THE UNIVERSITY OF TEXAS AT ARLINGTON

Project Part 5 Test Report

November 30

2015

 Team 3 Members: Anuj Rakheja, Arjun Punabhai Vekariyam, Neeraj Mishra, Purn Prem Kumar, Sneha Suhas Chitre

ComputeSimulationStateTest.java Junit test report

Contents

ADVDisplay.updateDisplay JUnit test Report

1) Source code & JUnit test code –

Both source code and Junit test code is placed in attachments.

Source code is attached as Updated_source_code_SoftwareTesting_Project_Part5.zip

Junit test file is under Test Code directory -> ComputeSimulationStateTest.java

Test Cases are attached as -> CSS Test Case table.xlsx

2) JaCoCo Coverage Reports & JUnit test results –

(1) ComputeSimulationStateTest.java

Top screenshot:

Project Explorer | JUnit

Finished after 0.054 seconds

Runs: 1/1 Errors: 0 Failures: 0

▶ ADV.ComputeSimulationStateTest [Runner: JUnit

Failure Trace

ComputeSimulationStateTest.java | ComputeSimulationState.java

```
35      public int[] in_shld_damage_cnt = {8, 8, 8, 8, 8, 8, 7, 7, 11, 0, 0, 0, 0, 0, 0, 0, 8, 8, 0, 11, 5, 11, 11};
36      public int[] in_esr_persistence_cnt = {0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -1, 0, 0, 0, 0, 0};
37      public int[] in_cum_att = {5, 5, 5, 5, 5, 5, 5, 5, 6, -6, 4, -4, 5, 6, 5, 5, 6, 5, 5, 6, 6, 4, -4};
38      public int[] in_ter_att = {-1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -2, -1, -1, -1, -1, -1, -1, -1,
39
40      public boolean[] in_esr_latch = {F, F, F, F, T, F, F, F, F, F, F, F, F, F, F, F, F, F, T, F, F, F, F, F, F};
41
42      public String[] in_shld_pos = {R, R, R, D, D, D, D, R, D, R, R, R, R, R, R, R, R, R, D, D, R, D, R, R};
43      public String[] in_shld_cmd = {R, R, R, D, D, R, D, R, D, R, R, R, R, R, R, R, R, R, D, D, D, R, D, R, R};
44
45      public boolean[] out_power60 = {F, F, F, T, T, T, T, T, F, T, T, T, T, T, T, T, T, T, T, T, T, T, T, T, T};
46      public boolean[] out_pos =     {T, T, T, F, F, F, F, F, T, F, T, F, F, F, F, F, F, T, F, F, F, F, F, F, F};
47      public boolean[] out_pdmg =    {F, F, F, F, F, F, F, F, T, F, F, F, F, F, F, F, F, F, F, F, F, F, T, T, T};
48      public boolean[] out_pnd =     {F, F, F, F, F, F, F, F, T, F, F, F, F, F, F, F, T, F, F, F, T, T, F, F, T};
49      public boolean[] out_dc =      {F, F, F, F, F, F, F, F, T, F, F, F, F, F, F, F, T, F, F, F, T, F, F, T, F};
50      public boolean[] out_esr =     {F, F, F, T, T, F, T, F, F, F, F, F, F, F, F, F, F, T, F, F, F, F, F, F, F};
51      public boolean[] out_isrz =    {F, F, F, F, T, T, T, T, T, T, T, T, T, F, T, F, F, F, F, F, F, F, F, F, F};
52      public boolean[] out_pd =      {F, F, F, F, F, F, F, F, F, T, T, T, T, F, T, T, F, F, F, F, F, F, F, T, F};
53
54      public double[] out_alt =              {249.9, 250.0, 250.0, 0.1, 14.0, 14.0, 23.8, 48.0, 23.8, 250.0, 0.0, 0.0, 0.0,
55                                              0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 14.2, 23.8, 0.0, 0.0, 0.0, 0.0, 0.0};
56
57      public double[] out_vf =               {100.005, 100.005, 100.005, 25.005, 14.985, 14.985, 24.990, 99.645, 24.990,
58                                              100.005, 0.075, 0.075, 0.075, 0.075, 0.075, 0.075, 0.075, 0.075, 15.000, 25.005,
59                                              0.075, 0.075, 0.075, 0.075, 0.075};
60
61      public double[] out_vd =               {-6.667, -6.667, -6.667, -1.667, -0.999, -0.999, -1.666, -6.643, -1.666, -6.667, -0.005
62                                              -0.005, -0.005, -0.005, -0.005, -0.005, -0.005, -0.005, -1.000, -1.667,
63                                              -0.005, -0.005, -0.005, -0.005, -0.005};
64
65      public String[] out_motor_state =      {MP1, MP1, MP1, MP2, MP2, MP2, MP2, MP1, MP2, MP1, OFF, OFF, OFF,
66                                              OFF, OFF, OFF, OFF, OFF, OFF, MP2, MP2, OFF, OFF, OFF, OFF, OFF};
67
68      public int[] out_power_rem =           {180, 180, 180, 179, 165, 165, 172, 179, 172, 180, 155, 155, 155, 155, 155, 155, 1
69                                              155, 154, 165, 173, 155, 155, 155, 155};
70
71      public String[] out_shld_pos =         {R, R, R, D, D, R, D, R, D, R, R, R, R, R, R, R, R, R, D, D, R, D, R, R};
```

