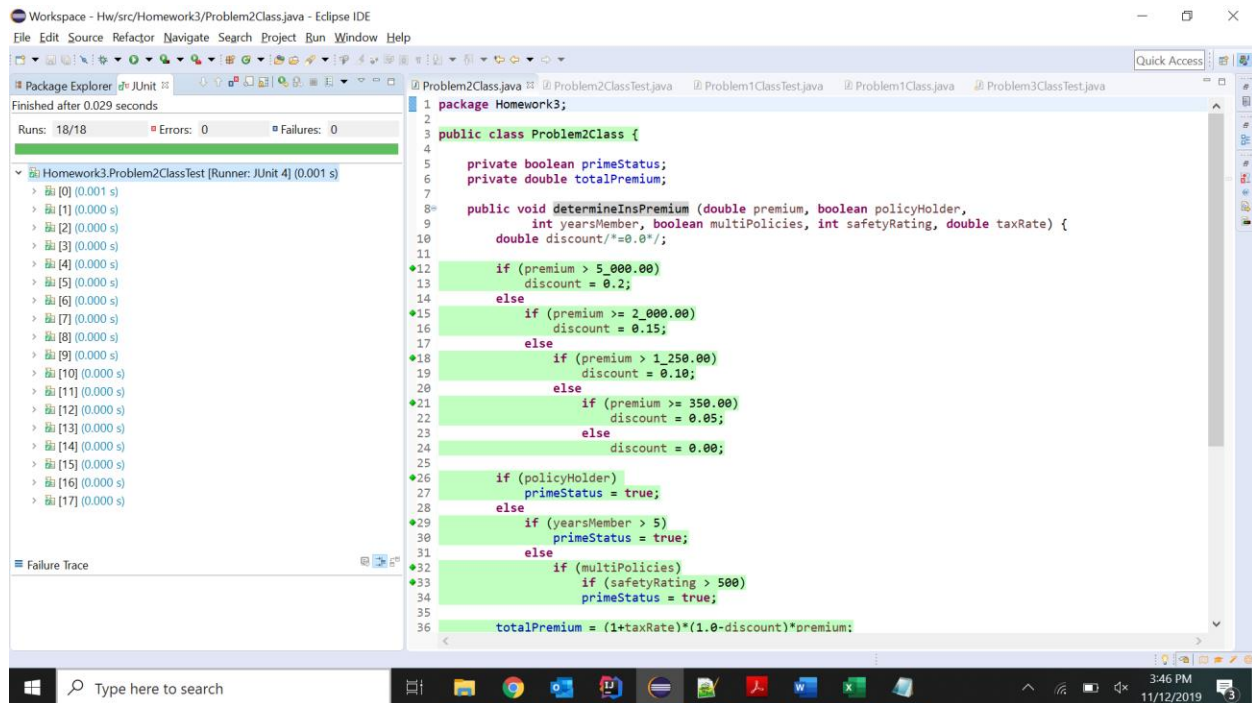
2. JUnit Pass Indicator:





