

Software Quality FS 2017

Discussion Exercise 2

Eya Ben Charrada

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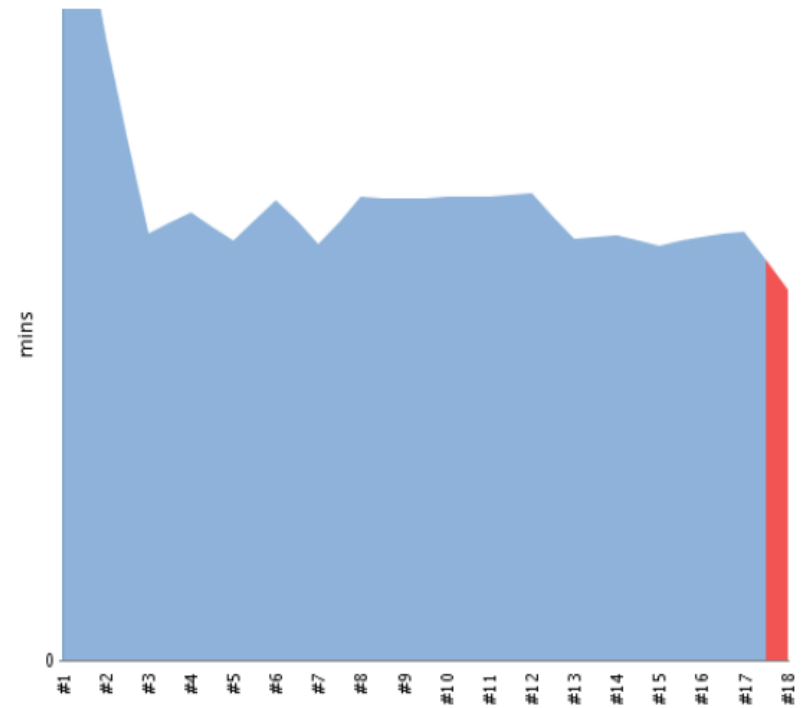
**University of
Zurich** ^{UZH}

ImageJ Builds

Build Time Trend

Build History		(trend)
#18	Mar 20, 2017 12:43:52 PM	
#17	Mar 20, 2017 12:40:41 PM	
#16	Mar 20, 2017 12:25:52 PM	
#15	Mar 20, 2017 9:28:52 AM	
#14	Mar 20, 2017 7:29:52 AM	
#13	Mar 16, 2017 7:40:52 PM	
#12	Mar 16, 2017 11:14:52 AM	
#11	Mar 16, 2017 10:42:52 AM	
#10	Mar 16, 2017 10:35:52 AM	
#9	Mar 16, 2017 10:33:52 AM	
#8	Mar 16, 2017 10:32:52 AM	
#7	Mar 15, 2017 11:36:52 AM	
#6	Mar 15, 2017 11:16:52 AM	
#5	Mar 15, 2017 10:48:52 AM	
#4	Mar 14, 2017 1:34:52 PM	
#3	Mar 14, 2017 12:00:52 PM	
#2	Mar 14, 2017 11:27:52 AM	
#1	Feb 6, 2017 11:56:52 AM	

Build	↑ Duration
#18	9 sec
#17	10 sec
#16	10 sec
#15	10 sec
#14	10 sec
#13	10 sec
#12	11 sec
#11	11 sec
#10	11 sec
#9	11 sec
#8	11 sec
#7	10 sec
#6	11 sec
#5	10 sec
#4	10 sec
#3	10 sec
#2	15 sec
#1	21 sec



