



Program Verification Environment

Integrated tool set built on Eclipse IDE and JML
infrastructure (JML4 is also built on Eclipse).
Each component of MOBIUS is also a complete
software package in itself e.g. ESC/Java2.

Mobius

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MOBIUS Components

Name	Languages Processed	Main Repository	Plugin Repository
BML Library	BML	src/BmlLib/trunk	src/BmlLib_plugin
BONc	BON	src/bon	
Coq Editor	Coq		
Simplify	Mobius VC AST → Simplify	src/simplify	src/simplify_plugin
Bico	BC → Bicolano BC (Coq)	src/bico	
DirectVCGen	Source + FOL → Mobius VC AST	src/escjava/trunk/MobiusDirectVCGen	
CCT		src/CCT/trunk	
BML2BPL	BML → BPL	src/BML_BPL_Translator	
ETHZ JML2 Plugin	JML		
ESC/Java2	Java + JML → Mobius VC AST	src/escjava/trunk/ESCTools	src/escjava_plugin
Examples		src/examples	
Freeboogie	BPL → Mobius VC AST	src/freeboogie/trunk/FreeBoogie	
Javafe	Java + Bytecode → Mobius VC AST	src/Javafe	src/Javafe_plugin
JML2BML	JML → BML	src/Jml2Bml/trunk	
JML Class Library		src/Jmlclasslib	
JML Folding	JML		src/JML_folding_plugin
Logging		src/logging	
Plugin Library			libs/pluginlib
Prover Editor			src/provereditor_plugin
Umbra	Java Bytecode	src/Umbra/trunk	src/Umbra_plugin

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<http://trac.edgewall.org/>

Done

mobius.ucd.ie

Architecture

- Languages: BON, BPL, ByteCode, BML, Coq, Java 1.4, Java 1.5, Java 6, JavaCard, JML...
- Actions: Static Analysis, Abstract Syntax Trees, Transformation...
- Interfaces: command line, front-end API, back-end (e.g. theorem provers), interactive plug-ins...

Interaction

- PVE components communicate with each other using a shared language and interface
- Example: Extended Static Checking
JavaFE: Java/JML \rightarrow AST
ESC/Java2: AST \rightarrow VC
Simplify: VC \rightarrow Success/Fail
Logging: Success/Fail \rightarrow Eclipse warnings
ESC plugin: adds markers to the code

Distributed Testing

- Maven
- Project Object Model (POM)
- Hudson - Continuous Integration Engine
- <http://voting.ucd.ie:8080/>

Hudson » ESCJava2_mvn_clean_install

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Build Queue

No builds in the queue.

Build History [\(trend\)](#)

#25	Jun 11, 2008 10:11:25 AM
#24	Jun 10, 2008 2:31:10 PM
#22	Jun 10, 2008 1:31:10 PM
#21	Jun 10, 2008 11:13:14 AM
#20	Jun 10, 2008 10:31:08 AM
#19	Jun 9, 2008 5:01:45 PM
#18	Jun 9, 2008 2:46:12 PM
#17	Jun 9, 2008 11:01:45 AM
#16	Jun 6, 2008 6:01:45 PM
#15	Jun 6, 2008 4:01:44 PM
#14	Jun 5, 2008 6:01:44 PM
#12	May 29, 2008 3:00:06 PM
#11	May 29, 2008 1:25:17 PM
#10	May 28, 2008 2:09:17 PM
#9	May 26, 2008 2:05:29 PM
#8	May 23, 2008 4:48:16 PM
#6	May 21, 2008 9:27:28 AM
#4	May 20, 2008 4:01:51 PM
#3	May 20, 2008 3:33:06 PM
#2	May 20, 2008 3:29:51 PM
#1	May 20, 2008 2:39:19 PM
#0	May 20, 2008 2:01:57 PM

[for all](#) [for failures](#)

Project name ESCJava2_mvn_clean_install

Description Extended Static Checker for Java, version 2

☐ Discard Old Builds

Disable Build ☐ (No new builds will be executed until the project is re-enabled.)

☐ Tie this project to a node

Advanced Project Options

Advanced...

Source Code Management

☐ None

☐ CVS

☒ Subversion

Modules Repository URL [https://mobius.ucd.ie/repos/src/escjava/trunk/ESCTools](#)

Local module directory (optional) ESCJava2

Add more locations...

Use update ☒

If checked, Hudson will use 'svn update' whenever possible, making the build faster. But this causes the artifacts from the previous build to remain when a new build starts.

