The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0

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The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0

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Technical report hal-01480084

https://hal.archives-ouvertes.fr/hal-01480084

This report lists the test-suite adequate patches found by the Nopol automatic repair system [3] on version 1.1.0 of the Defects4J benchmark of bugs [2]. In total, Nopol finds a test-suite adequate patches for 103 different bugs, as shown in Table 1.

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  TITLE = {{The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0}},
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We the Oracle JDK 1.7.0_7 to run Nopol and OpenJDK 1.8.0 for compiling the project Mockito. We give a time budget of three hours to Nopol to find a patch. The experiment has been conducted on machines that are equipped of Xeon X3440 Quad-core processor and 15GB RAM, the machines are part of the Grid5000 infrastructure [1].

Reproduction information:

• Nopol source code: https://github.com/SpoonLabs/nopol/
  Commit used: 473964ec2d5c668517bd45be1d878074858ceb934f
• Defects4j version: https://github.com/rjust/defects4j/releases/tag/v1.1.0/
• Execution traces: https://github.com/Spirals-Team/defects4j-repair/tree/master/results/2017-march/

1 Chart

Nopol repairs 9 bugs in the project Chart.

1.1 Chart 3

--- /tmp/chart_3_Nopol/source/org/jfree/data/time/TimeSeries.java
+++ /tmp/chart_3_Nopol/source/org/jfree/data/time/TimeSeries.java
@@ -884,3 +884,3 @@
  }
- if (removed) {
+ if (removed) {

1
Table 1: The number of synthesized test-suite adequate patches for each project.

<table>
<thead>
<tr>
<th>Project</th>
<th># Patches</th>
<th># Bugs</th>
<th>Repair Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart</td>
<td>9</td>
<td>26</td>
<td>37%</td>
</tr>
<tr>
<td>Closure</td>
<td>56</td>
<td>133</td>
<td>42%</td>
</tr>
<tr>
<td>Lang</td>
<td>4</td>
<td>65</td>
<td>6%</td>
</tr>
<tr>
<td>Math</td>
<td>24</td>
<td>106</td>
<td>22%</td>
</tr>
<tr>
<td>Mockito</td>
<td>2</td>
<td>38</td>
<td>5%</td>
</tr>
<tr>
<td>Time</td>
<td>8</td>
<td>27</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>395</td>
<td>26%</td>
</tr>
</tbody>
</table>

Listing 1: "The generated patch for the bug Chart 3"

Number of tests that execute the patch: 86
Execution time: 50 seconds

1.2 Chart 4

Listing 2: "The generated patch for the bug Chart 4"

Number of tests that execute the patch: 18
Execution time: 7 minutes, 32 seconds

1.3 Chart 5

Listing 3: "The generated patch for the bug Chart 5"

Number of tests that execute the patch: 6
Execution time: 38 seconds

1.4 Chart 9

Listing 4: "The generated patch for the bug Chart 9"

Number of tests that execute the patch: 4
Execution time: 34 seconds

1.5 Chart 13
Listing 5: "The generated patch for the bug Chart 13"

Number of tests that execute the patch: 2
Execution time: 42 seconds

1.6 Chart 17

Listing 6: "The generated patch for the bug Chart 17"

Number of tests that execute the patch: 4
Execution time: 33 seconds

1.7 Chart 21

Listing 7: "The generated patch for the bug Chart 21"

Number of tests that execute the patch: 12
Execution time: 37 seconds

1.8 Chart 25

Number of tests that execute the patch: 2
Execution time: 42 seconds
else if (orientation == PlotOrientation.VERTICAL) {
    drawVerticalItem(g2, state, dataArea, plot, domainAxis, rangeAxis,
    statData, row, column);
}

Listing 8: "The generated patch for the bug Chart 25"

Number of tests that execute the patch: 10
Execution time: 33 seconds

1.9 Chart 26

--- /tmp/chart_26_Nopol/source/org/jfree/chart/plot/CategoryPlot.java
+++ /tmp/chart_26_Nopol/source/org/jfree/chart/plot/CategoryPlot.java
@@ -2537,3 +2537,3 @@
    boolean b2 = (area.getHeight() <= MINIMUM_HEIGHT_TO_DRAW);
-    if (b1 || b2) {
+    if (org.jfree.chart.plot.CategoryPlot.DEFAULT_CROSSHAIR_STROKE != null) {
        return;
    }

Listing 9: "The generated patch for the bug Chart 26"

Number of tests that execute the patch: 48
Execution time: 1 minute, 40 seconds

2 Closure

Nopol repairs 56 bugs in the project Closure.

2.1 Closure 1

--- /tmp/closure_1_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_1_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1410,7 +1410,9 @@
    if (diff != null) {
-        return "Node tree inequality:" +
-        "\nTree1:\n" + toStringTree() +
-        "\nTree2:\n" + node2.toStringTree() +
-        "\nSubtree1: " + diff.nodeA.toStringTree() +
-        "\nSubtree2: " + diff.nodeB.toStringTree();
+        if ((node2.type) != (com.google.javascript.rhino.Node.this.type)) {
+            return "Node tree inequality:" +
+            "\nTree1:\n" + toStringTree() +
+            "\nTree2:\n" + node2.toStringTree() +
+            "\nSubtree1: " + diff.nodeA.toStringTree() +
+            "\nSubtree2: " + diff.nodeB.toStringTree();
+        }
}

Listing 10: "The generated patch for the bug Closure 1"

