



source:https://communityovercode.files.wordpress.com/2023/03/halifax_harbour_sunset_skyline.jpg

Maven 102

Best Practices

Brian Demers
Open Source Developer

 BrianDemers  bdemers

Who is this guy?



Java™
Champions



Maven™

Sonatype
Nexus





TABS



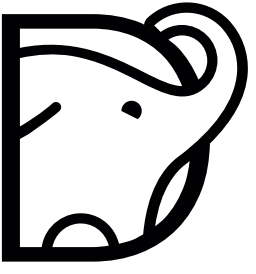
SPACES



vs



Gradle

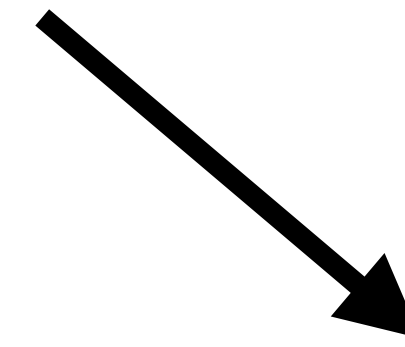
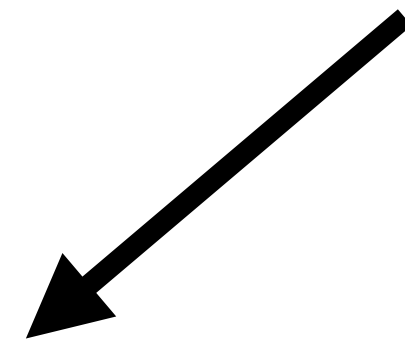
BUILD  TOOL

VS

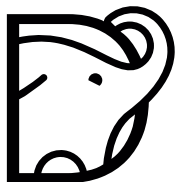
Maven  TM



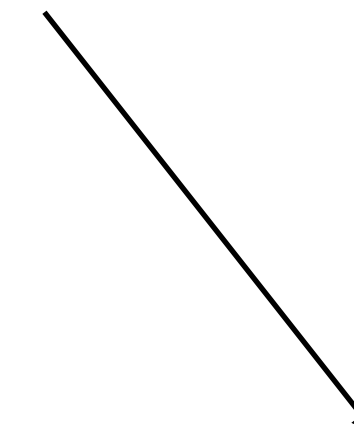
Gradle



Gradle

BUILD  TOOL

 DEVELOLOCITY



Developer
Productivity
Engineering

Gradle

BUILD  TOOL

Maven[™]

 Bazel

sbt

https://ge.apache.org

The screenshot displays the Gradle Enterprise interface. At the top, there are navigation tabs for 'Build Scans', 'Performance', 'Trends', 'Failures', 'Tests', and 'Predictive Test Selection'. A search bar is located below the navigation, with filters for 'User', 'Hostname', 'Project' (set to '*scim*'), 'Requested tasks/goals', 'Build tool', and 'Build tool version'. The 'Start time' filter is set to 'Last 90 days'. A 'Refresh' button is visible on the right side of the search area.

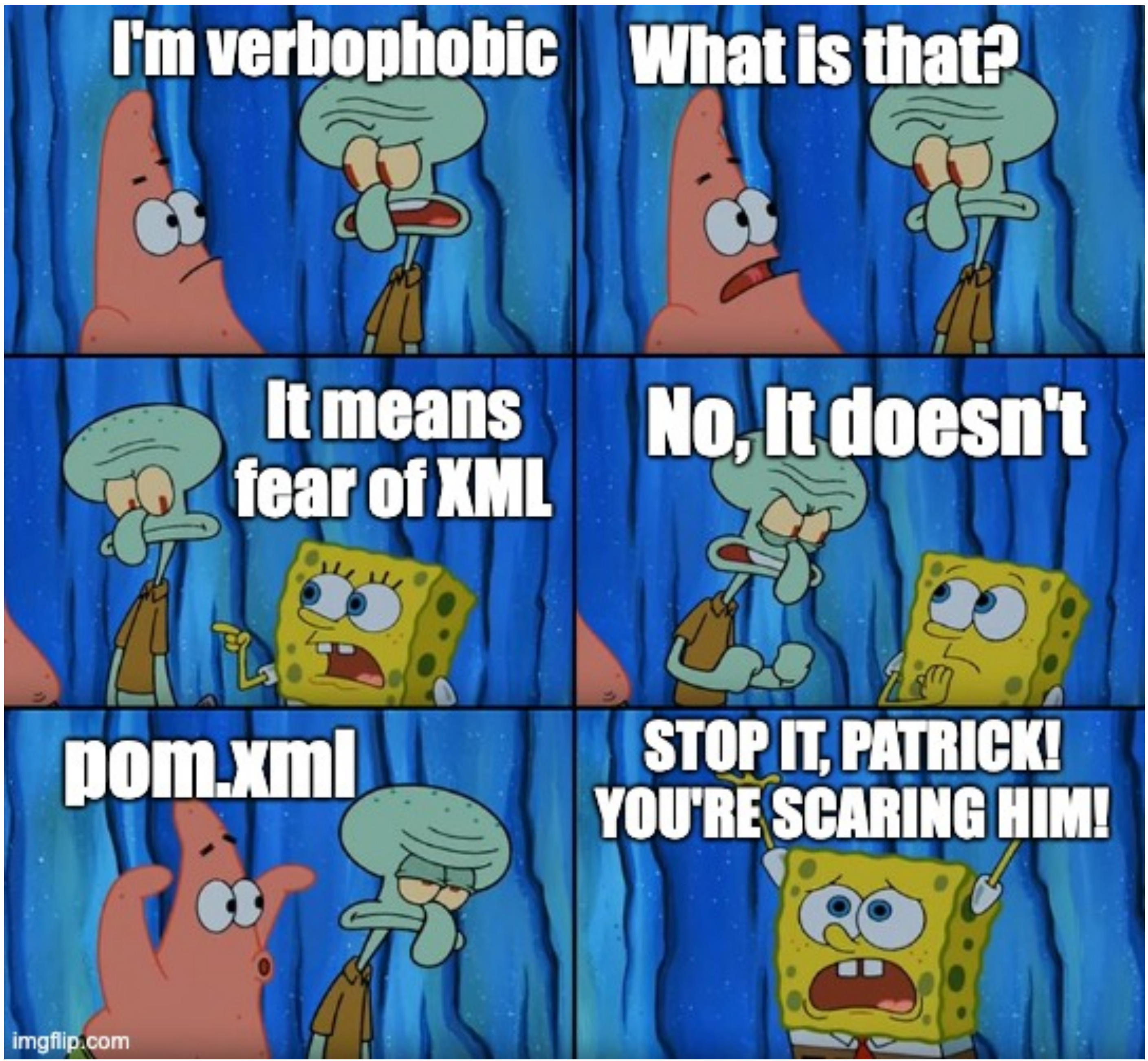
User	Hostname	Project	Requested tasks/goals	Start time	Duration	Version	Tags	Views
runner	fv-az339-459	✓ SCIMple - Parent	verify	Sep 25 2023 at 16:13:58 ADT	3 min 16 sec	3.9.1	3	0
runner	fv-az1025-147	✓ SCIMple - Parent	verify	Sep 25 2023 at 16:13:57 ADT	3 min 13 sec	3.9.1	3	0
runner	fv-az986-675	✓ SCIMple - Parent	verify	Sep 25 2023 at 16:02:04 ADT	3 min 14 sec	3.9.1	3	0
runner	fv-az482-163	✓ SCIMple - Parent	verify	Sep 25 2023 at 16:02:02 ADT	3 min 22 sec	3.9.1	3	0
bdemers	Hyperpower	✓ SCIMple - Parent	clean install	Sep 25 2023 at 15:59:24 ADT	36 sec	3.9.3	5	0
bdemers	Hyperpower	✗ SCIMple - Parent	clean install	Sep 25 2023 at 15:56:32 ADT	3.4 sec	3.9.3	5	0
bdemers	Hyperpower	✗ SCIMple - Parent	clean install	Sep 25 2023 at 15:55:57 ADT	4.4 sec	3.9.3	5	0
runner	fv-az735-197	✓ SCIMple - Parent	verify	Sep 25 2023 at 15:46:25 ADT	5 min 5 sec	3.9.1	3	0