ImageJ

• Closing Tickets

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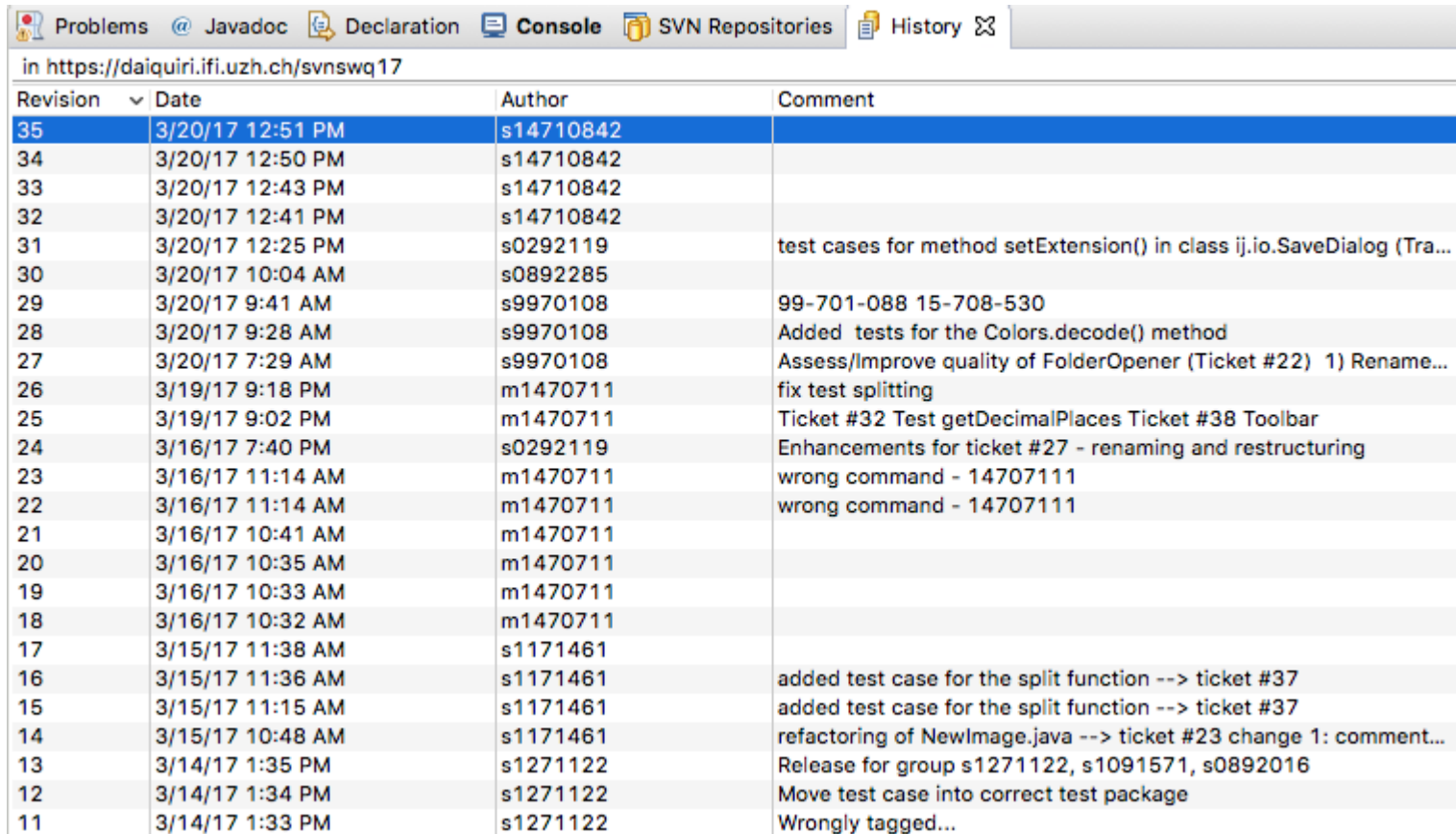
{6} All Tickets By Milestone (Including closed) (41 matches)

A more complex example to show how to make advanced reports.