Number of tests that execute the patch: 15
Execution time: 2 minutes, 4 seconds

2.2 Closure 2

--- /tmp/closure_2_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
+++ /tmp/closure_2_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
@@ -1663,4 +1663,6 @@
    currentProperties.clear();
    checkInterfaceConflictProperties(t, n, functionPrivateName,
    properties, currentProperties, interfaceType);
+    if (com.google.javascript.jscomp.TypeCheck.this.unknownCount < com.google.javascript
+        .jscomp.TypeCheck.this.typedCount) {
+        checkInterfaceConflictProperties(t, n, functionPrivateName,
+            properties, currentProperties, interfaceType);
    }
    properties.putAll(currentProperties);

Listing 11: "The generated patch for the bug Closure 2"

Number of tests that execute the patch: 17
Execution time: 2 minutes, 7 seconds

2.3 Closure 3
Listing 12: "The generated patch for the bug Closure 3"
Number of tests that execute the patch: 10
Execution time: 7 minutes, 8 seconds

2.4 Closure 5

Listing 13: "The generated patch for the bug Closure 5"
Number of tests that execute the patch: 8
Execution time: 1 minute, 51 seconds

2.5 Closure 7

Listing 14: "The generated patch for the bug Closure 7"
Number of tests that execute the patch: 358
Execution time: 3 minutes, 26 seconds

2.6 Closure 8
Listing 15: "The generated patch for the bug Closure 8"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 28 seconds

2.7 Closure 10

Listing 16: "The generated patch for the bug Closure 10"

Number of tests that execute the patch: 8
Execution time: 4 minutes, 28 seconds

2.8 Closure 12

Listing 17: "The generated patch for the bug Closure 12"

Number of tests that execute the patch: 8
Execution time: 7 minutes, 35 seconds

2.9 Closure 14

Listing 18: "The generated patch for the bug Closure 14"

Number of tests that execute the patch: 7
2.10 Closure 15

--- /tmp/closure_15_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_15_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429 ,7 +1429 ,9 @@

 if ( diff != null ) {
     return "Node tree inequality:" +
     "\nTree1:\n" + toStringTree() +
-    "\nTree2:\n" + node2.toStringTree() +
+    "\nTree1:\n" + node2.toStringTree() +
+    "\nTree2:\n" + node2.toStringTree() +
     "\nSubtree1:" + diff.nodeA.toStringTree() +
     "\nSubtree2:" + diff.nodeB.toStringTree();
     +
     if ( com.google.javascript.rhino.Node.this.type < 32) {
     +
     return "Node tree inequality:" +
     "\nTree1:\n" + toStringTree() +
     "\nTree2:\n" + node2.toStringTree() +
     "\nSubtree1:" + diff.nodeA.toStringTree() +
     "\nSubtree2:" + diff.nodeB.toStringTree();
     +
     }
}

Listing 19: "The generated patch for the bug Closure 15"

Number of tests that execute the patch: 8
Execution time: 7 minutes, 28 seconds

2.11 Closure 16

--- /tmp/closure_16_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_16_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1445 ,3 +1445 ,5 @@

 if (!isEquivalentTo(node2, false, false)) {
     return new NodeMismatch(this, node2);
+    if (com.google.javascript.rhino.Node.this.sourcePosition <= 1) {
+        return new NodeMismatch(this, node2);
+    }
}

Listing 20: "The generated patch for the bug Closure 16"

Number of tests that execute the patch: 12
Execution time: 4 minutes, 12 seconds

2.12 Closure 17

--- /tmp/closure_17_Nopol/src/com/google/javascript/jscomp/TypedScopeCreator.java
+++ /tmp/closure_17_Nopol/src/com/google/javascript/jscomp/TypedScopeCreator.java
@@ -1294 ,3 +1294 ,5 @@

 // then we can safely use that.
-    return rValue.getJSType();
+    if (!((com.google.jscomp.TypedScopeCreator.DELEGATE_PROXY_SUFFIX.length() == -1 + com.google.jscomp.TypedScopeCreator.this.functionAnalysisResults.size()))) {
+        return rValue.getJSType();
+    }
  } else if (rValue.isOr()) {

Listing 21: "The generated patch for the bug Closure 17"

Number of tests that execute the patch: 25
Execution time: 2 minutes, 1 second

2.13 Closure 18

--- /tmp/closure_18_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_18_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429 ,7 +1429 ,9 @@

 if (diff != null) {
     return "Node tree inequality:" +
     "\nTree1:\n" + toStringTree() +
-    "\nTree2:\n" + node2.toStringTree() +
+    "\nTree1:\n" + node2.toStringTree() +
+    "\nTree2:\n" + node2.toStringTree() +
     "\nSubtree1:" + diff.nodeA.toStringTree() +
     "\nSubtree2:" + diff.nodeB.toStringTree();
     +
     if (com.google.javascript.rhino.Node.this.type <= com.google.javascript.rhino.Node.IS_DISPATCHER) {
     +
     return "Node tree inequality:" +
     "\nTree1:\n" + toStringTree() +
     "\nTree2:\n" + node2.toStringTree() +
     "\nSubtree1:" + diff.nodeA.toStringTree() +

7
Listing 22: "The generated patch for the bug Closure 18"

Number of tests that execute the patch: 8
Execution time: 1 minute, 51 seconds

2.14 Closure 20

Listing 23: "The generated patch for the bug Closure 20"

Number of tests that execute the patch: 8
Execution time: 2 minutes

2.15 Closure 21

Listing 24: "The generated patch for the bug Closure 21"