370 total, 1 - 50

Gradle Enterprise 2023.3 | © Gradle Inc. 2023 | [Help and Feedback](#)

Topics

- Maven Demystification
- Speed up your build
- Things to Commit or Omit
- Memes



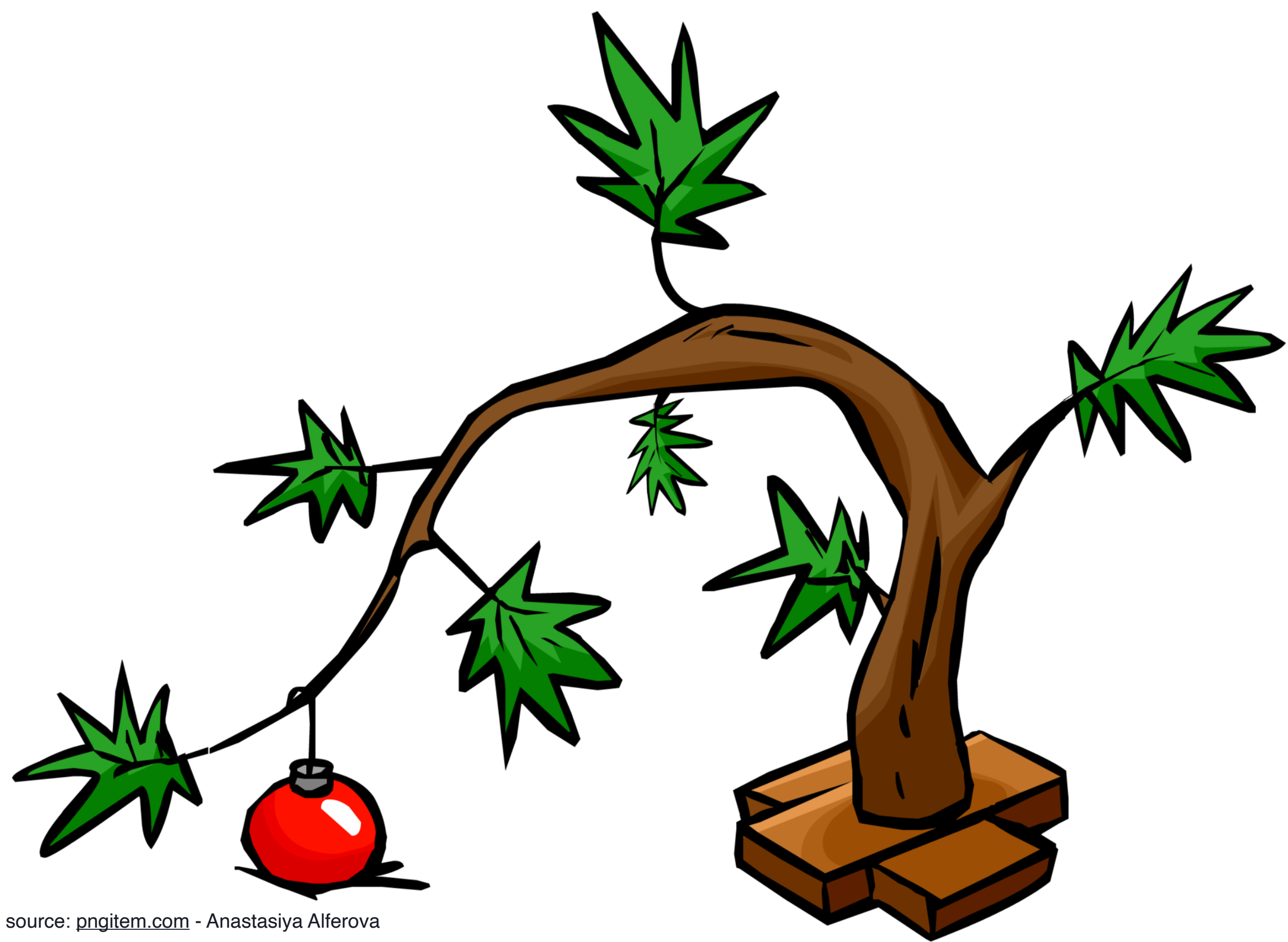
HELL



#13

HEY BUDDY COMICS | f t

Dependencies are a tree



source: pngitem.com - Anastasiya Alferova

```
$ mvn dependency:tree
junit-jupiter
+- junit-jupiter-api
| +- opentest4j
| +- junit-platform-commons
| \- apiguardian-api
+- junit-jupiter-params
\- junit-jupiter-engine
   \- junit-platform-engine
```

Your Application





Andres Almiray

@aalmiray



#maven



3:00 AM · Mar 16, 2020

Maven Build Lifecycle

- validate
- initialize
- generate-sources
- process-sources
- generate-resources
- process-resources
- compile
- process-classes
- generate-test-sources
- process-test-sources
- generate-test-resources
- process-test-resources
- test-compile
- process-test-classes
- test
- prepare-package
- package
- pre-integration-test
- integration-test
- post-integration-test
- verify
- install
- deploy

Maven Build Lifecycle

Phase	Plugin Goal
process-resources	resources:resources
compile	compiler:compile
process-test-resources	resources:testResources
test-compile	compiler:testCompile
test	surefire:test
package	jar:jar
install	install:install
deploy	deploy:deploy

Maven Build Lifecycle

Phase	Plugin Goal
process-resources	resources:resources
compile	compiler:compile
process-test-resources	resources:testResources
test-compile	compiler:testCompile
test	surefire:test
package	jar:jar
verify	pmd:check, check style:check, jacoco:check
install	install:install
deploy	deploy:deploy

Plugin Configuration

```
<plugin>
  <groupId>org.codehaus.mojo</groupId>
  <artifactId>buildnumber-maven-plugin</artifactId>
  <version>3.0.0</version>
  <executions>
    <execution>
      <phase>validate</phase>
      <goals>
        <goal>create</goal>
      </goals>
    </execution>
  </executions>
  <configuration>
    <shortRevisionLength>7</shortRevisionLength>
    <doCheck>>false</doCheck>
    <doUpdate>>false</doUpdate>
  </configuration>
</plugin>
```

Plugin Configuration

```
<plugin>
  <groupId>org.codehaus.mojo</groupId>
  <artifactId>buildnumber-maven-plugin</artifactId>
  <version>3.0.0</version>
  <executions>
    <execution>
      <phase>validate</phase>
      <goals>
        <goal>create</goal>
      </goals>
      <configuration>
        <shortRevisionLength>7</shortRevisionLength>
        <doCheck>>false</doCheck>
        <doUpdate>>false</doUpdate>
      </configuration>
    </execution>
  </executions>
</plugin>
```