Ticket	Summary	Component	Status	Resolution	Version	Type	Priority	Owner	Modified
# 25	Resizer	component1	new	None		enhancement	major	somebody	03/09/17
# 20	CurveFitter	component1	accepted	None		enhancement	major	14-740-419	03/15/17
# 24	Options	component1	accepted	None		enhancement	major	s14710842	03/15/17
# 29	Test ConvertArray	component1	accepted	None		task	major	s14710842	03/15/17
# 26	RoiDecoder	component1	new	None		enhancement	major	somebody	03/09/17
# 33	Test hexToColor	component1	accepted	None		task	major	s0892285	03/15/17
# 19	Calibrator	component1	new	None		enhancement	major	somebody	03/09/17
# 39	Test Contrast Enhancement	component1	new	None		task	major	somebody	03/09/17
# 40	Test Image Rotation/Transformation	component1	new	None		task	major	somebody	03/09/17
# 35	Test Image Scaling/Resizing	component1	new	None		task	major	somebody	03/09/17
# 41	access to the version control repository	component1	new	None		defect	major	m1053681	03/15/17
# 36	Test setExtension	component1	closed	fixed		task	major	s1072850	03/20/17
# 32	Test getDecimalPlaces	component1	closed	fixed		task	major	m1470711	03/20/17
# 38	Toolbar	component1	closed	fixed		enhancement	major	m1470711	03/20/17
# 30	Test Decode	component1	closed	fixed		task	major	s9970108	03/20/17
# 22	FolderOpener	component1	closed	fixed		enhancement	major	s9970108	03/20/17
# 27	Scaler	component1	closed	fixed		enhancement	major	s1072850	03/16/17
# 23	NewImage	component1	closed	fixed		enhancement	major	s1170843	03/15/17

ImageJ

- Comments



Revision	Date	Author	Comment
35	3/20/17 12:51 PM	s14710842	
34	3/20/17 12:50 PM	s14710842	
33	3/20/17 12:43 PM	s14710842	
32	3/20/17 12:41 PM	s14710842	
31	3/20/17 12:25 PM	s0292119	test cases for method setExtension() in class ij.io.SaveDialog (Tra...
30	3/20/17 10:04 AM	s0892285	
29	3/20/17 9:41 AM	s9970108	99-701-088 15-708-530
28	3/20/17 9:28 AM	s9970108	Added tests for the Colors.decode() method
27	3/20/17 7:29 AM	s9970108	Assess/Improve quality of FolderOpener (Ticket #22) 1) Rename...
26	3/19/17 9:18 PM	m1470711	fix test splitting
25	3/19/17 9:02 PM	m1470711	Ticket #32 Test getDecimalPlaces Ticket #38 Toolbar
24	3/16/17 7:40 PM	s0292119	Enhancements for ticket #27 - renaming and restructuring
23	3/16/17 11:14 AM	m1470711	wrong command - 1470711
22	3/16/17 11:14 AM	m1470711	wrong command - 1470711
21	3/16/17 10:41 AM	m1470711	
20	3/16/17 10:35 AM	m1470711	
19	3/16/17 10:33 AM	m1470711	
18	3/16/17 10:32 AM	m1470711	
17	3/15/17 11:38 AM	s1171461	
16	3/15/17 11:36 AM	s1171461	added test case for the split function --> ticket #37
15	3/15/17 11:15 AM	s1171461	added test case for the split function --> ticket #37
14	3/15/17 10:48 AM	s1171461	refactoring of NewImage.java --> ticket #23 change 1: comment...
13	3/14/17 1:35 PM	s1271122	Release for group s1271122, s1091571, s0892016
12	3/14/17 1:34 PM	s1271122	Move test case into correct test package
11	3/14/17 1:33 PM	s1271122	Wrongly tagged...

Imagej

- Comments

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11	3/14/17 1:33 PM	s1271122	Wrongly tagged...
10	3/14/17 12:04 PM	s1271122	Release for group s1271122, s1091571, s0892016
9	3/14/17 12:00 PM	s1271122	Closes #31: Test ij.util.Tools.fixNewLines()
8	3/14/17 11:26 AM	s1271122	s1271122: Refactor filters

Action	Affected paths	Description
M	/imagej/trunk/src/main/java/ij/gui/NewImage.java	refactoring of NewImage.java --> ticket #23 change 1: commented unused imports change 2: commented unused constructor change 3: prevented possible nullpointerexception by creating a new Object() instead of setting it to null

JUnit

```
@Test
public void decode() throws Exception {
    ...
    hex = "#37F49A";
    c = Colors.decode(hex, green);
    assertEquals(0x37, c.getRed());
    assertEquals(0xF4, c.getGreen());
    assertEquals(0x9A, c.getBlue());
}
```

Only the first failure is reported by a test method

Testing strategies

- **Black-box:**
 - Boundary values
 - Equivalence partitioning
- **White-box:**
 - Coverage (branch, statement,...)
- **Documentation challenge**

Testing

Documentation challenge

« First **it was very hard to understand what the method exactly** does, because the results that were provided did not make sense for me. There are absolutely no comments except the method header: `"/** Returns the number of decimal places need to display two numbers. */"`, which is quite useless because one can guess this functionality from the method name... »

Testing Coverage Tools

Instruction metric coverage summary:

Markers Prop... Servers Data... Snipp... Cons... JUnit History Call H... CVS R... Team... Task... CVS E... Cover...

ToolsTest (2014.03.18, 0:55:03)

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
parseDouble(String)	0,0 %	0	4	4
split(String)	0,0 %	0	4	4
getDecimalPlaces(double, double)	100,0 %	81	0	81
StringSorter.java	0,0 %	0	110	110
Java2.java	0,0 %	0	69	69
src/test/java	72,0 %	72	28	100

Branch metric coverage summary:

ToolsTest (2014.03.18, 1:06:53)

Element	Coverage	Covered Branches	Missed Branches	Total Branches
getMinMax(float[])	0,0 %	0	6	6
split(String, String)	0,0 %	0	6	6
fixNewLines(String)	0,0 %	0	4	4
getDecimalPlaces(double, double)	100,0 %	22	0	22
c2hex(Color)	0,0 %	0	2	2
f2hex(float)	0,0 %	0	2	2

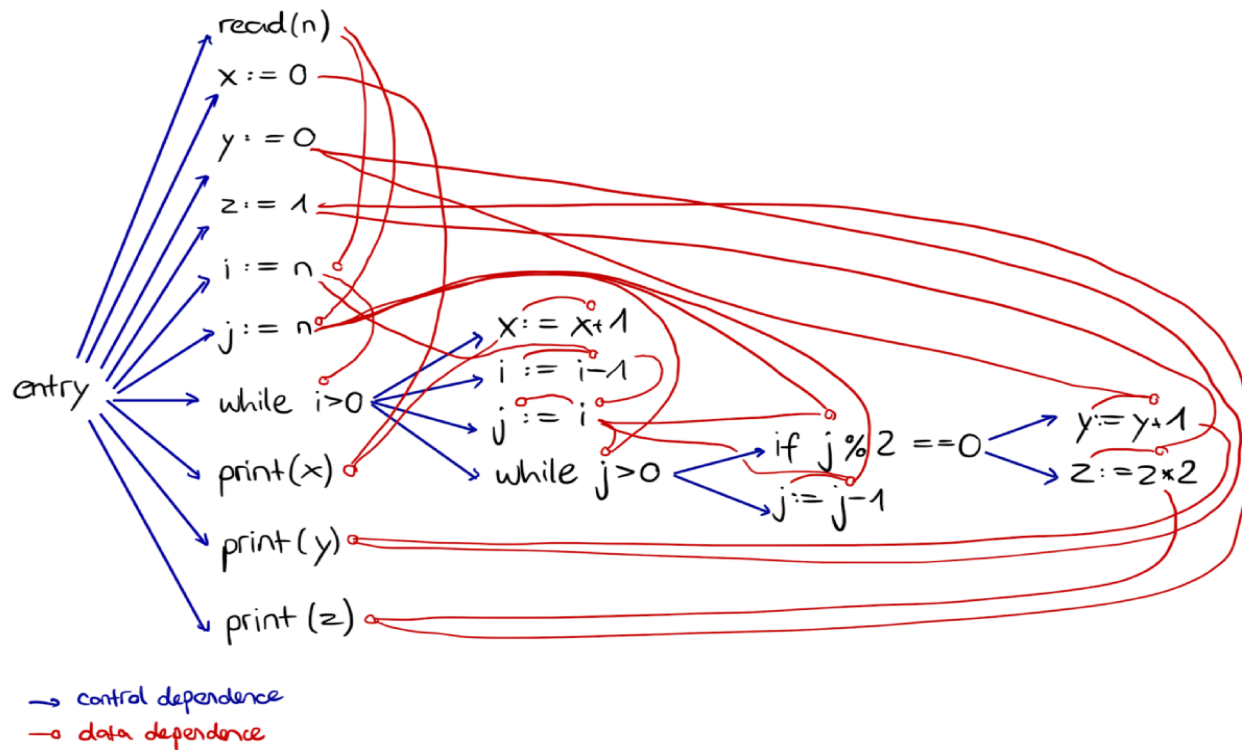
JUnit

```
public class MyTestCase {  
  
    @Before  
    public void setUp() {  
        // Set up for the test  
    }  
  
    @Test  
    public void testCondition1() {  
        assertTrue(condition1);  
    }  
  
    @Test  
    public void testCondition2() {  
        assertTrue(condition2);  
    }  
}
```

Dependencies

What's wrong?