Number of tests that execute the patch: 3
Execution time: 1 minute, 59 seconds

2.16 Closure 22

Listing 25: "The generated patch for the bug Closure 22"

Number of tests that execute the patch: 3
2.17 Closure 26

Listing 26: "The generated patch for the bug Closure 26"

Number of tests that execute the patch: 14
Execution time: 3 minutes, 34 seconds

2.18 Closure 28

Listing 27: "The generated patch for the bug Closure 28"

Number of tests that execute the patch: 8
Execution time: 1 minute, 55 seconds

2.19 Closure 29

Listing 28: "The generated patch for the bug Closure 29"

Number of tests that execute the patch: 12
Execution time: 2 minutes
Listing 29: "The generated patch for the bug Closure 30"
Number of tests that execute the patch: 5
Execution time: 1 minute, 45 seconds

2.21 Closure 31

Listing 30: "The generated patch for the bug Closure 31"
Number of tests that execute the patch: 3
Execution time: 1 minute, 54 seconds

2.22 Closure 33

Listing 31: "The generated patch for the bug Closure 33"
Number of tests that execute the patch: 8
Execution time: 1 minute, 52 seconds

2.23 Closure 35
```java
+ if ((fieldName.length() != 5) { 
+ if (builder.addProperty(fieldName, fieldType, fieldNameNode) == null) { 
+ // Duplicate field name, warning and skip 
+ reporter.warning( 
+ "Duplicate record field " + fieldName, 
+ sourceName, 
+ n.getLineno(), fieldNameNode.getCharno()); 
+ }
```
Number of tests that execute the patch: 3
Execution time: 2 minutes, 7 seconds

2.27 Closure 45

--- /tmp/closure_45_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_45_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1403,7 +1403,9 @@
    if ( diff != null ) {
        return "Node tree inequality:" +
            "\nTree1: \n" + toStringTree() +
-    "\nSubtree1: + diff.nodeA.toStringTree() +
-    "\nSubtree2: + diff.nodeB.toStringTree();
+    if ( com.google.javascript.rhino.Node.this.type < 32) {
+        return "Node tree inequality:" +
+            "\nTree1: \n" + toStringTree() +
+    "\nSubtree1: + diff.nodeA.toStringTree() +
+    "\nSubtree2: + diff.nodeB.toStringTree();
    }
}

Listing 36: "The generated patch for the bug Closure 45"

Number of tests that execute the patch: 3
Execution time: 1 minute, 41 seconds

2.28 Closure 49

--- /tmp/closure_49_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_49_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1566,7 +1566,9 @@
    if ( diff != null ) {
        return "Node tree inequality:" +
            "\nTree1: \n" + toStringTree() +
-    "\nSubtree1: + diff.nodeA.toStringTree() +
-    "\nSubtree2: + diff.nodeB.toStringTree();
+    if ( com.google.javascript.rhino.Node.this.type <= com.google.javascript.rhino.Node.LABEL_PROP) {
+        return "Node tree inequality:" +
+            "\nTree1: \n" + toStringTree() +
+    "\nSubtree1: + diff.nodeA.toStringTree() +
+    "\nSubtree2: + diff.nodeB.toStringTree();
    }
}

Listing 37: "The generated patch for the bug Closure 49"

Number of tests that execute the patch: 68
Execution time: 1 minute, 47 seconds

2.29 Closure 50

--- /tmp/closure_50_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_50_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1566,7 +1566,9 @@
    if ( diff != null ) {
        return "Node tree inequality:" +
            "\nTree1: \n" + toStringTree() +
-    "\nSubtree1: + diff.nodeA.toStringTree() +
-    "\nSubtree2: + diff.nodeB.toStringTree();
+    if ( com.google.javascript.rhino.Node.this.type <= com.google.javascript.rhino.Node.LABEL_PROP) {
+        return "Node tree inequality:" +
+            "\nTree1: \n" + toStringTree() +
+    "\nSubtree1: + diff.nodeA.toStringTree() +
+    "\nSubtree2: + diff.nodeB.toStringTree();
    }
}

Listing 38: "The generated patch for the bug Closure 50"

Number of tests that execute the patch: 4
Execution time: 1 minute, 50 seconds

2.30 Closure 55
Listing 39: "The generated patch for the bug Closure 55"

Number of tests that execute the patch: 11
Execution time: 2 minutes, 14 seconds

2.31 Closure 60

Listing 40: "The generated patch for the bug Closure 60"

Number of tests that execute the patch: 31
Execution time: 12 minutes, 12 seconds

2.32 Closure 61

Listing 41: "The generated patch for the bug Closure 61"

Number of tests that execute the patch: 4
Execution time: 1 minute, 39 seconds

2.33 Closure 62

Listing 42: "The generated patch for the bug Closure 62"

Number of tests that execute the patch: 1
Execution time: 1 minute, 39 seconds
if (error != null) {
    for (int i = 0; i < charno; i++) {
Listing 42: "The generated patch for the bug Closure 62"
Number of tests that execute the patch: 5
Execution time: 1 minute, 32 seconds

2.34 Closure 63
--- /tmp/closure_63_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
+++ /tmp/closure_63_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
@@ -96,4 +96,3 @@
// at the end of the line
- if (excerpt.equals(LINE))
- & & 0 <= charno & & charno < sourceExcerpt.length()) {
+ if (error != null) {
    for (int i = 0; i < charno; i++) {
Listing 43: "The generated patch for the bug Closure 63"
Number of tests that execute the patch: 5
Execution time: 1 minute, 31 seconds