Coverage

ComputeSimulationStateTest (Nov 30, 2015 9:38:19 PM)

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
▶ ST_P_4	51.5 %	3,005	2,829	5,834

Bottom screenshot:

Project Explorer | JUnit

Finished after 0.054 seconds

Runs: 1/1 Errors: 0 Failures: 0

▶ ADV.ComputeSimulationStateTest [Runner: JUnit

Failure Trace

ComputeSimulationStateTest.java | ComputeSimulationState.java

```
71      public String[] out_shld_pos =         {R, R, R, D, D, R, D, R, D, R, R, R, R, R, R, R, R, R, D, D, R, D, R, R};
72      public String[] out_shld_cmd =         {R, R, R, D, R, R, D, R, D, R, R, R, R, R, R, R, R, R, D, D, R, R, R, R};
73
74
75
76      @Test
77      public void test() {
78          Alerts alerts = new Alerts();
79          Measurements measurements = new Measurements();
80          ComputeSimulationState state = new ComputeSimulationState();
81
82          //Total of 26 test cases has been identified to achieve full coverage
83          //of ComputeSimulationState.compute_state() method.
84          for (int tc_no = 0; tc_no < TEST_CASE_COUNT; tc_no++) {
85              System.out.println("TestCase :" + tc_no);
86              System.out.println("O/Ps :- ");
87              clearAlerts(alerts);
88              measurements.setAltitude(in_alt[tc_no]);
89              measurements.setshield_position(in_shld_pos[tc_no]);