Plugin Configuration (example)

```
$ mvn buildnumber:create # global config
```

```
[INFO] Storing buildNumber: 6231815
```

```
$ mvn buildnumber:create # execution config
```

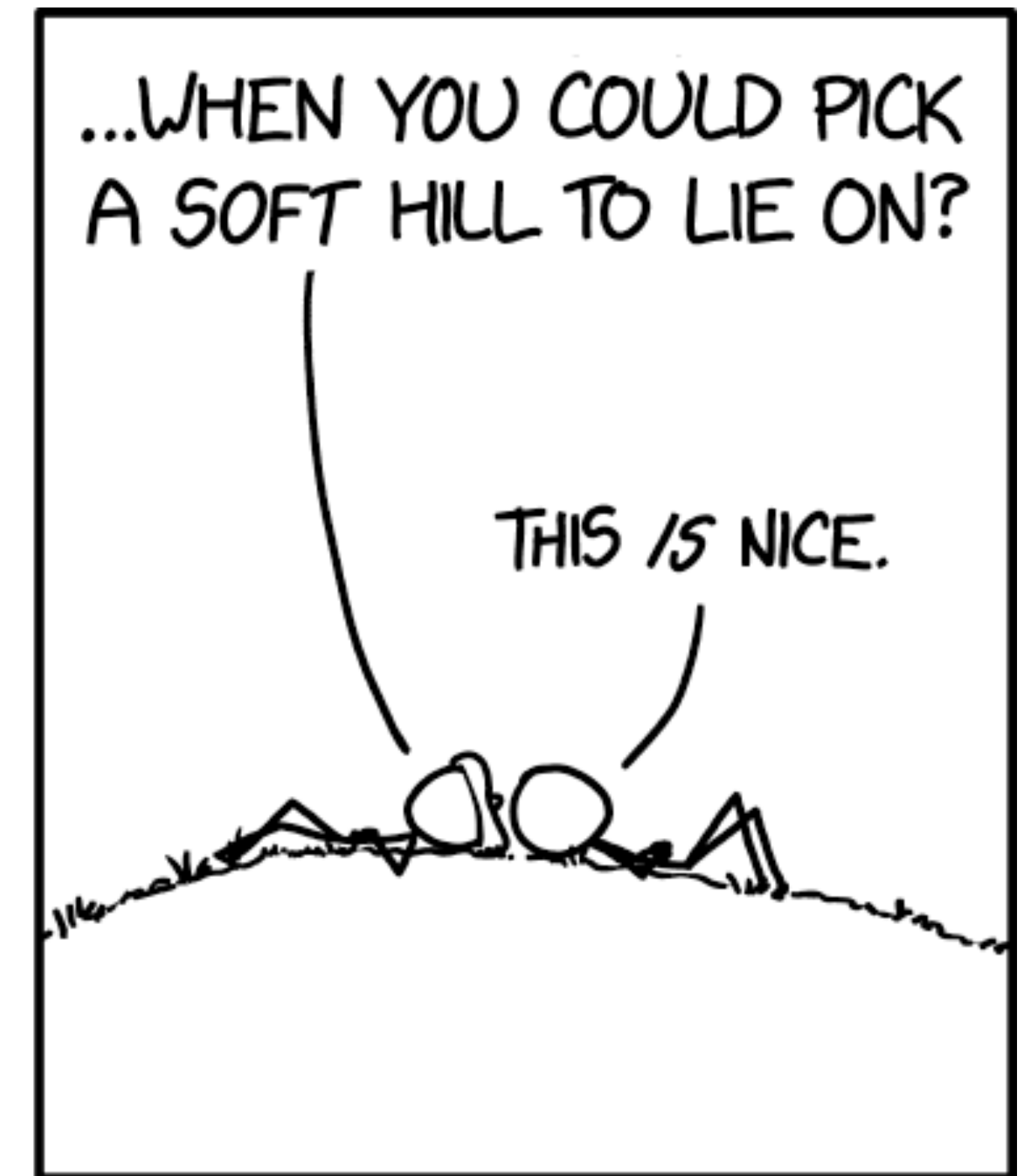
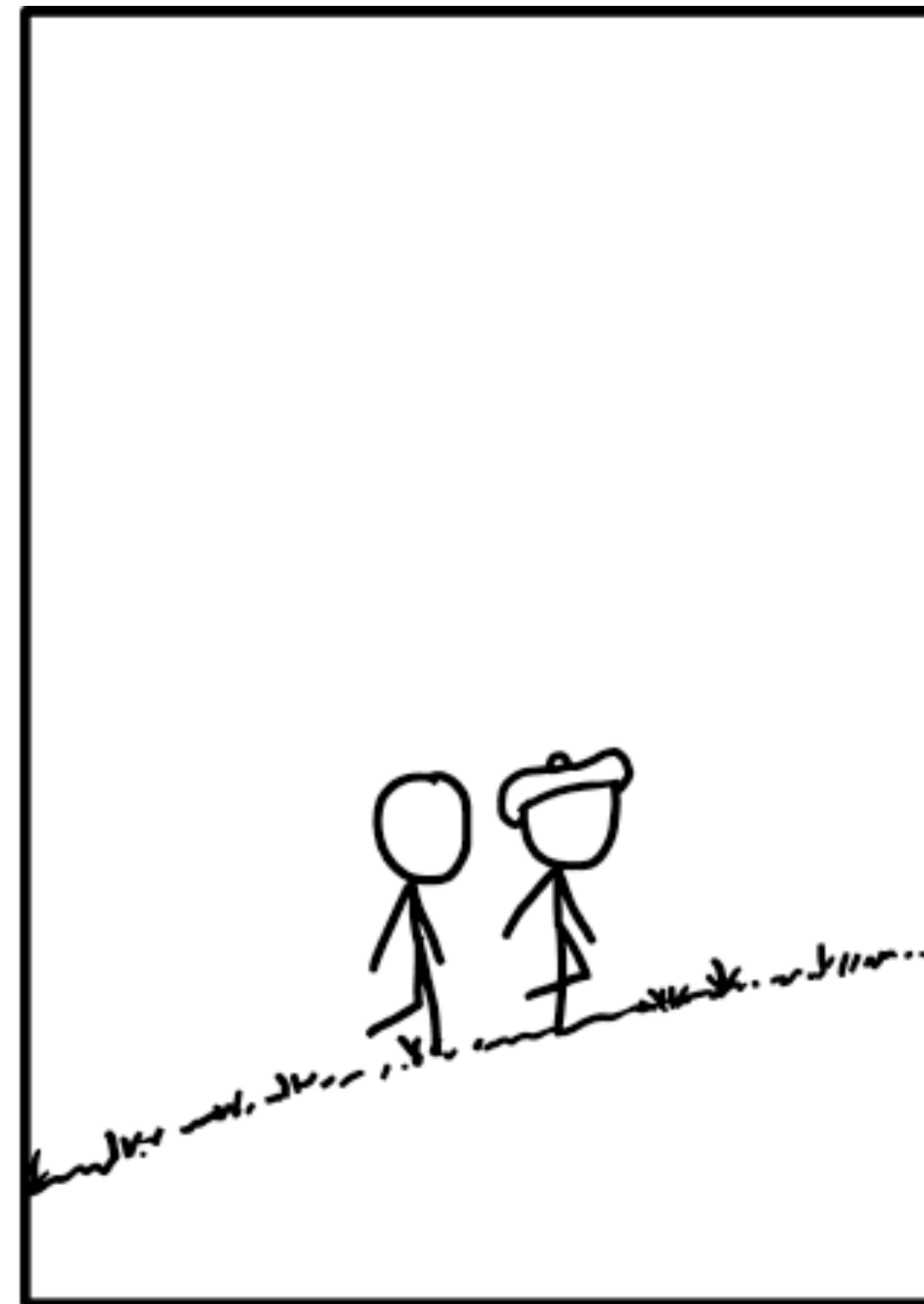
```
[INFO] Storing buildNumber: 623181597908f815cb9af206a389e739d80435a5
```