2.35 Closure 66
--- /tmp/closure_66_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
+++ /tmp/closure_66_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
@@ -821,3 +821,5 @@
if (type == null) {
- nullCount ++;
+ if (com.google.javascript.jscomp.TypeCheck.this.inExterns) {
+ nullCount ++;
+ }
} else if (type.isUnknownType()) {
Listing 44: "The generated patch for the bug Closure 66"
Number of tests that execute the patch: 166
Execution time: 2 minutes, 21 seconds

2.36 Closure 67
--- /tmp/closure_67_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_67_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1384,7 +1384,9 @@
if (diff != null) {
- return "Node tree inequality:" +
- "\nTree1:\n" + toStringTree() +
- "\nTree2:\n" + node2.toStringTree() +
- "\nSubtree1: " + diff.nodeA.toStringTree() +
- "\nSubtree2: " + diff.nodeB.toStringTree();
+ if ((com.google.javascript.rhino.Node.this.type) != (node2.type)) {
+ return "Node tree inequality:" +
+ "\nTree1:\n" + toStringTree() +
+ "\nTree2:\n" + node2.toStringTree() +
+ "\nSubtree1: " + diff.nodeA.toStringTree() +
+ "\nSubtree2: " + diff.nodeB.toStringTree();
+ }
Listing 45: "The generated patch for the bug Closure 67"
Number of tests that execute the patch: 2
Execution time: 1 minute, 37 seconds

2.37 Closure 72
--- /tmp/closure_72_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_72_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1381,7 +1381,9 @@
if (diff != null) {
- return "Node tree inequality:" +
- "\nTree1:\n" + toStringTree() +
- "\nTree2:\n" + node2.toStringTree() +
- "\nSubtree1: " + diff.nodeA.toStringTree() +
- "\nSubtree2: " + diff.nodeB.toStringTree();
+ if ((com.google.javascript.rhino.Node.this.type) != (node2.type)) {
+ return "Node tree inequality:" +
+ "\nTree1:\n" + toStringTree() +
+ "\nTree2:\n" + node2.toStringTree() +
+ "\nSubtree1: " + diff.nodeA.toStringTree() +
+ "\nSubtree2: " + diff.nodeB.toStringTree();
+ }
Listing 46: "The generated patch for the bug Closure 72"
Listing 46: "The generated patch for the bug Closure 72"

Number of tests that execute the patch: 2
Execution time: 1 minute, 32 seconds

2.38 Closure 75

--- /tmp/closure_75_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_75_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1410,3 +1410,5 @@
           this.first.getType()) {
             res = n.checkTreeEqualsImpl(n2);
Listing 47: "The generated patch for the bug Closure 75"

Number of tests that execute the patch: 3164
Execution time: 24 minutes, 1 second

2.39 Closure 76

--- /tmp/closure_76_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_76_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1368,7 +1368,9 @@
     if (node2.type < com.google.javascript.rhino.Node.FUNCTION_PROP) {
       return "Node tree inequality:
           " + toStringTree() +
Listing 48: "The generated patch for the bug Closure 76"

Number of tests that execute the patch: 5
Execution time: 1 minute, 30 seconds

2.40 Closure 78

--- /tmp/closure_78_Nopol/src/com/google/javascript/jscomp/PeepholeFoldConstants.java
+++ /tmp/closure_78_Nopol/src/com/google/javascript/jscomp/PeepholeFoldConstants.java
@@ -717,3 +717,5 @@
   if (53 == 0) {
     error(DiagnosticType.error("JSC_DIVIDE_BY_0_ERROR", "Divide by 0"), right);
   }
Listing 49: "The generated patch for the bug Closure 78"

Number of tests that execute the patch: 1
Execution time: 1 minute, 25 seconds

2.41 Closure 111

--- /tmp/closure_111_Nopol/src/com/google/javascript/rhino/testing/Asserts.java
+++ /tmp/closure_111_Nopol/src/com/google/javascript/rhino/testing/Asserts.java
@@ -102,3 +102,3 @@
   if (real == 0) {
     if (a == null) {
     if (a == null) {
   return null;
Listing 50: "The generated patch for the bug Closure 111"
Listing 50: "The generated patch for the bug Closure 111"

Number of tests that execute the patch: 381
Execution time: 2 minutes, 49 seconds

2.42 Closure 113

--- /tmp/closure_113_Nopol/src/com/google/javascript/jscomp/ProcessClosurePrimitives.java
+++ /tmp/closure_113_Nopol/src/com/google/javascript/jscomp/ProcessClosurePrimitives.java
@@ -328,3 +328,3 @@
    // let them be caught in the subsequent run.
    - if (provided != null) {
    + if ((provided != null) || (!(ns.length() < 10))) {
      parent.detachFromParent();

Listing 51: "The generated patch for the bug Closure 113"

Number of tests that execute the patch: 26
Execution time: 2 minutes, 22 seconds

2.43 Closure 114

--- /tmp/closure_114_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_114_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
        "\nTree1:\n" + toStringTree() +
    - "\nTree2:\n" + node2.toStringTree() +
    - "\nSubtree1: " + diff.nodeA.toStringTree() +
    - "\nSubtree2: " + diff.nodeB.toStringTree();
    + if (node2.type < com.google.jsHost.Rhino.Node.JSDOC_INFO_PROP) {
    +    return "Node tree inequality:" +
    +    "\nTree1:\n" + toStringTree() +
    +    "\nTree2:\n" + node2.toStringTree() +
    +    "\nSubtree1: " + diff.nodeA.toStringTree() +
    +    "\nSubtree2: " + diff.nodeB.toStringTree();
    +    }
    }