3. JaCoCo Statement Coverage:



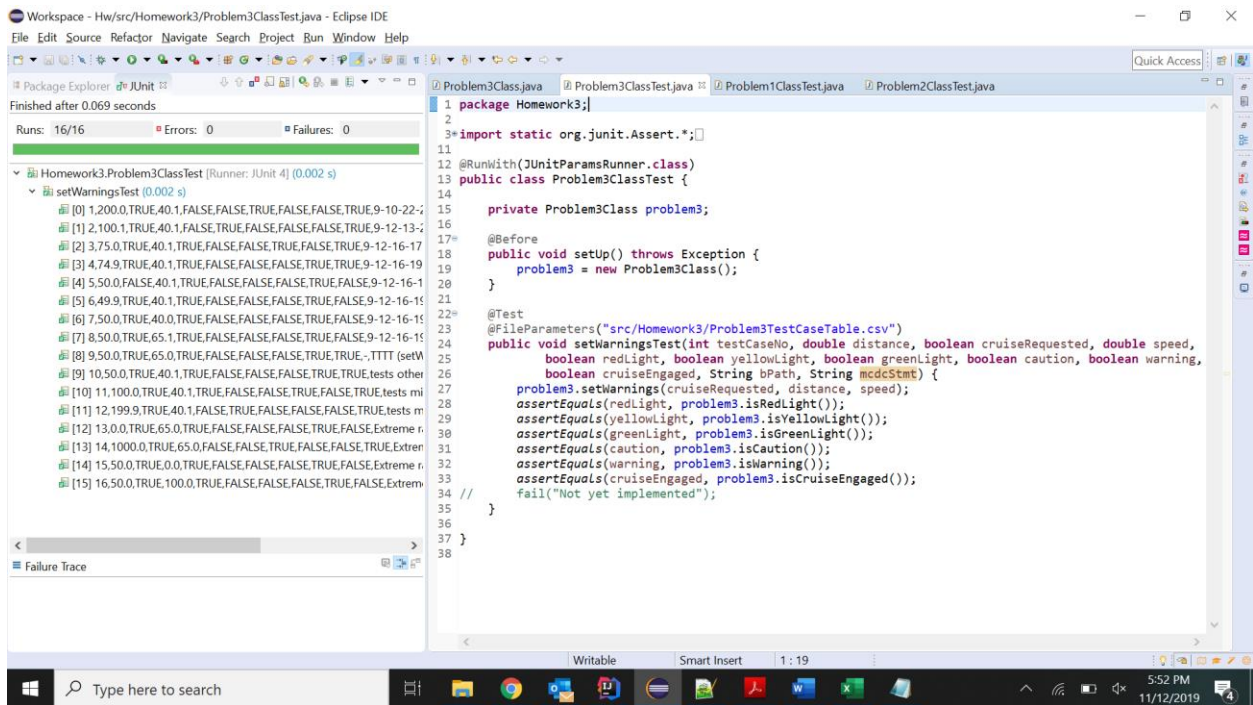


Problem 3

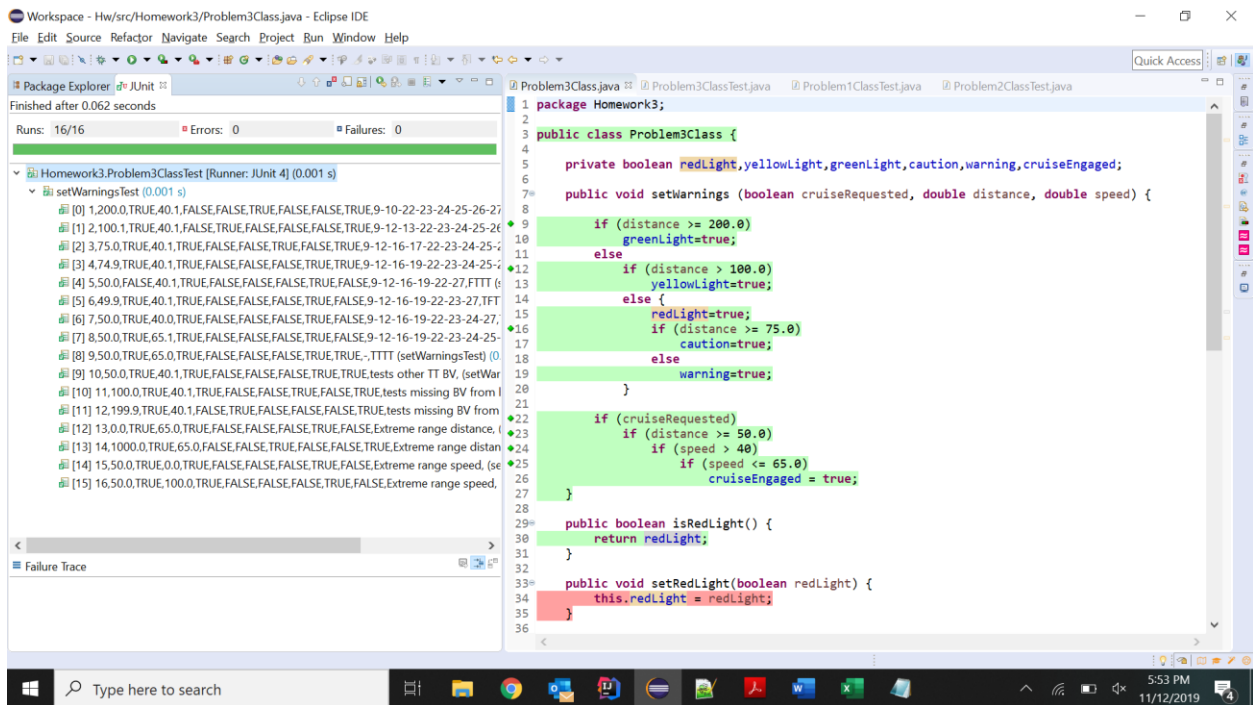
1. Test Case Table:

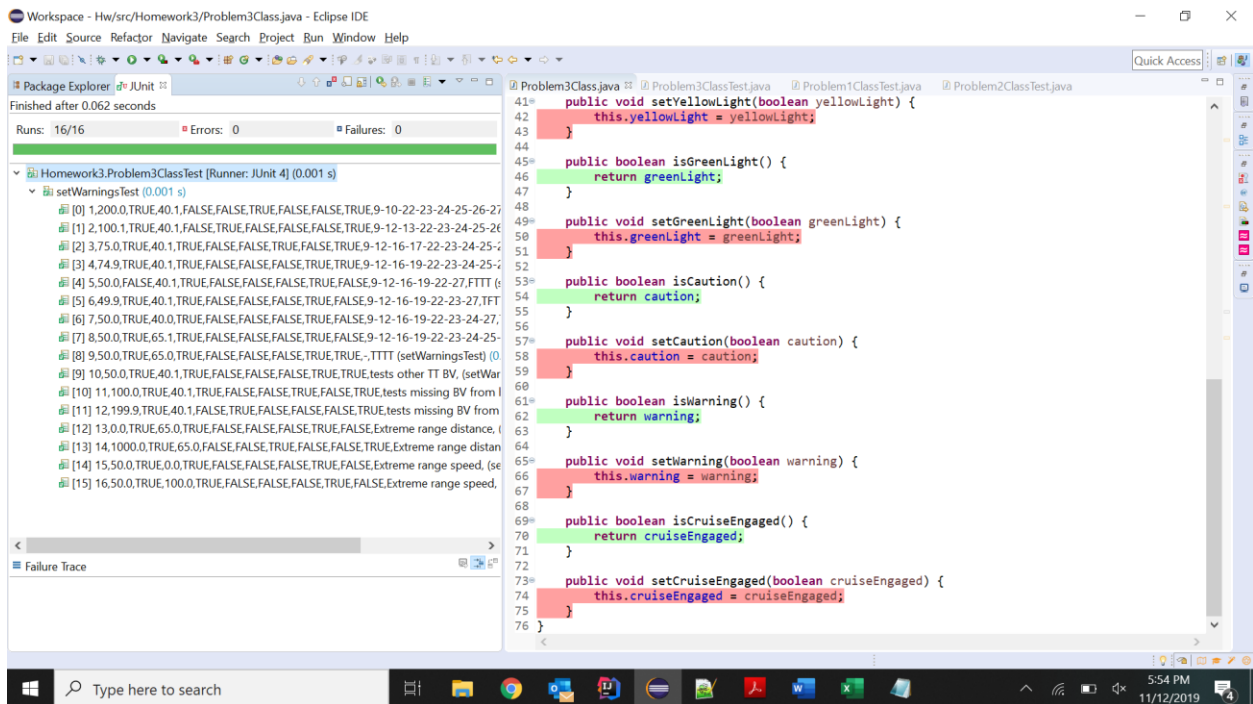
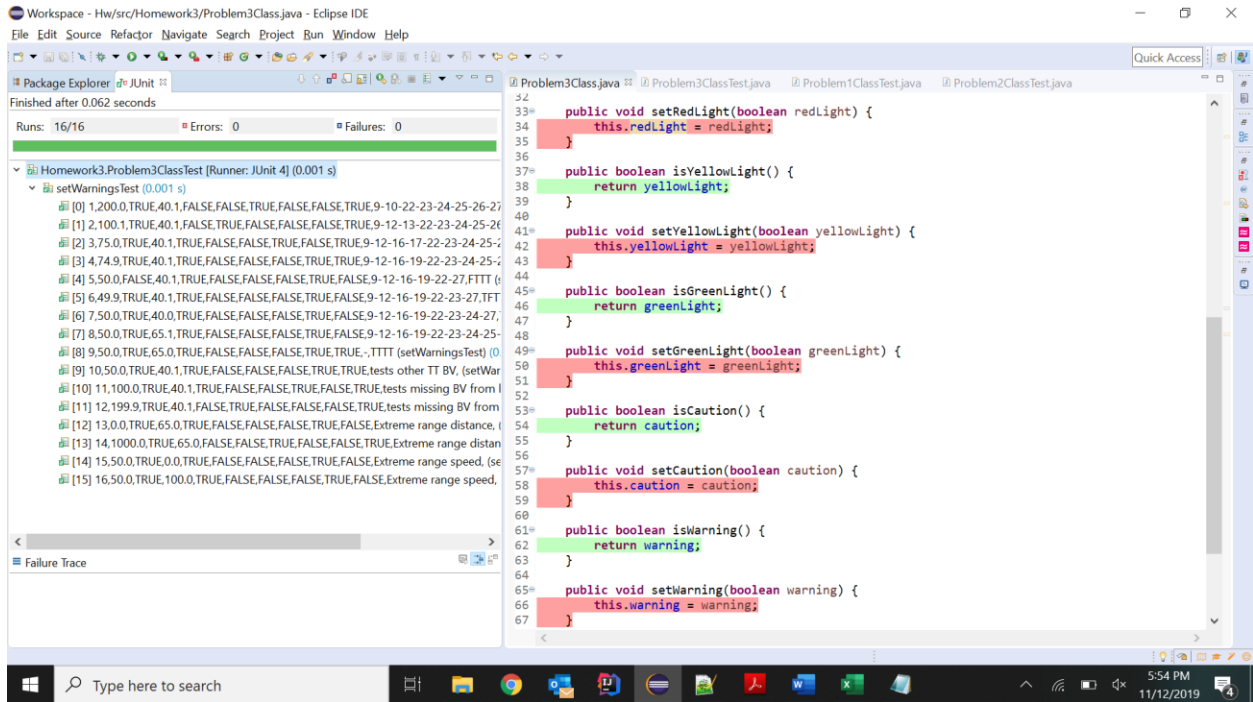
Test Case Number	Inputs			Expected Outputs							Basis Path	MCDC stmt 22-26
	distance (ft.)	cruiseRequested	speed (mph)	redLight	yellowLight	greenLight	caution	warning	cruiseEngaged			
1	200.0	TRUE	40.1	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	9-10-22-23-24-25-26-27		
2	100.1	TRUE	40.1	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	9-12-13-22-23-24-25-26-27		
3	75.0	TRUE	40.1	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	9-12-16-17-22-23-24-25-26-27		
4	74.9	TRUE	40.1	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	9-12-16-19-22-23-24-25-26-27		
5	50.0	FALSE	40.1	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	9-12-16-19-22-27	FTTT	
6	49.9	TRUE	40.1	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	9-12-16-19-22-23-27	TTFT	
7	50.0	TRUE	40	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	9-12-16-19-22-23-24-27	TTFT	
8	50.0	TRUE	65.1	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	9-12-16-19-22-23-24-25-27	TTTF	
9	50.0	TRUE	65	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	-	TTTT	
10	50.0	TRUE	40.1	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	tests other TT BV		
11	100.0	TRUE	40.1	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	tests missing BV from bPath		
12	199.9	TRUE	40.1	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	tests missing BV from bPath		
13	0.0	TRUE	65	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	Extreme range distance		
14	1,000.0	TRUE	65	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	Extreme range distance		
15	50.0	TRUE	0	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	Extreme range speed		
16	50.0	TRUE	100	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	Extreme range speed		