Custom Maven Plugins

```
@Mojo(name = "roll", defaultPhase = LifecyclePhase.VERIFY)
public class DiceMojo extends org.apache.maven.plugin.AbstractMojo {
    @Parameter(property = "expression", defaultValue = "1d20")
    private String expression;

    public void execute() throws MojoExecutionException,
        MojoFailureException {
        getLog().info("Dice eval: " + Dice.roll(expression));
    }
}
```

Dependency Ranges



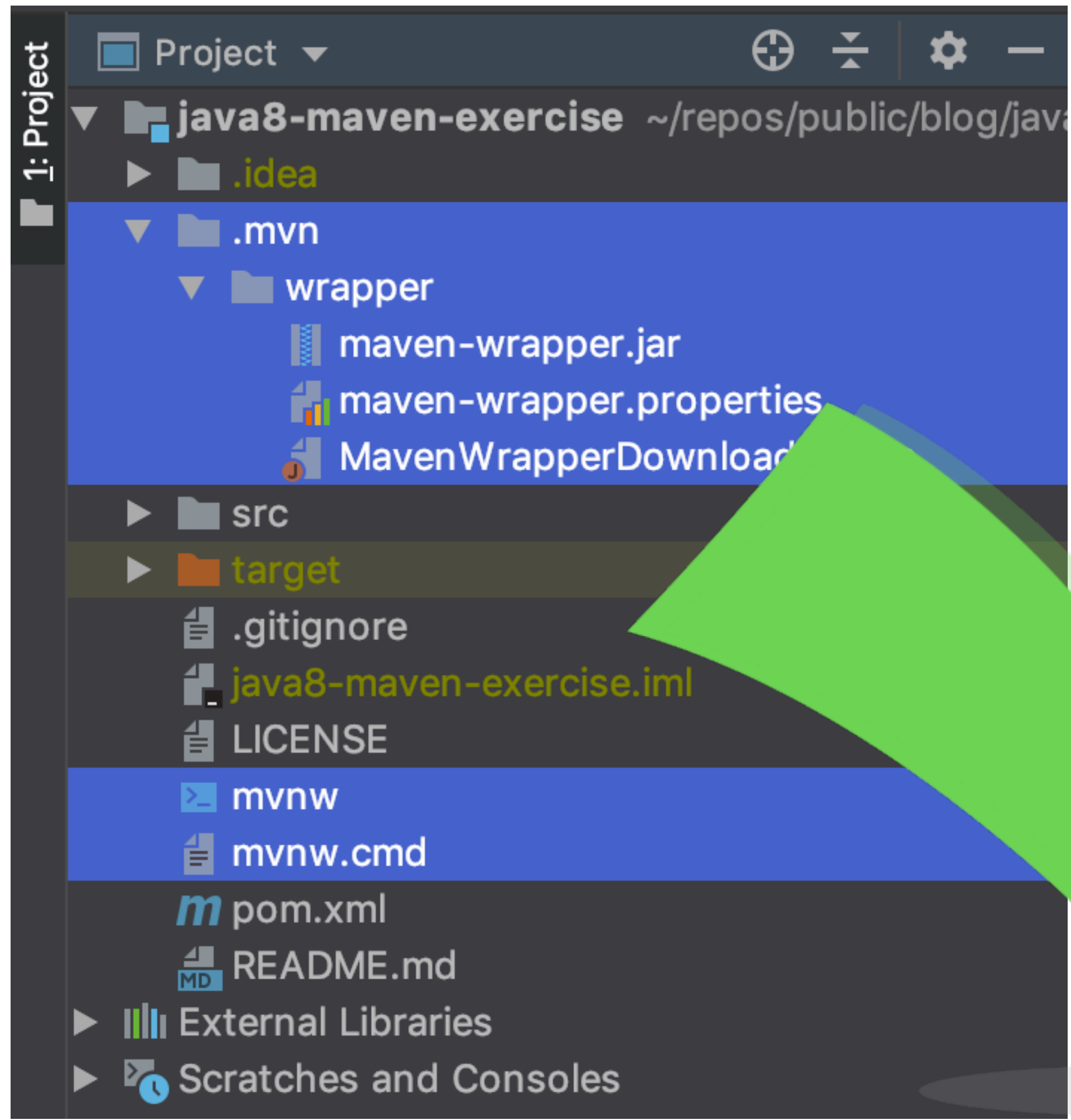
source: xkcd.com/2247

Dependency Ranges

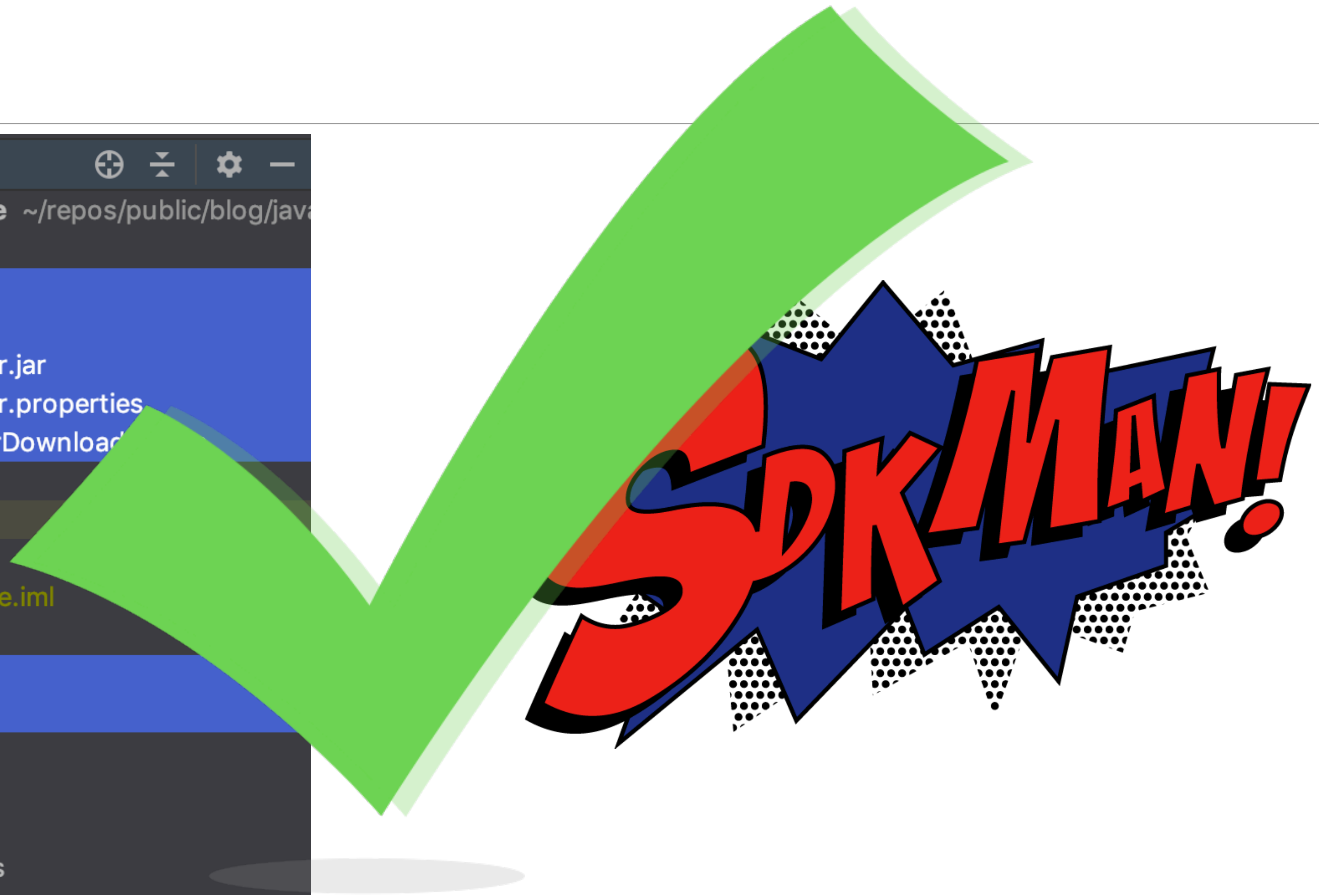
Range	Meaning
(,1.0]	$x \leq 1.0$
(,1.0)	$x < 1.0$
[1.0]	$x = 1.0$
[1.0,)	$x \geq 1.0$
(1.0,)	$x > 1.0$
(1.0,2.0)	$1.0 < x < 2.0$
[1.0,2.0]	$1.0 \leq x \leq 2.0$
(,1.0],[1.2,)	$x \leq 1.0$ or $x \geq 1.2$. Multiple ranges are comma-separated
(,1.1),(1.1,)	$x \neq 1.1$