Listing 52: "The generated patch for the bug Closure 114"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 14 seconds

2.44 Closure 115

--- /tmp/closure_115_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_115_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
        "\nTree1:\n" + toStringTree() +
    - "\nTree2:\n" + node2.toStringTree() +
    - "\nSubtree1: " + diff.nodeA.toStringTree() +
    - "\nSubtree2: " + diff.nodeB.toStringTree();
    + if (node2.type < com.google.jsHost.Rhino.Node.JSDOC_INFO_PROP) {
    +    return "Node tree inequality:" +
    +    "\nTree1:\n" + toStringTree() +
    +    "\nTree2:\n" + node2.toStringTree() +
    +    "\nSubtree1: " + diff.nodeA.toStringTree() +
    +    "\nSubtree2: " + diff.nodeB.toStringTree();
    +    }
    }

Listing 53: "The generated patch for the bug Closure 115"

Number of tests that execute the patch: 14
Execution time: 2 minutes, 18 seconds

2.45 Closure 116

--- /tmp/closure_116_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_116_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
        "\nTree1:\n" + toStringTree() +
        "\nTree2:\n" + node2.toStringTree() +
    - "\nSubtree1: " + diff.nodeA.toStringTree() +
    - "\nSubtree2: " + diff.nodeB.toStringTree();
    + if (node2.type < com.google.jsHost.Rhino.Node.JSDOC_INFO_PROP) {
    +    return "Node tree inequality:" +
    +    "\nTree1:\n" + toStringTree() +
    +    "\nTree2:\n" + node2.toStringTree() +
    +    "\nSubtree1: " + diff.nodeA.toStringTree() +
    +    "\nSubtree2: " + diff.nodeB.toStringTree();
    +    }
    }

Listing 54: "The generated patch for the bug Closure 116"

Number of tests that execute the patch: 6
Execution time: 2 minutes, 20 seconds
Listing 54: "The generated patch for the bug Closure 116"

Number of tests that execute the patch: 13
Execution time: 2 minutes, 13 seconds

2.46 Closure 119

Listing 55: "The generated patch for the bug Closure 119"

Number of tests that execute the patch: 394
Execution time: 32 minutes, 2 seconds

2.47 Closure 120

Listing 56: "The generated patch for the bug Closure 120"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 11 seconds

2.48 Closure 121
Listing 57: "The generated patch for the bug Closure 121"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 12 seconds

2.49 Closure 124

--- /tmp/closure_124_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_124_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1427,7 +1427,9 @@
     if ( diff != null ) {
       return "Node tree inequality:" +
       "\nTree1:\n" + toStringTree() +
-     "\n\nTree2:\n" + node2.toStringTree() +
-     "\n\nSubtree1: " + diff.nodeA.toStringTree() +
-     "\n\nSubtree2: " + diff.nodeB.toStringTree();
+     if ( node2.type < com.google.javascript.rhino.Node.SIDE_EFFECT_FLAGS ) {
+       return "Node tree inequality:" +
+       "\nTree1:\n" + toStringTree() +
+       "\n\nTree2:\n" + node2.toStringTree() +
+       "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+       "\n\nSubtree2: " + diff.nodeB.toStringTree();
     }
   }

Listing 58: "The generated patch for the bug Closure 124"

Number of tests that execute the patch: 8
Execution time: 17 minutes, 49 seconds

2.50 Closure 126

--- /tmp/closure_126_Nopol/src/com/google/javascript/jscomp/MinimizeExitPoints.java
+++ /tmp/closure_126_Nopol/src/com/google/javascript/jscomp/MinimizeExitPoints.java
@@ -142,3 +142,5 @@
      finallyBlock = n.getLastChild();
-     tryMinimizeExits(finallyBlock, exitType, labelName);
+     if (0 == 1) {
+       tryMinimizeExits(finallyBlock, exitType, labelName);
+     }
   }

Listing 59: "The generated patch for the bug Closure 126"

Number of tests that execute the patch: 2
Execution time: 2 minutes, 1 second

2.51 Closure 127

--- /tmp/closure_127_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_127_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1427,7 +1427,9 @@
     if ( diff != null ) {
       return "Node tree inequality:" +
       "\nTree1:\n" + toStringTree() +
-     "\n\nTree2:\n" + node2.toStringTree() +
-     "\n\nSubtree1: " + diff.nodeA.toStringTree() +
-     "\n\nSubtree2: " + diff.nodeB.toStringTree();
+     if ( node2.type < com.google.javascript.rhino.Node.SIDE_EFFECT_FLAGS ) {
+       return "Node tree inequality:" +
+       "\nTree1:\n" + toStringTree() +
+       "\n\nTree2:\n" + node2.toStringTree() +
+       "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+       "\n\nSubtree2: " + diff.nodeB.toStringTree();
     }
   }

Listing 60: "The generated patch for the bug Closure 127"

Number of tests that execute the patch: 13
Execution time: 2 minutes, 4 seconds

2.52 Closure 129
Listing 61: "The generated patch for the bug Closure 129"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 18 seconds

2.53 Closure 130

Listing 62: "The generated patch for the bug Closure 130"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 3 seconds

2.54 Closure 131

Listing 63: "The generated patch for the bug Closure 131"

Number of tests that execute the patch: 9
Execution time: 2 minutes, 21 seconds

2.55 Closure 132
if (diff != null) {
  return "Node tree inequality:" +
    "\nTree1:\n" + toStringTree() +
    "\nTree2:\n" + node2.toStringTree() +
    "\nSubtree1:" + diff.nodeA.toStringTree() +
    "\nSubtree2:" + diff.nodeB.toStringTree();
}

if (com.google.javascript.rhino.Node.this.type <= com.google.javascript.rhino.Node.INFERRED_FUNCTION) {
  return "Node tree inequality:" +
    "\nTree1:\n" + toStringTree() +
    "\nTree2:\n" + node2.toStringTree() +
    "\nSubtree1:" + diff.nodeA.toStringTree() +
    "\nSubtree2:" + diff.nodeB.toStringTree();
}

Listing 64: "The generated patch for the bug Closure 132"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 25 seconds

2.56 Closure 133

--- /tmp/closure_133_Nopol/src/com/google/javascript/jscomp/parsing/JsDocInfoParser.java
+++ /tmp/closure_133_Nopol/src/com/google/javascript/jscomp/parsing/JsDocInfoParser.java
@@ -1412,4 +1412,3 @@
-  if (token == JsDocToken.EOC || token == JsDocToken.EOL ||
-    token == JsDocToken.EOF) {
+  if (com.google.javascript.jscomp.parsing.JsDocInfoParser.this.unreadToken!=null) {
      return new ExtractionInfo("", token);
  }

Listing 65: "The generated patch for the bug Closure 133"

Number of tests that execute the patch: 254
Execution time: 4 minutes, 22 seconds

3. Lang

Nopol repairs 4 bugs in the project Lang.

3.1 Lang 44

--- /tmp/lang_44_Nopol/src/java/org/apache/commons/lang/NumberUtils.java
+++ /tmp/lang_44_Nopol/src/java/org/apache/commons/lang/NumberUtils.java
@@ -192,5 +192,3 @@
-  case 'L':
-    if (dec == null
-      && exp == null
-      && (numeric.charAt(0) == '-' && isDigits(numeric.substring(1)) ||
+  if (((dec == null) && (exp == null)) {
    try {
@@ -201,3 +199,3 @@
      return createBigInteger(numeric);
-    
+    }
}

Listing 66: "The generated patch for the bug Lang 44"

Number of tests that execute the patch: 3
Execution time: 29 seconds

3.2 Lang 51

--- /tmp/lang_51_Nopol/src/java/org/apache/commons/lang/BooleanUtils.java
+++ /tmp/lang_51_Nopol/src/java/org/apache/commons/lang/BooleanUtils.java
@@ -676,6 +676,6 @@
-  if (ch == 'Y') {
-    return
-      (str.charAt(1) == 'E' || str.charAt(1) == 'e') &&
-      (str.charAt(2) == 'S' || str.charAt(2) == 's');
+  if (str!=null) {
+    return
+      (str.charAt(1) == 'E' || str.charAt(1) == 'e') &&

20
Listing 67: "The generated patch for the bug Lang 51"

Number of tests that execute the patch: 1
Execution time: 28 seconds

3.3 Lang 53

Listing 68: "The generated patch for the bug Lang 53"

Number of tests that execute the patch: 6
Execution time: 35 seconds

3.4 Lang 58

Listing 69: "The generated patch for the bug Lang 58"

Number of tests that execute the patch: 3
Execution time: 10 minutes, 26 seconds

4 Math

Nopol repairs 24 bugs in the project Math.

4.1 Math 2

Listing 70: "The generated patch for the bug Math 2"

Number of tests that execute the patch: 63
Execution time: 6 minutes, 18 seconds

4.2 Math 4
Listing 71: "The generated patch for the bug Math 4"
Number of tests that execute the patch: 24
Execution time: 6 minutes, 7 seconds

4.3 Math 7

Listing 72: "The generated patch for the bug Math 7"
Number of tests that execute the patch: 14
Execution time: 20 minutes, 6 seconds

4.4 Math 24

Listing 73: "The generated patch for the bug Math 24"
Number of tests that execute the patch: 2
Execution time: 9 minutes, 53 seconds

4.5 Math 28

Listing 74: "The generated patch for the bug Math 28"
Number of tests that execute the patch: 4
Execution time: 10 minutes, 31 seconds

4.6 Math 33
Listing 75: "The generated patch for the bug Math 33"

Number of tests that execute the patch: 5
Execution time: 9 minutes, 59 seconds

4.7 Math 39

Listing 76: "The generated patch for the bug Math 39"

Number of tests that execute the patch: 101
Execution time: 6 minutes, 49 seconds

4.8 Math 40

Listing 77: "The generated patch for the bug Math 40"

Number of tests that execute the patch: 19
Execution time: 10 minutes, 33 seconds

4.9 Math 41

Listing 78: "The generated patch for the bug Math 41"

Number of tests that execute the patch: 6
Execution time: 4 minutes, 31 seconds

4.10 Math 42
Listing 79: "The generated patch for the bug Math 42"

Number of tests that execute the patch: 16
Execution time: 4 minutes, 39 seconds

4.11 Math 44

--- /tmp/math_44_Nopol/src/main/java/org/apache/commons/math/ode/AbstractIntegrator.java
+++ /tmp/math_44_Nopol/src/main/java/org/apache/commons/math/ode/AbstractIntegrator.java
@@ -286,3 +286,5 @@
statesInitialized = true;
+ if (1 == org.apache.commons.math.ode.AbstractIntegrator.this.stepHandlers.size)
+ statesInitialized = true;
+
Listing 80: "The generated patch for the bug Math 44"

Number of tests that execute the patch: 137
Execution time: 7 minutes, 10 seconds

4.12 Math 49

--- /tmp/math_49_Nopol/src/main/java/org/apache/commons/math/linear/OpenMapRealVector.java
+++ /tmp/math_49_Nopol/src/main/java/org/apache/commons/math/linear/OpenMapRealVector.java
@@ -666,3 +666,5 @@
} else if (entries.containsKey(index)) {
- entries.remove(index);
+ if (org.apache.commons.math.linear.OpenMapRealVector.DEFAULT_ZERO_TOLERANCE == org.apache.commons.math.linear.OpenMapRealVector.this.epsilon) {
+ entries.remove(index);
+
Listing 81: "The generated patch for the bug Math 49"

Number of tests that execute the patch: 3
Execution time: 3 minutes, 18 seconds

4.13 Math 50

--- /tmp/math_50_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BaseSecantSolver.java
+++ /tmp/math_50_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BaseSecantSolver.java
@@ -236,15 +236,17 @@
} else if (atol) {
- switch (allowed) {
- case ANY_SIDE:
- return x1;
- case LEFT_SIDE:
- return inverted ? x1 : x0;
- case RIGHT_SIDE:
+ if (((atol) != (org.apache.commons.math.analysis.solvers.BaseSecantSolver.DEFAULT_ABSOLUTE_ACCURACY)) && (org.apache.commons.math.analysis.solvers.BaseSecantSolver.this.method != null)) || (f0 <= atol)) {
+ switch (allowed) {
+ case ANY_SIDE:
+ return x1;
+ case LEFT_SIDE:
+ return inverted ? x1 : x0;
+ case RIGHT_SIDE:
+ default:
+ throw new MathInternalError();
+ if (((atol) != (org.apache.commons.math.analysis.solvers.BaseSecantSolver.DEFAULT_ABSOLUTE_ACCURACY)) && (org.apache.commons.math.analysis.solvers.BaseSecantSolver.this.method != null)) || (f0 <= atol)) {
+ switch (allowed) {
+ case ANY_SIDE:
+ return x1;
+ case LEFT_SIDE:
+ return inverted ? x1 : x0;
+ case RIGHT_SIDE:
+ return inverted ? x0 : x1;
+ case BELOW_SIDE:
+ return (f1 <= 0) ? x1 : x0;
+ case ABOVE_SIDE:
+ return (f1 >= 0) ? x1 : x0;
+ default:
Number of tests that execute the patch: 21
Execution time: 8 minutes, 22 seconds

4.14 Math 57

Number of tests that execute the patch: 5
Execution time: 3 minutes, 10 seconds

4.15 Math 58

Number of tests that execute the patch: 10
Execution time: 2 minutes, 54 seconds

4.16 Math 69

Number of tests that execute the patch: 11
Execution time: 33 seconds

4.17 Math 73

Number of tests that execute the patch: 11
Execution time: 33 seconds
Listing 86: "The generated patch for the bug Math 73"
Number of tests that execute the patch: 5
Execution time: 34 seconds

4.18 Math 78

```java
--- /tmp/math_78_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BrentSolver.java
+++ /tmp/math_78_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BrentSolver.java
@@ -260 ,3 +260 ,3 @@
    // it should NOT be replaced by proximity test
    - if (x0 == x2) {
    + if (((1 < x2) && (!(y0 <= i))) || (x0 == x2)) {
        // Linear interpolation.
```
Listing 87: "The generated patch for the bug Math 78"
Number of tests that execute the patch: 116
Execution time: 15 minutes, 41 seconds

4.19 Math 80

```java
--- /tmp/math_80_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
+++ /tmp/math_80_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
@@ -1138 ,3 +1138 ,5 @@
    final double tmp = work[i + k];
    - work[i + k] = work[j - k];
    + if (org.apache.commons.math.linear.EigenDecompositionImpl.this.cashedD !=
    + null) {
    +    work[i + k] = work[j - k];
    +    }
    work[j - k] = tmp;
```
Listing 88: "The generated patch for the bug Math 80"
Number of tests that execute the patch: 1
Execution time: 39 seconds

4.20 Math 81

```java
--- /tmp/math_81_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
+++ /tmp/math_81_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
@@ -1585 ,4 +1585 ,4 @@
    case 1 : // one eigenvalue just deflated. use dMin1, dN1 for dMin and dN.
    - if (dMin1 == dN1 && dMin2 == dN2) {
    + if (org.apache.commons.math.linear.EigenDecompositionImpl.this.main !=null) {
    +     } else {
    +     // cases 7 and 8.
    @@ -1618 ,3 +1618 ,3 @@
    -    }
    +    // case 9.
```
Listing 89: "The generated patch for the bug Math 81"
Number of tests that execute the patch: 4
Execution time: 40 seconds

4.21 Math 85

```java
--- /tmp/math_85_Nopol/src/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverUtils.java
+++ /tmp/math_85_Nopol/src/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverUtils.java
@@ -197 ,9 +197 ,9 @@
```

26
if (fa * fb >= 0.0) {
  if (maximumIterations == initial) {
    throw new ConvergenceException(
      "number of iterations={0}, maximum iterations={1}, " +
      "initial={2}, lower bound={3}, upper bound={4}, final a value={5}, " +
      "final b value={6}, f(a)={7}, f(b)={8}" ,
      numIterations, maximumIterations, initial,
      lowerBound, upperBound, a, b, fa, fb);
  }
}

Listing 90: "The generated patch for the bug Math 85"

Number of tests that execute the patch: 17
Execution time: 37 seconds

4.22 Math 87

if (!restrictToNonNegative) {
  matrix[row][get SlackVariableOffset() - 1] =
  if ((1) != (constraints.size())) {
    matrix[row][get SlackVariableOffset() - 1] =
    getInvertedCoefficientSum(constraint.getCoefficients());
  }
}

Listing 91: "The generated patch for the bug Math 87"

Number of tests that execute the patch: 12
Execution time: 50 seconds

4.23 Math 88

if (tableau.getEntry(basicRow, j) == 1) {
  coefficients[i] = 0;
  if (org.apache.commons.math.optimization.linear.SimplexTableau.this.
      constraints.size() < org.apache.commons.math.optimization.linear.SimplexTableau.this.
      numDecisionVariables) {
    coefficients[i] = 0;
  }
}

Listing 92: "The generated patch for the bug Math 88"

Number of tests that execute the patch: 3
Execution time: 23 seconds

4.24 Math 105

xbar = x;
if (y <= x) {
  ybar = y;
  if (y <= x) {
    ybar = y;
  }
} else {

Listing 93: "The generated patch for the bug Math 105"

Number of tests that execute the patch: 9
Execution time: 35 seconds

5 Mockito

Nopol repairs 2 bugs in the project Mockito.
5.1 Mockito 29

Listing 94: "The generated patch for the bug Mockito 29"

Number of tests that execute the patch: 5
Execution time: 18 seconds

5.2 Mockito 38

Listing 95: "The generated patch for the bug Mockito 38"

Number of tests that execute the patch: 173
Execution time: 3 minutes, 12 seconds

6 Time

Nopol repairs 8 bugs in the project Time.

6.1 Time 4

Listing 96: "The generated patch for the bug Time 4"

Number of tests that execute the patch: 75
Execution time: 56 seconds

6.2 Time 7

Listing 97: "The generated patch for the bug Time 7"

Number of tests that execute the patch: 84
Execution time: 43 seconds

6.3 Time 11
if (tailZone != null) {
  if (tailZone.iStartRecurrence.getNameKey().equals(tailZone.iEndRecurrence.getNameKey())) {
    if (ZoneInfoCompiler.verbose()) {
      System.out.println("Fixing duplicate recurrent name key - " + tailZone.iStartRecurrence.getNameKey());
      tailZone.iStartRecurrence.getNameKey());
    }
  } else {
    tailZone = new DSTZone(
      tailZone.getID(),
      tailZone.iStandardOffset,
      tailZone.iStartRecurrence.renameAppend("-Summer"),
      tailZone.iEndRecurrence);
    tailZone = new DSTZone(
      tailZone.getID(),
      tailZone.iStandardOffset,
      tailZone.iStartRecurrence.renameAppend("-Summer"),
      tailZone.iEndRecurrence);
  }
}

Listing 98: "The generated patch for the bug Time 11"

Number of tests that execute the patch: 18
Execution time: 53 seconds

6.4 Time 12

Listing 99: "The generated patch for the bug Time 12"

Number of tests that execute the patch: 159
Execution time: 1 minute, 29 seconds

6.5 Time 14

Listing 100: "The generated patch for the bug Time 14"

Number of tests that execute the patch: 63
Execution time: 37 seconds

6.6 Time 16
Listing 101: "The generated patch for the bug Time 16"

Number of tests that execute the patch: 54
Execution time: 40 seconds

6.7 Time 18

--- /tmp/time_18_Nopol/src/main/java/org/joda/time/chrono/BasicChronology.java
+++ /tmp/time_18_Nopol/src/main/java/org/joda/time/chrono/BasicChronology.java
@@ -604,3 +604,5 @@
    FieldUtils.verifyValueBounds(DateTimeFieldType.monthOfYear(), monthOfYear, 1,
                getMaxMonth(year));
    FieldUtils.verifyValueBounds(DateTimeFieldType.dayOfMonth(), dayOfMonth, 1,
                getDaysInYearMonth(year, monthOfYear));
    + if ((!(10 == monthOfYear )) && (((31) - (2) ) != ( dayOfMonth ))) {
    + FieldUtils.verifyValueBounds(DateTimeFieldType.dayOfMonth(), dayOfMonth, 1,
                getDaysInYearMonth(year, monthOfYear));
    + }
    return getYearMonthDayMillis(year, monthOfYear, dayOfMonth);

Listing 102: "The generated patch for the bug Time 18"

Number of tests that execute the patch: 3456
Execution time: 7 minutes, 48 seconds

6.8 Time 19

--- /tmp/time_19_Nopol/src/main/java/org/joda/time/DateTimeZone.java
+++ /tmp/time_19_Nopol/src/main/java/org/joda/time/DateTimeZone.java
@@ -899,3 +899,3 @@}
    } else if (offsetLocal > 0) {
    + } else if (org.joda.time.DateTimeZone.this.iID != null) {
      long prev = previousTransition(instantAdjusted);

Listing 103: "The generated patch for the bug Time 19"

Number of tests that execute the patch: 2139
Execution time: 3 minutes, 24 seconds

References