Repository browser (Auto)

Build Triggers

☐ Trigger builds remotely (e.g., from scripts)

☒ Poll SCM

Schedule 30 * * * *

☐ Build periodically

Build

Root POM pom.xml

Goals clean install

Advanced...

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Test Result

2 failures (+2)

313 tests (±0)

All Failed Tests

Test Name	Duration	Age
junitutils.TestFilesTestSuite\$Helper.src/test/resources/FormalNonnullInheritance.java	1.075	1
junitutils.TestFilesTestSuite\$Helper.src/test/resources/NonnullBad.java	1.183	1

All Tests

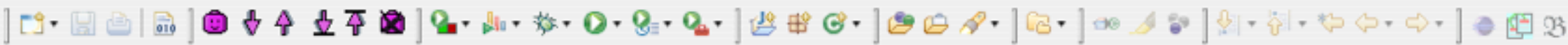
Package	Duration	Fail	(diff)	Total	(diff)
junitutils	5 minutes 43 seconds	2	+2	313	

Test Environments

- Mac OS X 10.4 and 10.5 (ppc and intel)
- Linux (i386)
- Solaris

Release Modes

- Standalone command line tools
- Eclipse plugins
- MOBIUS PVE customization of Eclipse


 Package Explorer
 Hierarchy

- ▶ BML [src/BmlLib]
- ▶ BML_BPL_Translator [src/BML_BPL_Translator]
- ▶ CCT [src/CCT]
- ▶ ESCJava2 [src/escjava/trunk/ESCTools]
- ▶ Escjava2Feature [src/escjava_plugin/Escjava2Feature]
- ▶ Escjava2UI [src/escjava_plugin/Escjava2UI]
- ▶ Escjava2UpdateSite [src/escjava_plugin/Escjava2UpdateSite]
- ▶ Esctools [src/escjava_plugin/Esctools]
- ▶ Examples [src/examples]
- ▶ freeboogie [src/freeboogie]
- ▶ Javafe [src/Javafe/trunk]
- ▶ JavafeFeature [src/Javafe_plugin/JavafeFeature]
- ▶ JavafePlugin [src/Javafe_plugin/JavafePlugin]
- ▶ JavafeUpdateSite [src/Javafe_plugin/JavafeUpdateSite]
- ▶ Jml2Bml [src/Jml2Bml]
- ▶ jmlspecs
- ▶ MobiusDirectVCGen [src/escjava/trunk/MobiusDirectVCGen]
- ▶ MobiusUILibrary [libs/pluginlib]
- ▶ MobiusUILibraryFeature [libs/pluginlib_feature]
- ▶ Simplify [src/simplify_plugin/SimplifyPlugin]
- ▶ SimplifyFeature [src/simplify_plugin/SimplifyFeature]
- ▶ SimplifyProver [src/simplify]
- ▶ SimplifyUpdateSite [src/simplify_plugin/SimplifyUpdateSite]

Bill.java

```

/**
 * The Bill class provides an abstract implementation of the bill
 * functionality. It calculates the aggregate cost for series of
 * investments based on the implementation of the method which gives
 * the cost of a single round (to be implemented in subclasses).
 *
 * @author Hermann Lehner, Aleksy Schubert, Joseph Kiniry
 */

abstract class Bill
{
    private /*@ spec_public @*/ int sum;
    //@ public invariant 0 <= sum;

    /**
     * This method gives a cost of a single round.
     *
     * @param x is the number of the particular round
     * @return the cost of the investment in this round, it's not
     * greater than <code>x</code>.
     */
    //@ ensures 0 <= \result & \result <= x;
    abstract int roundCost(int x) throws Exception;

    /**
     * This method calculates the cost of the whole series of
     * investments.
     *
     * @return <code>true</code> when the calculation is successful and
     * <code>false</code> when the calculation cannot be performed.
     */
    //@ requires 0 < n;
    //@ ensures sum <= \old(sum) + n*(n+1)/2;
    public boolean produce_bill(final int n) {
        int i = 0;
        try {
            //@ loop_invariant 0 < i & i <= n + 1 & 0 <= sum & sum <= \old(sum) + (i - 1) * i / 2;

```

 Problems
 @ Javadoc
Declaration
Console

ESC/Java2

[2.039 s 97971176 bytes] failed

Bill: Bill() ...

[0.021 s 98177112 bytes] passed

[2.857 s 98178248 bytes total]

1 warning

Operating Environments

- Mac OS X (ppc and intel)
- Linux (32 bit)
- Windows XP and Vista

Summary/Questions

- What remains to be done?
- What support/help do you need to use/develop/integrate with the PVE?
- Any other questions or issues?