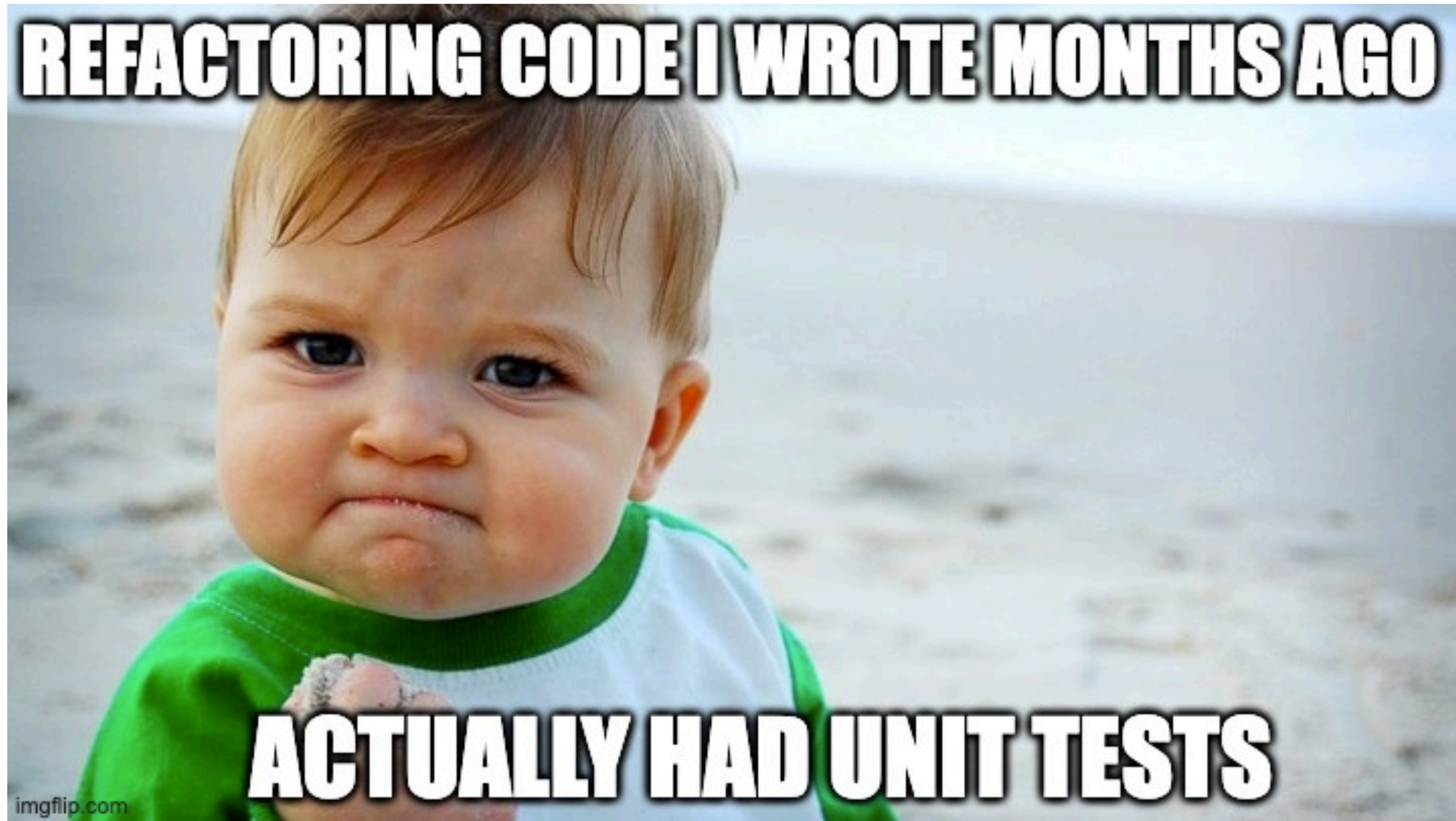
Pin Versions



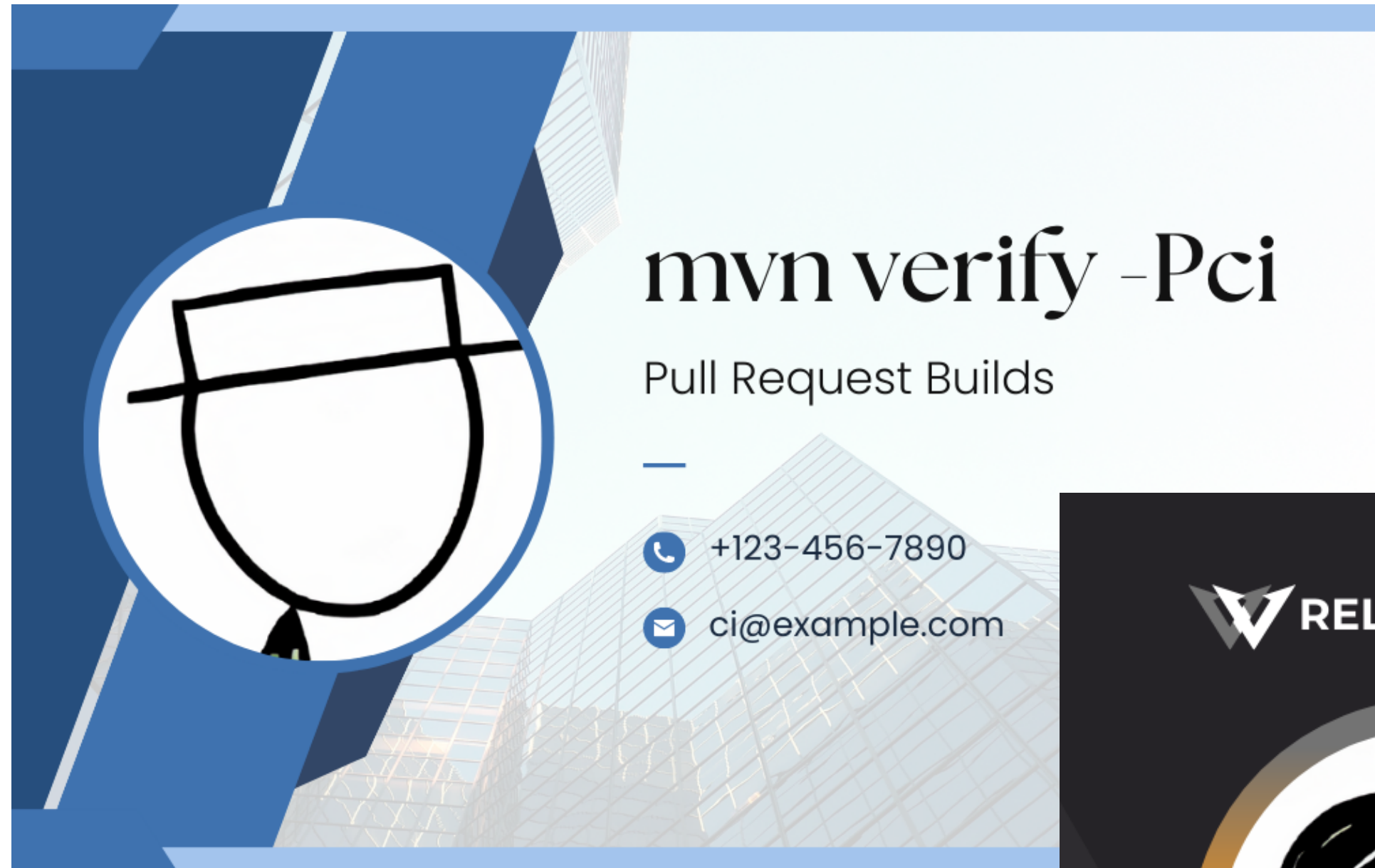
<https://area-b.com/blog/2019/05/04/1210/>



Separate Unit and Integration Tests



Use Profiles



mvn verify -Pci
Pull Request Builds

+123-456-7890
ci@example.com

A profile card with a blue background and a white circle containing a stick figure wearing a graduation cap. The text is in a serif font.



QUICK BUILDS



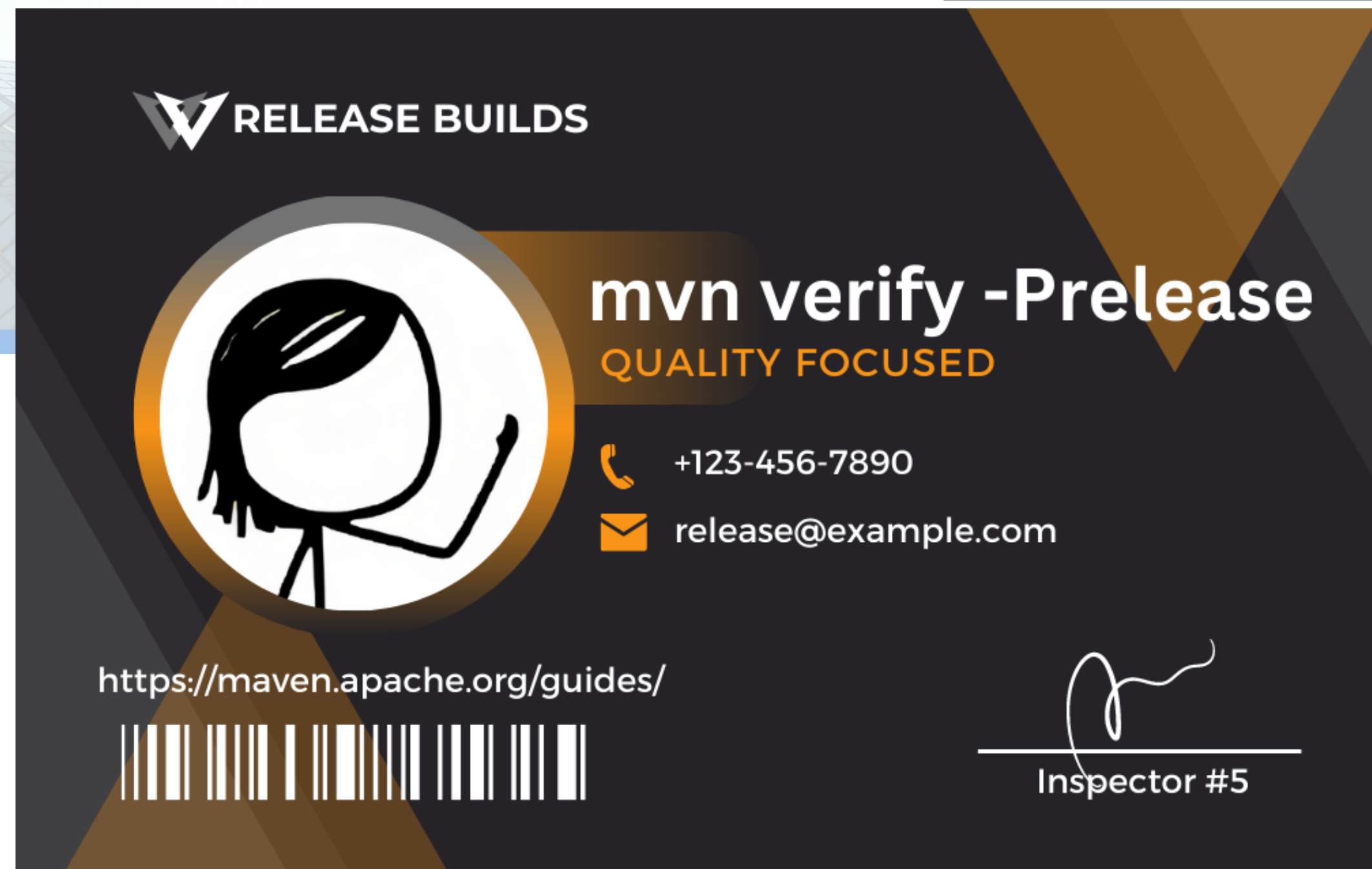
A dark blue header with a gold logo of three buildings. To the right is a stick figure wearing a black graduation cap, set against a city skyline background.

Email : quick@example.com
Address: 10 Second Build St.
Phone : +123-456-7890

mvn verify -Pquick
Fast Build

maven.apache.org/guides/

headshots: xkcd.com




RELEASE BUILDS

mvn verify -Prelease
QUALITY FOCUSED

+123-456-7890
release@example.com

<https://maven.apache.org/guides/>



Inspector #5

A profile card with a dark background and a white circle containing a stick figure with long hair. The text is in a sans-serif font. At the bottom, there is a barcode and a signature line.