2. JUnit Pass Indicator:



3. JaCoCo Statement Coverage:





Problem 4

1. Test Case Table:

Test Case Number	Inputs			Exp Out	Basis Path	MCDC
	landin	speed (mpl)	altitude (ft)	return		
1	TRUE	500.1	4,999.9	engageRetro	10-11-12-13-14-22	stmt 11 TTT
2	FALSE	500.1	4,999.9	disengageRetro	10-21-22	
3	TRUE	150.0	2,499.9	deployPods	10-11-16-17-18-19-22	stmt 16 TTT
4	TRUE	500.1	2,499.9	orbit	10-11-12-22	stmt 11 TFT
5	TRUE	149.9	2,499.9	orbit	10-11-16-22	stmt 16 FTT
6	TRUE	500.1	5,000.0	orbit	10-11-12-13-22	stmt 11 TTF
7	TRUE	150.0	1,000.0	orbit	10-11-16-17-22	stmt 16 TFT
8	TRUE	150.0	2,500.0	orbit	10-11-16-17-18-22	stmt 16 TTF
9	TRUE	500.0	4,999.9	orbit	-	stmt 11 FTT
10	TRUE	500.1	2,500.0	engageRetro	-	
11	TRUE	150.0	1,000.1	deployPods	-	
12	TRUE	200.0	10,000.0	orbit	extreme range altitude	
13	TRUE	200.0	0.0	orbit	extreme range altitude	
14	TRUE	1,000.0	5,000.1	orbit	extreme range speed	
15	TRUE	0.0	5,000.1	orbit	extreme range speed	