90              measurements.setshield_cmd(in_shld_cmd[tc_no]);
91              measurements.setVf(in_vf[tc_no]);
92              measurements.setVd(in_vd[tc_no]);
93              measurements.setpower_remaining(in_power_rem[tc_no]);
94              alerts.setRand_value(in_random[tc_no]);
95              alerts.setShield_damage_count(in_shld_damage_cnt[tc_no]);
96              alerts.setESR_latch(in_esr_latch[tc_no]);
97              alerts.setEsr_persistence_count(in_esr_persistence_cnt[tc_no]);
98              measurements.setCum_attitude(in_cum_att[tc_no]);
99              measurements.setTerr_attitude(in_ter_att[tc_no]);
100             state.compute_state(measurements, alerts, 1);
101             assertEquals(out_power60[tc_no],alerts.isPWR60());
102             assertEquals(out_pos[tc_no],alerts.isPOS());
103             assertEquals(out_pdmg[tc_no],alerts.isPDMG());
104             assertEquals(out_pnd[tc_no],alerts.isPND());
105             assertEquals(out_dc[tc_no],alerts.isDC());
106             assertEquals(out_esr[tc_no],alerts.isESR());
107             assertEquals(out_isrz[tc_no],alerts.isISRZ());
108             assertEquals(out_pd[tc_no],alerts.isPD());
```
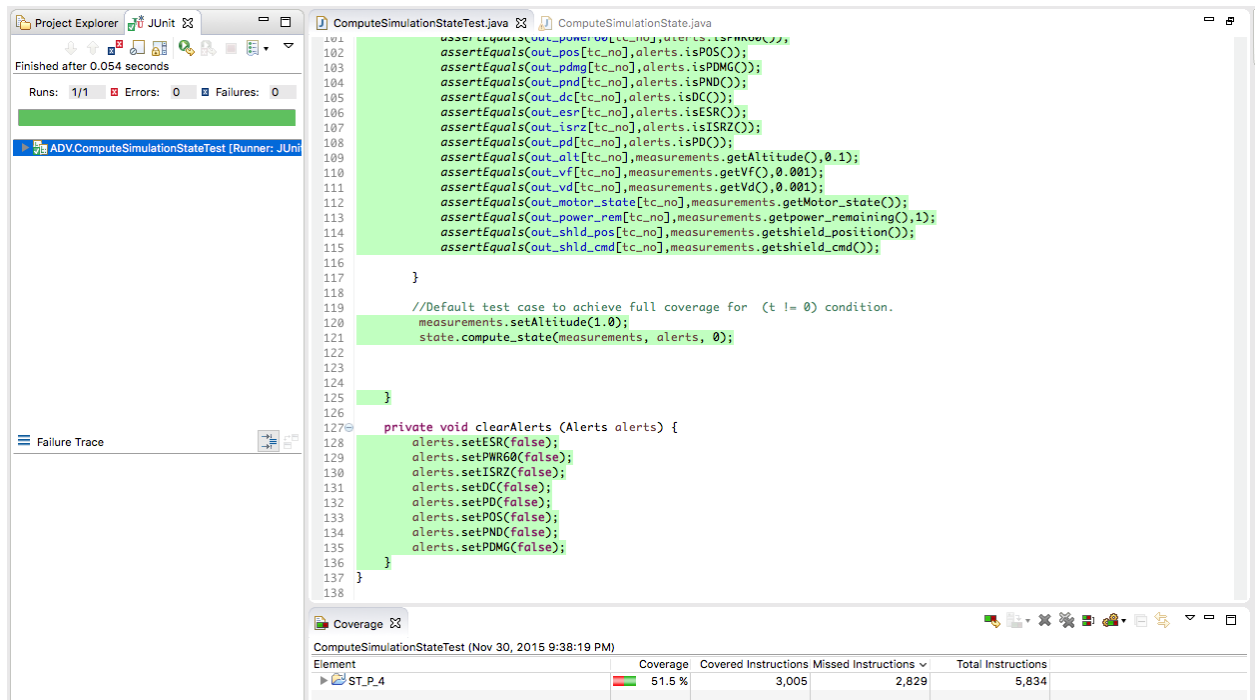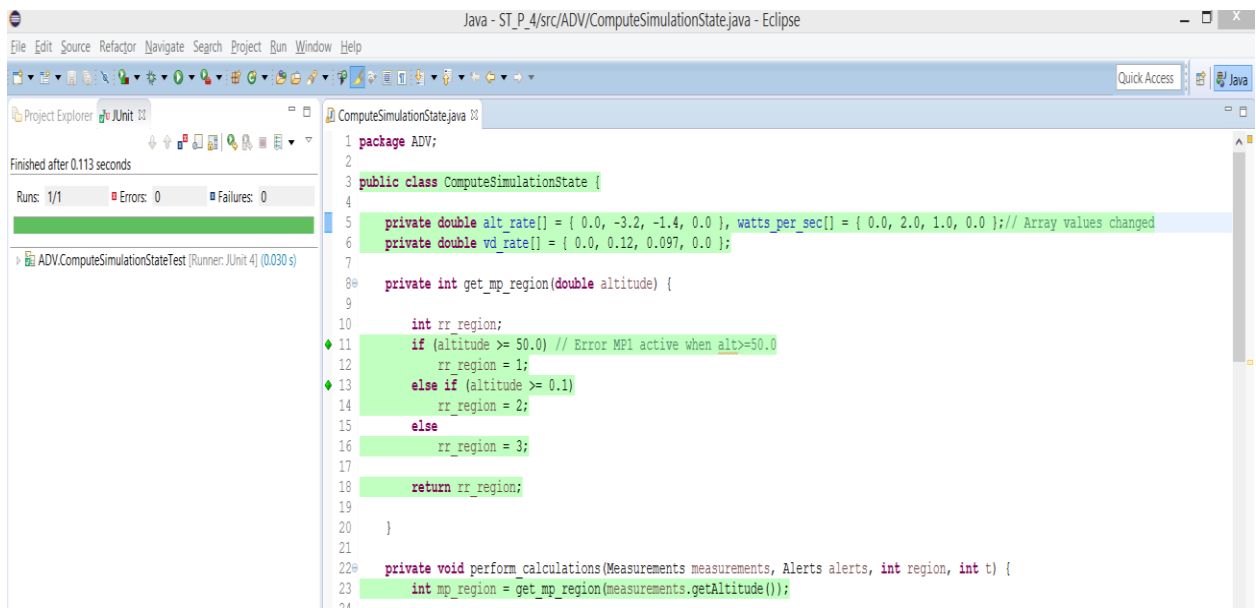
Coverage