Test Jars



Uberjars



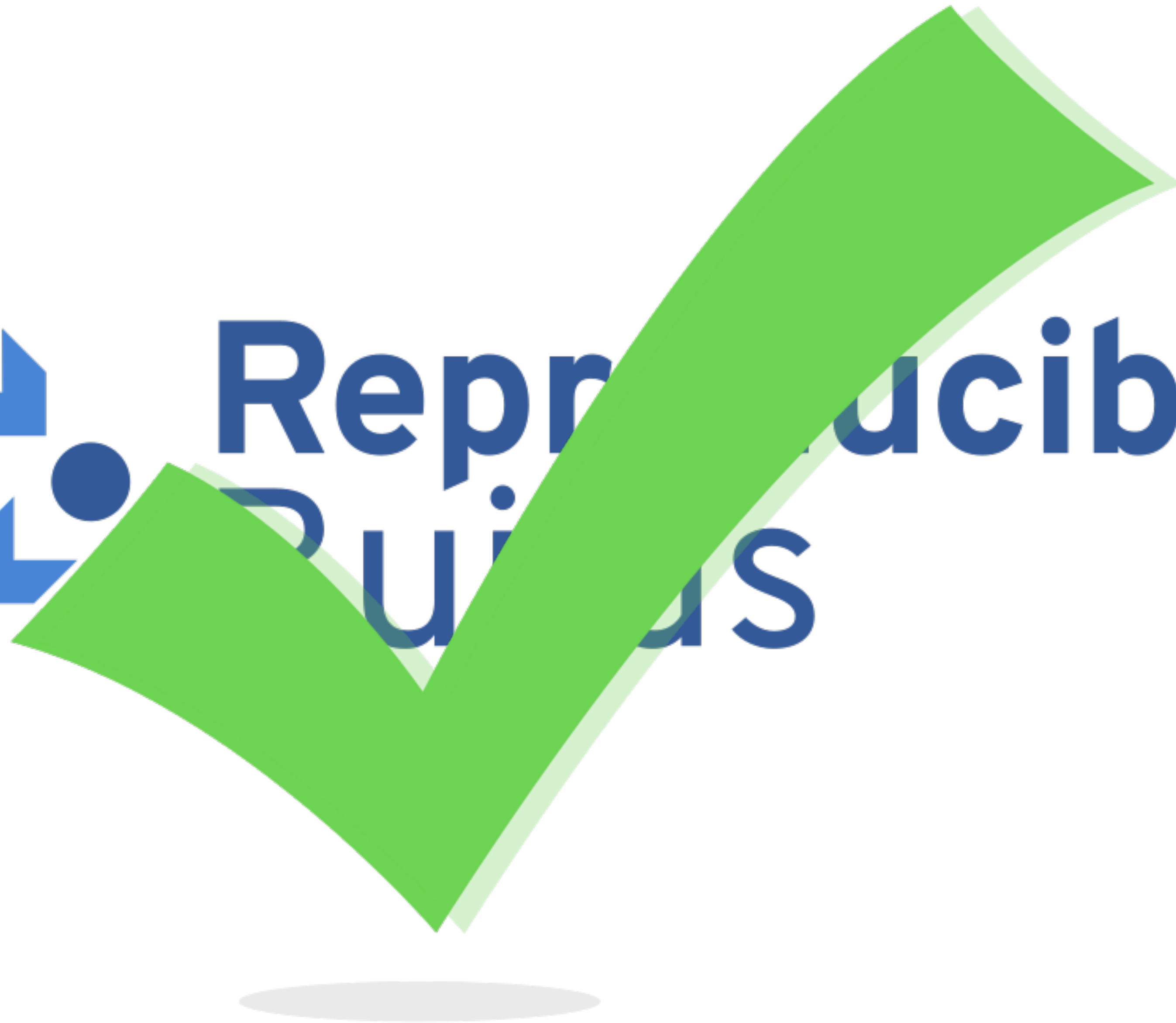
Source jars



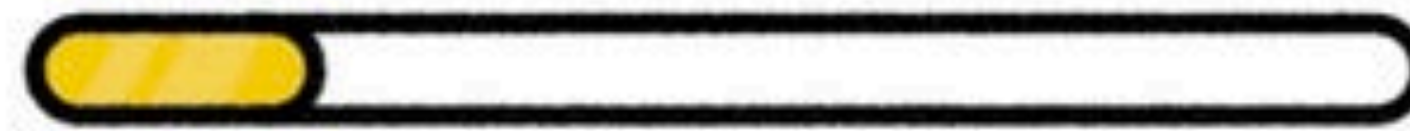
```
1 package org.junit;
2
3 > import ...
9
10 A set of assertion methods useful for writing tests. Only failed assertions are recorded.
11 can be used directly: Assert.assertEquals(...), however, they read better if they
12 through static import:
13
14     import static org.junit.Assert.*;
15     ...
16     assertEquals(...);
17
18 Since: 4.0
19 See Also: AssertionError
20
25 public class Assert {
26     | Protect constructors in subclasses. Inherited from java.lang.Object
27
28     |
29     protected
30 }
31
32 | Asserts that a condition is true. If the condition is false, an AssertionError is thrown with the given message.
33 |
34 | Params: message - the identifying message to be used in the error (null okay)
35 | condition - condition to be checked
36
37
38
39
40 public static void assertTrue(String message, boolean condition) {
41     if (!condition) {
42         fail(message);
43     }
44 }
```