2. Junit Pass Indicator:

The screenshot shows the Eclipse IDE interface. The top toolbar includes File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, and Help. The Package Explorer on the left shows the project structure: Workspace - Hw/src/Homework3/Problem4ClassTest.java - Eclipse IDE. The JUnit test results are displayed in the center, showing a successful run of 15/15 tests with 0 errors and 0 failures. The test results list includes 15 test cases, each with its input parameters and the expected output. The Java code for Problem4ClassTest.java is shown on the right, featuring imports for JUnit and JUnit4, a private Problem4Class instance, and a public void setUp() method. The main test method is public void landCraftTest(int testCaseNo, boolean landing, double speed, double altitude, String bPath, String mcDCStm) which calls problem4.landCraft(landing, altitude, speed) and asserts the result against the expected output.

```
1 package Homework3;
2
3 import static org.junit.Assert.*;
4
5 import org.junit.Before;
6 import org.junit.Test;
7 import org.junit.runner.RunWith;
8
9 import junitparams.FileParameters;
10 import junitparams.JUnit4Runner;
11
12 @RunWith(JUnit4Runner.class)
13 public class Problem4ClassTest {
14
15     private Problem4Class problem4;
16
17     @Before
18     public void setUp() throws Exception {
19         problem4 = new Problem4Class();
20     }
21
22     @Test
23     @FileParameters("src/Homework3/Problem4TestCasesTable.csv")
24     public void landCraftTest(int testCaseNo, boolean landing, double speed, double altitude,
25                             String bPath, String mcDCStm) {
26         problem4.landCraft(landing, altitude, speed);
27         assertEquals(action, problem4.getAction());
28     }
29 }
30
31
```

3. JaCoCo Statement Coverage:

Workspace - Hw/src/Homework3/Problem4Class.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer JUnit

Finished after 0.047 seconds

Runs: 15/15 Errors: 0 Failures: 0

Homework3.Problem4ClassTest [Runner: JUnit 4] (0.000 s)

landCraftTest (0.000 s)

- [0] 1.TRUE,500.1,4999.9,engageRetro,10-11-12-13-14-22,stmt 11 TTT (landCraftTest) (0.000 s)
- [1] 2.FALSE,500.1,4999.9,disengageRetro,10/21/2022, (landCraftTest) (0.000 s)
- [2] 3.TRUE,150,2499.9,deployPods,10-11-16-17-18-19-22,stmt 16 TTT (landCraftTest) (0.000 s)
- [3] 4.TRUE,500.1,2499.9,orbit,10-11-12-22,stmt 11 TFT (landCraftTest) (0.000 s)
- [4] 5.TRUE,149.9,2499.9,orbit,10-11-16-22,stmt 16 FTT (landCraftTest) (0.000 s)
- [5] 6.TRUE,500.1,5000,orbit,10-11-12-13-22,stmt 11 TTF (landCraftTest) (0.000 s)
- [6] 7.TRUE,150,1000,orbit,10-11-16-17-22,stmt 16 TTF (landCraftTest) (0.000 s)
- [7] 8.TRUE,150,2500,orbit,10-11-16-17-18-22,stmt 16 TTF (landCraftTest) (0.000 s)
- [8] 9.TRUE,500.4999.9,orbit,stmt 11 FTT (landCraftTest) (0.000 s)
- [9] 10.TRUE,500.1,2500,engageRetro, (landCraftTest) (0.000 s)
- [10] 11.TRUE,150,1000.1,deployPods, (landCraftTest) (0.000 s)
- [11] 12.TRUE,200,10000,orbit,extreme range altitude, (landCraftTest) (0.000 s)
- [12] 13.TRUE,200,0,orbit,extreme range altitude, (landCraftTest) (0.000 s)
- [13] 14.TRUE,1000,5000.1,orbit,extreme range speed, (landCraftTest) (0.000 s)
- [14] 15.TRUE,0,5000.1,orbit,extreme range speed, (landCraftTest) (0.000 s)

```

1 package Homework3;
2
3 public class Problem4Class {
4
5     public enum landing {engageRetro, disengageRetro, deployPods, orbit};
6     private Problem4Class.landing action;
7
8     public void landCraft (boolean landing, double altitude, double speed) {
9         action=Problem4Class.landing.orbit;
10        if (landing)
11            if (speed > 500.0) {
12                if (altitude >= 2_500.0)
13                    if (altitude < 5_000.0)
14                        action = Problem4Class.landing.engageRetro;
15            }
16            else {
17                if (speed >= 150.0)
18                    if (altitude > 1_000.0)
19                        if (altitude < 2_500.0)
20                            action = Problem4Class.landing.deployPods;
21            }
22            else
23                action = Problem4Class.landing.disengageRetro;
24        }
25        public Problem4Class.landing getAction() {
26            return action;
27        }
28        public void setAction(Problem4Class.landing action) {
29            this.action = action;
30        }
31    }