ComputeSimulationStateTest (Nov 30, 2015 9:38:19 PM)

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
▶ ST_P_4	51.5 %	3,005	2,829	5,834

(2) ComputeSimulationState.java

Top panel — Eclipse JUnit / Coverage view

Project Explorer · JUnit
Finished after 0.054 seconds
Runs: 1 · Errors: 0 · Failures: 0

ADV.ComputeSimulationStateTest [Runner: JUnit]

Failure Trace

ComputeSimulationStateTest.java · ComputeSimulationState.java

```java
21     private void perform_calculations(Measurements measurements, Alerts alerts, int region, int t) {
23         int mp_region = get_mp_region(measurements.getAltitude());
24
25
26         if (t != 0) {
27             measurements.setAltitude(measurements.getAltitude() + alt_rate[mp_region]);
28             measurements.setVd(measurements.getVd() + vd_rate[mp_region]);
29             measurements.setVf(15.0 * Math.abs(measurements.getVd()));
30             measurements.setpower_remaining(measurements.getpower_remaining() - watts_per_sec[mp_region]);
31         }
32
33     }
34
35     public void compute_state(Measurements measurements, Alerts alerts, int t) {
36
37         int j;
38         double rand, prev_alt, prev_vd, prev_pwr;
39
40         prev_alt = measurements.getAltitude();
41         prev_vd = measurements.getVd();
42         prev_pwr = measurements.getpower_remaining();
43
44         measurements.setshield_position(measurements.getshield_cmd());
45         j = get_mp_region(prev_alt);
46         measurements.setMotor_state(measurements.get_motor_program(j));
47
48         if (prev_alt < 0.1) {
49             measurements.setAltitude(prev_alt);
50             measurements.setVd(prev_vd);
51             measurements.setpower_remaining(prev_pwr);
52             measurements.setMotor_state("Off");
53             j = 3;
54         } else
55             perform_calculations(measurements, alerts, j, t);
56
57         if (measurements.getpower_remaining() < 180.0) // PWR60 Enabled condition rectified
```