Task 3a



Dependencies

Slicing

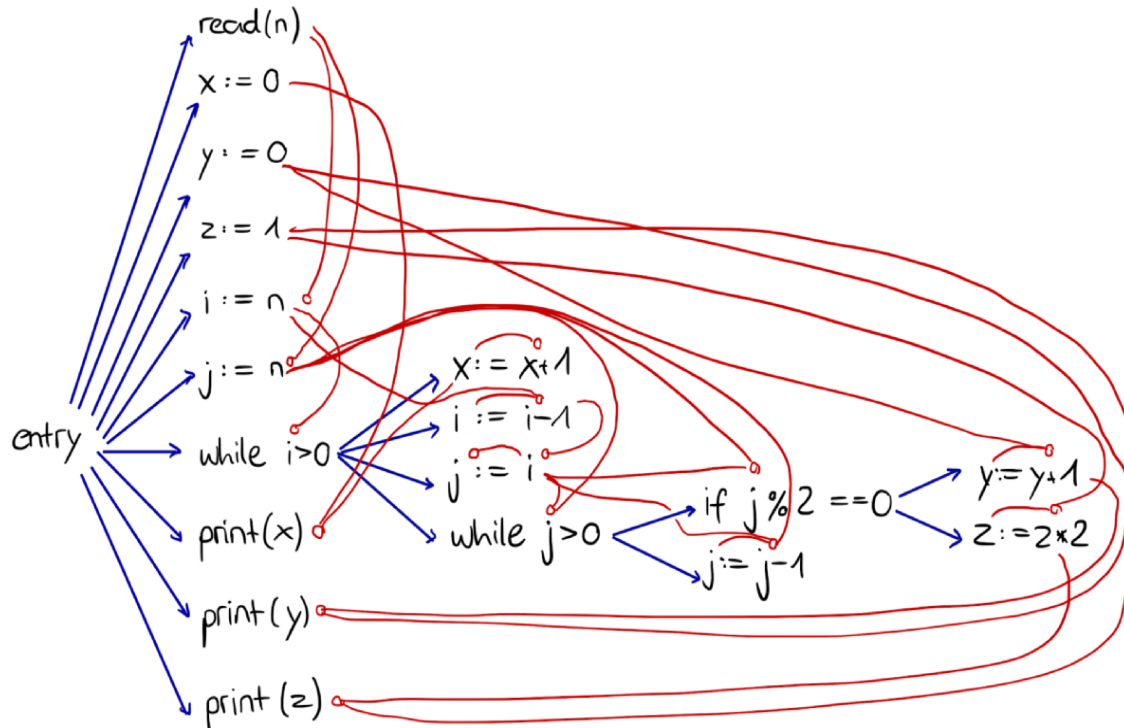
Forward slice: Which parts may be affected?

Backward slice: A version of the original program with some parts missing, can be compiled and executed.

[Source: <http://www.cs.ucl.ac.uk/staff/mharman/exe1.html>]

Dependencies

Slicing



```
public static void calculateXYZ(int n) {
    int x = 0;
    int y = 0;
    int z = 1;
    int i = n;
    int j = n;
    while (i > 0) {
        x = x + 1;
        i = i - 1;
        j = i;
        while (j > 0) {
            if (j % 2 == 0)
                y = y + 1;
            else
                z = z * 2;
            j = j - 1;
        }
    }
    System.out.println(x);
    System.out.println(y);
    System.out.println(z);
}
```

Exam

- **Location:** BIN 2.A.10
- **Duration:** 90 minutes
- **Scope:**
 - Lecture's slides
 - Exercises
- **Cheat sheet:** 1 double-sided handwritten A4 page

Exam

Structure

- 1/3 knowledge questions
- 1/3 application
- 1/3 essay and writings

Sample exam is available on the
lecture's website