```

Failure Trace

Type here to search

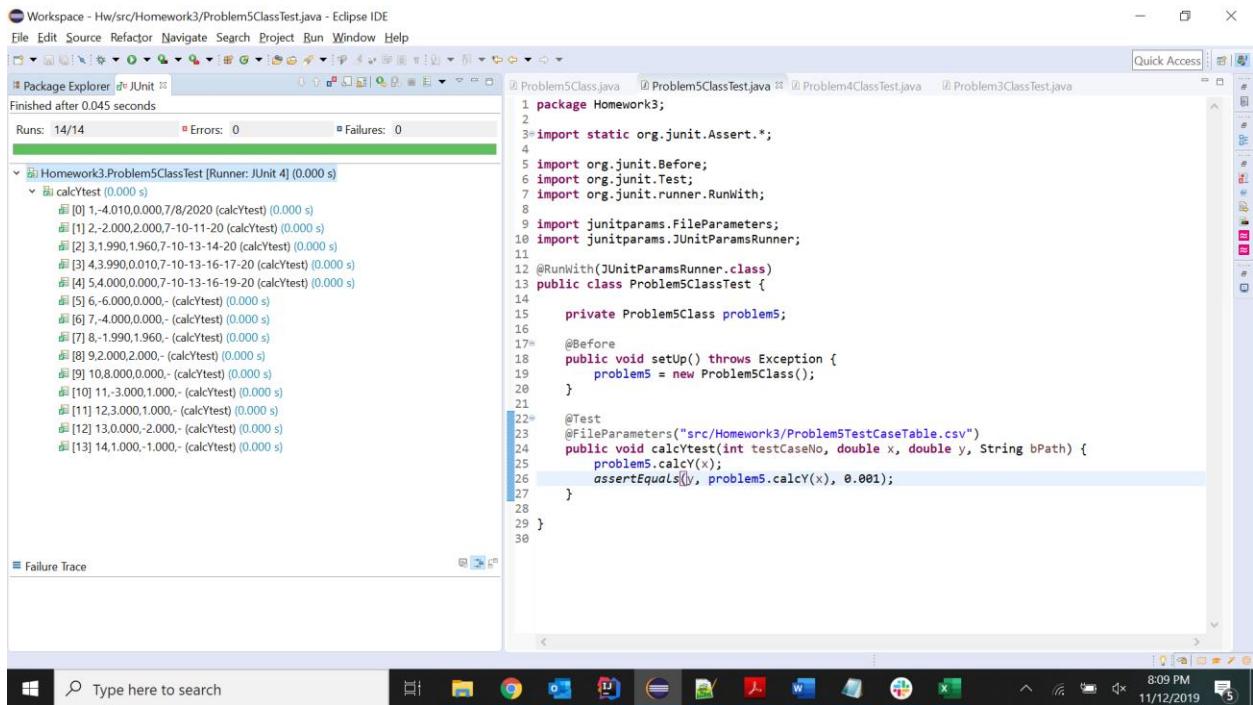
7:53 PM 11/12/2019

Problem 5

1.Test Case Table:

Test Case Number	Inputs x	Exp Out y	Basis Path Tested
1	-4.01	0.00	7-8-20
2	-2.00	2.00	7-10-11-20
3	1.99	1.96	7-10-13-14-20
4	3.99	0.01	7-10-13-16-17-20
5	4.00	0.00	7-10-13-16-19-20
6	-6.00	0.00	-
7	-4.00	0.00	-
8	-1.99	1.96	-
9	2.00	2.00	-
10	8.00	0.00	-
11	-3.00	1.00	-
12	3.00	1.00	-
13	0.00	-2.00	-
14	1.00	-1.00	-

2. Junit Pass Indicator:



3. JaCoCo Statement Coverage:

