

When a Virtual Machine is not Complex Enough

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What is STX:LIBJAVA

A Java
implementation for
Smalltalk/X

Smalltalk/X

What is Smalltalk/X??

- Fast smalltalk implementation

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- VM written in C, including JIT

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What is Smalltalk/X??

- Fast smalltalk implementation
- VM written in C, including JIT
- Support for Ruby, Javascript, XQuery, Pascal

Why yet another language?

- different approach

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- possibility to reuse existing code

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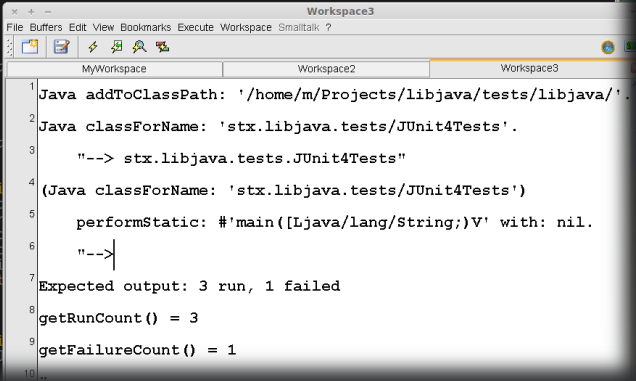
and it's fun :)

Hands on - JUnit

Hands on - JUnit

```
36
35 public class JUnit4Tests {
34
33     @Test
32     public void helloWorld() {
31         assertEquals("Is zero equal 5-5 test",0, (5-5));
30     }
29
28     @Test
27     public void assertEquals() {
26         assertEquals(0, (5-5));
25     }
24
23     @Test
22     public void assertEquals() {
21         assertEquals(0, (5-5));
20     }
19
18     public static void main(String[] args) {
17         System.out.println("JUnit4Tests");
16         Result r = new Result();
15         System.out.println(r.toString());
14         System.out.println(r.toString());
13         for (Failure f : r.getFailures()) {
12             System.out.println(f.toString());
11         }
10     }
9
8     public static void main(String[] args) {
7         return 0;
6     }

```

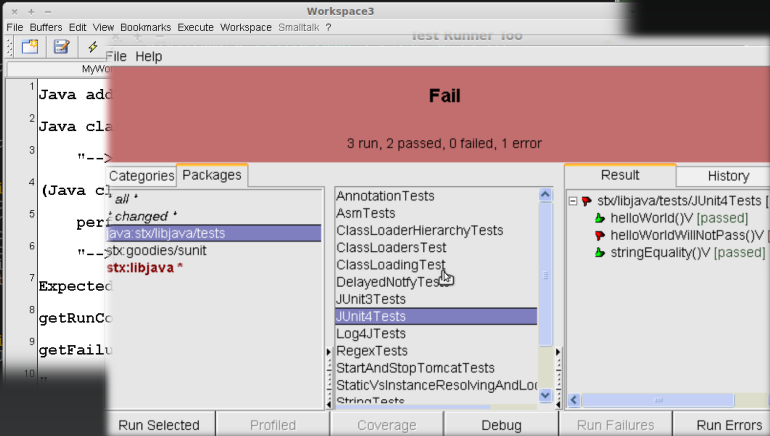


```
Workspace3
File Buffers Edit View Bookmarks Execute Workspace Smalltalk ?
MyWorkspace Workspace2 Workspace3
1 Java addToClassPath: '/home/m/Projects/libjava/tests/libjava/'.
2 Java classForName: 'stx.libjava.tests/JUnit4Tests'.
3     "--> stx.libjava.tests.JUnit4Tests"
4 (Java classForName: 'stx.libjava.tests/JUnit4Tests')
5     performStatic: #'main([Ljava/lang/String;)V' with: nil.
6     "-->
7 Expected output: 3 run, 1 failed
8 getRunCount() = 3
9 getFailureCount() = 1
10

```

Hands on - JUnit

```
30
31 public class JUnit4Tests {
32
33     @Test
34     public void helloWorld() {
35         assertEquals("Is zero equal 5-5 test",0, (5-5));
36     }
37
38     @Test
39     public void assertEquals() {
40         assertEquals(1, 1);
41     }
42
43     @Test
44     public void assertEquals() {
45         assertEquals(1, 1);
46     }
47
48     public static void main(String[] args) {
49         System.out.println("JUnit4Tests");
50         Result r = new Result();
51         System.out.println(r);
52         System.out.println("Expected");
53         for (Fail f : r.getFailures()) {
54             System.out.println(f);
55         }
56     }
57
58     public static void getRunCo
59     public static void getFailu
60 }
```



Hands on - JUnit

That's it??



Hands on - JUnit

That's it??

Not quite yet



How it works?

- loads Java `.class` files

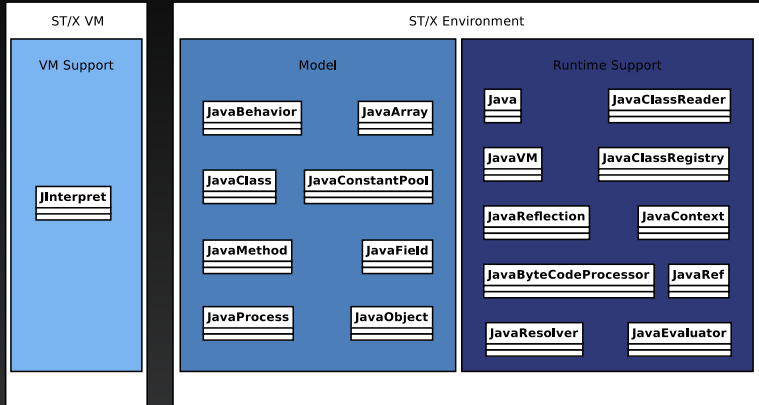
How it works?

- loads Java `.class` files
- executes Java bytecodes (no translation)

How it works?

- loads Java `.class` files
- executes Java bytecodes (no translation)
- no difference between Java and Smalltalk objects

High level overview



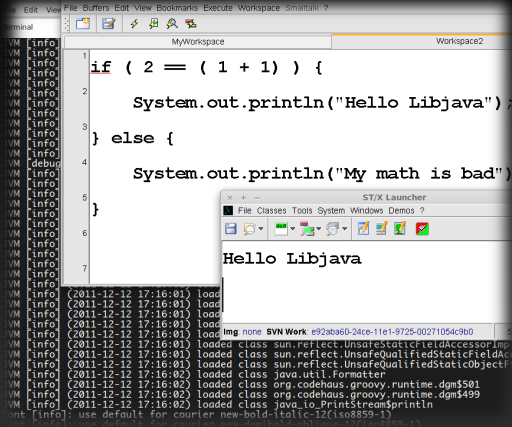
Hands on - Groovy



Hands on - Groovy

[illegible]

Hands on - Groovy



The screenshot shows an IDE with a Groovy script. The code defines a function that checks if 2 equals 1 + 1. If true, it prints "Hello Libjava"; otherwise, it prints "My math is bad". The output window shows "Hello Libjava". The console shows a series of "load" messages for various classes, including `sun.reflect.UnsafeStaticFieldAccessorImpl`, `sun.reflect.UnsafeQualifiedStaticFieldAccessorImpl`, `sun.reflect.UnsafeQualifiedStaticObjectFieldAccessorImpl`, `java.util.Formatter`, `org.codehaus.groovy.runtime.dgm$501`, `org.codehaus.groovy.runtime.dgm$499`, and `java.io.PrintStream$Println`.

```
File Edit View File Buffers Edit View Bookmarks Execute Workspace Smalltalk ?
terminal
MyWorkspace Workspace2
1 if ( 2 == ( 1 + 1 ) ) {
2     System.out.println("Hello Libjava");
3 } else {
4     System.out.println("My math is bad");
5 }
6
7
Hello Libjava
(2011-12-12 17:16:01) load
(2011-12-12 17:16:01) load
(2011-12-12 17:16:01) load
(2011-12-12 17:16:01) load
(2011-12-12 17:16:01) load
(2011-12-12 17:16:01) loaded class sun.reflect.UnsafeStaticFieldAccessorImpl
(2011-12-12 17:16:01) loaded class sun.reflect.UnsafeQualifiedStaticFieldAcc
(2011-12-12 17:16:01) loaded class sun.reflect.UnsafeQualifiedStaticObjectf
(2011-12-12 17:16:02) loaded class java.util.Formatter
(2011-12-12 17:16:02) loaded class org.codehaus.groovy.runtime.dgm$501
(2011-12-12 17:16:02) loaded class org.codehaus.groovy.runtime.dgm$499
(2011-12-12 17:16:02) loaded class java.io.PrintStream$Println
ont [info]: use default for courier new-bold-italic-12(iso8859-1)
```



Ok, better, but still..

Obstacles on the way

- Class Loaders



Obstacles on the way

- Class Loaders
- Synchronization



Obstacles on the way

- Class Loaders
- Synchronization
- Exceptions



Obstacles on the way

- Class Loaders
- Synchronization
- Exceptions
- finally



Hands on - Tomcat



Hands on - Tomcat



The screenshot shows a web browser window with the title "Apache Tomcat". The address bar contains "swing.fit.cvut.cz:8085". The browser's bookmark bar shows several folders: "ril", "VM Spec", "to_watch", "st", "ebee", "guitar", "ww", "lisp", "cs", and "katas". The main content area displays the "Apache Tomcat & stX:libJava" logo, which includes a yellow cat icon on the left and the text "stX:libJava" in a stylized font. Below the logo, there is a sidebar with navigation links: "Administration", "Status", "Tomcat Manager", "Documentation", and "Release Notes". The main text area contains the following content:

If you're seeing this page via a web browser, it

As you may have guessed by now, this is the default page of the Tomcat web server.

`$CATALINA_HOME/webapps/ROOT/`

where "`$CATALINA_HOME`" is the root of the Tomcat installation. If you don't think you should be, then you're either a user or an administrator who hasn't got his/her setup quite right.



Bits missing -- future work

- JIT



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- Integration



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- Integration
- Incremental compiler



Bits missing -- future work

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- Integration
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but mostly

interoperability



Questions

Q & A