Coverage — ComputeSimulationStateTest (Nov 30, 2015 9:38:19 PM)

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
ST_P_4	51.5 %	3,005	2,829	5,834

Bottom panel — Eclipse JUnit / Coverage view

Project Explorer · JUnit
Finished after 0.054 seconds
Runs: 1/1 · Errors: 0 · Failures: 0

ADV.ComputeSimulationStateTest [Runner: JUnit]

Failure Trace

ComputeSimulationStateTest.java · ComputeSimulationState.java

```java
55             perform_calculations(measurements, alerts, j, t);
56
57         if (measurements.getpower_remaining() < 180.0) // PWR60 Enabled condition rectified
58             alerts.setPWR60(true);
59
60         //Arjun New Bug "R" -> "D"
61         if (measurements.getshield_position().equals("D") & measurements.getVf() < 15.0) {
62             //New Error- set ESR 'true' only when shield position is "R"
63             alerts.setESR(true);
64             measurements.setshield_cmd("R"); //New Error
65             alerts.setEsr_persistence_count(5);// Persistence count set to 5 instead of 3
66         }
67
68         if (alerts.getEsr_persistence_count() > 0) {
69             alerts.setESR(true);
70             alerts.setEsr_persistence_count(alerts.getEsr_persistence_count() - 1);
71         }
72
73         if (measurements.getshield_position().equals("R") & measurements.getVf() > 100.0) {
74             alerts.setShield_damage_count(alerts.getshield_damage_count() + 1);
75             alerts.setPOS(true);
76         }
77         //Arjun New Bug added measurements.getshield_position().equals("D")
78         if (!alerts.isESR() & measurements.getshield_position().equals("D") & measurements.getVf() < 25.0 & measurements.getAltit
79             && alerts.getIsrz_persistence_count() == -1) { // Additional condition added to have ISRZ Indicator working properly.
80             alerts.setISRZ(true);
81             alerts.setIsrz_persistence_count(7); // Persistence count for ISRZset to 7
82         }
83         if (alerts.getIsrz_persistence_count() > 0) { // Additional conditional added to keep ISRZ Active for 7seconds
84             alerts.setISRZ(true);
85             alerts.setIsrz_persistence_count(alerts.getIsrz_persistence_count() - 1);
86         }
87
88         if (alerts.getshield_damage_count() > 10){
89             System.out.println("getshield_damage_count() : " + alerts.getshield_damage_count());
90             alerts.setPDMG(true);
91         }
```

Coverage — ComputeSimulationStateTest (Nov 30, 2015 9:38:19 PM)

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
ST_P_4	51.5 %	3,005	2,829	5,834

3) Test results-

All 26 tests passed successfully.

4) Bugs found/code changes made.

We found 2 new bugs that were remained unknown in project part 4 during the testing in project part 5.

We have updated the log form last time and mentioning the new bugs found in the end of the spreadsheet as Error no 31, 32. Spreadsheet is attached in the zip file with the name of->
Updated_Functional_problem_listing_spreadsheet_Software _Testing_Part_5.xlsx

Code Changes:
- Modified condition which sets ESR warning to update ESR value correctly.

if (**measurements.getshield_position().equals("D")** & measurements.getVf() < 15.0) {

   //New Error- set ESR 'true' only when shield position is "R"

   alerts.setESR(true);

   measurements.setshield_cmd("R");

   alerts.setEsr_persistence_count(5);

}

- Added one more missing condition measurements.getshield_position().equals("D") to set ISRZ alert as per ADV domain rule.

if (!alerts.isESR() & **measurements.getshield_position().equals("D")** & measurements.getVf() < 25.0 & measurements.getAltitude() < 50.0

   && alerts.getIsrz_persistence_count() == -1) {

   alerts.setISRZ(true);

   alerts.setIsrz_persistence_count(7);

}