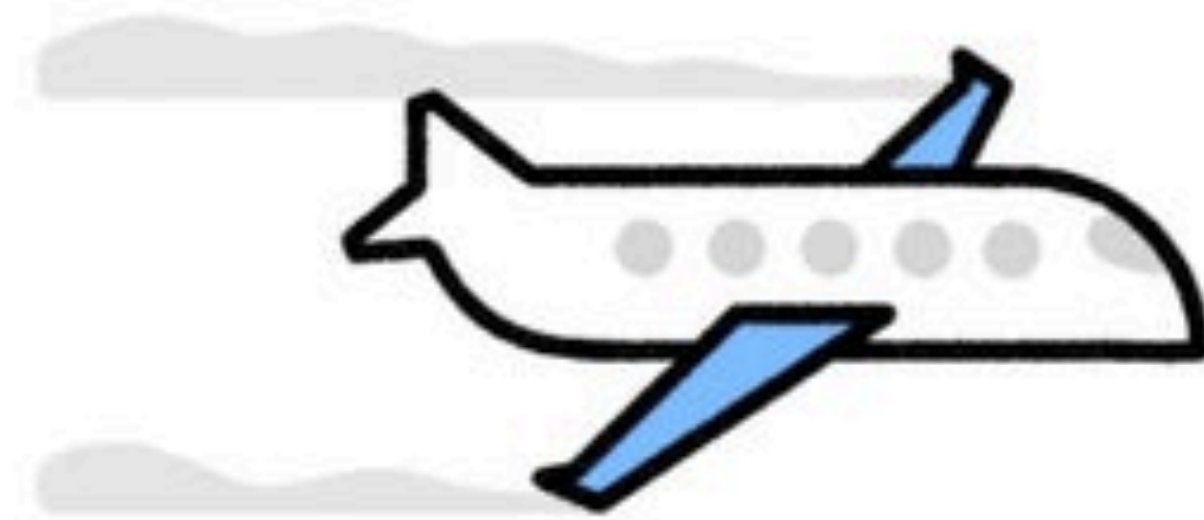
Reproducible
Builds



THE FASTEST THINGS ON EARTH



CHEETAH

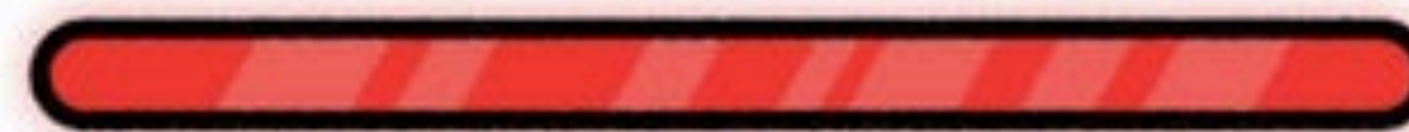


AIRPLANE



SPEED OF LIGHT

MavenTM



Parallel Builds

Multiple Threads

 Project-A

 api

 impl

 app

 Project-B

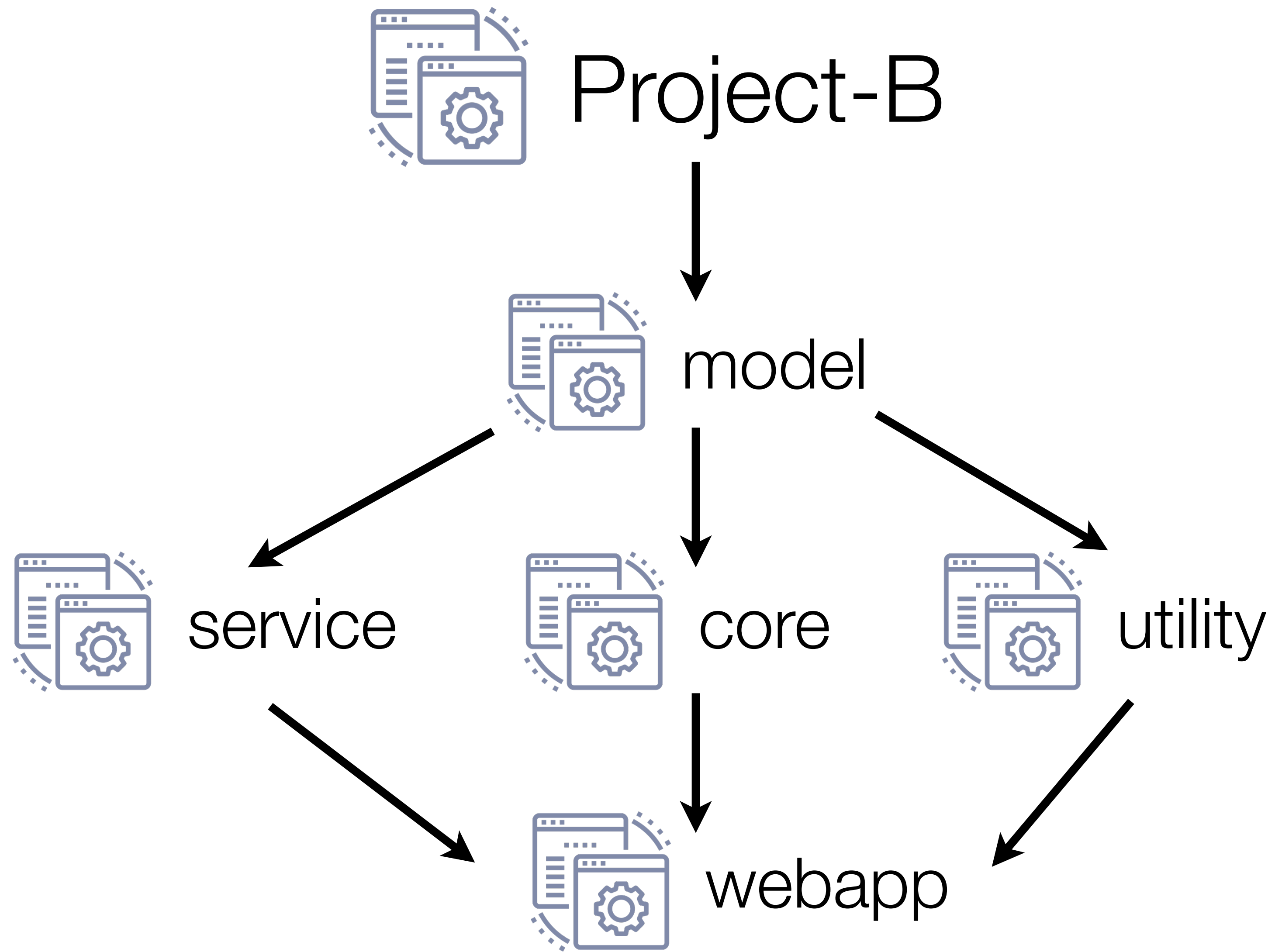
 model

 service

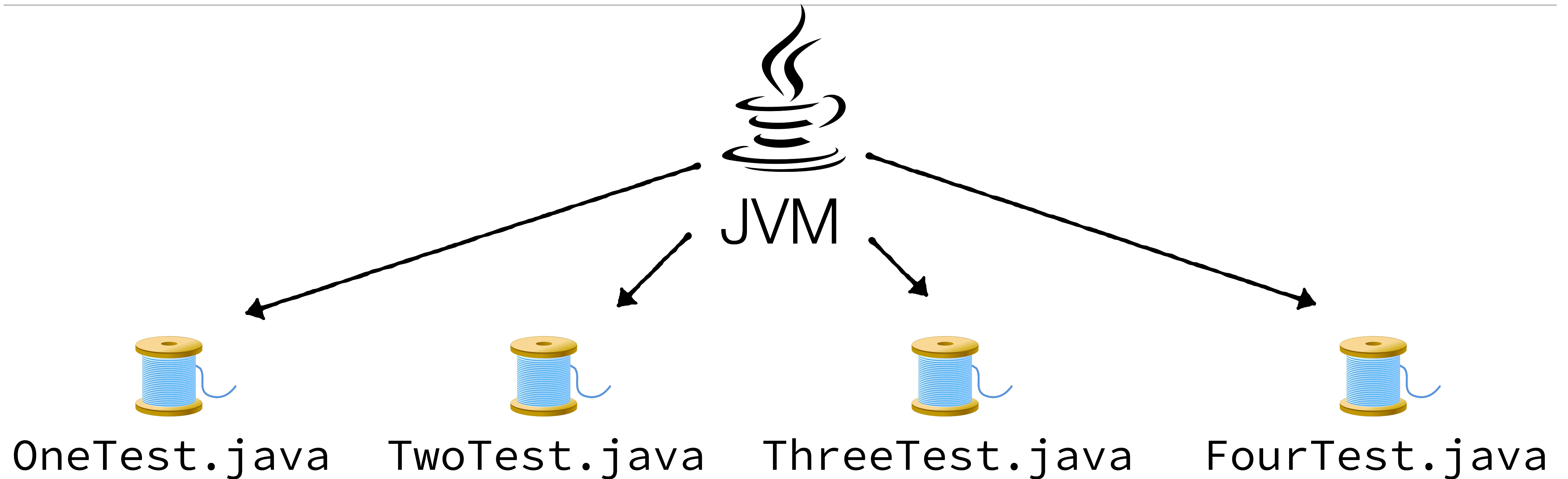
 core

 utility

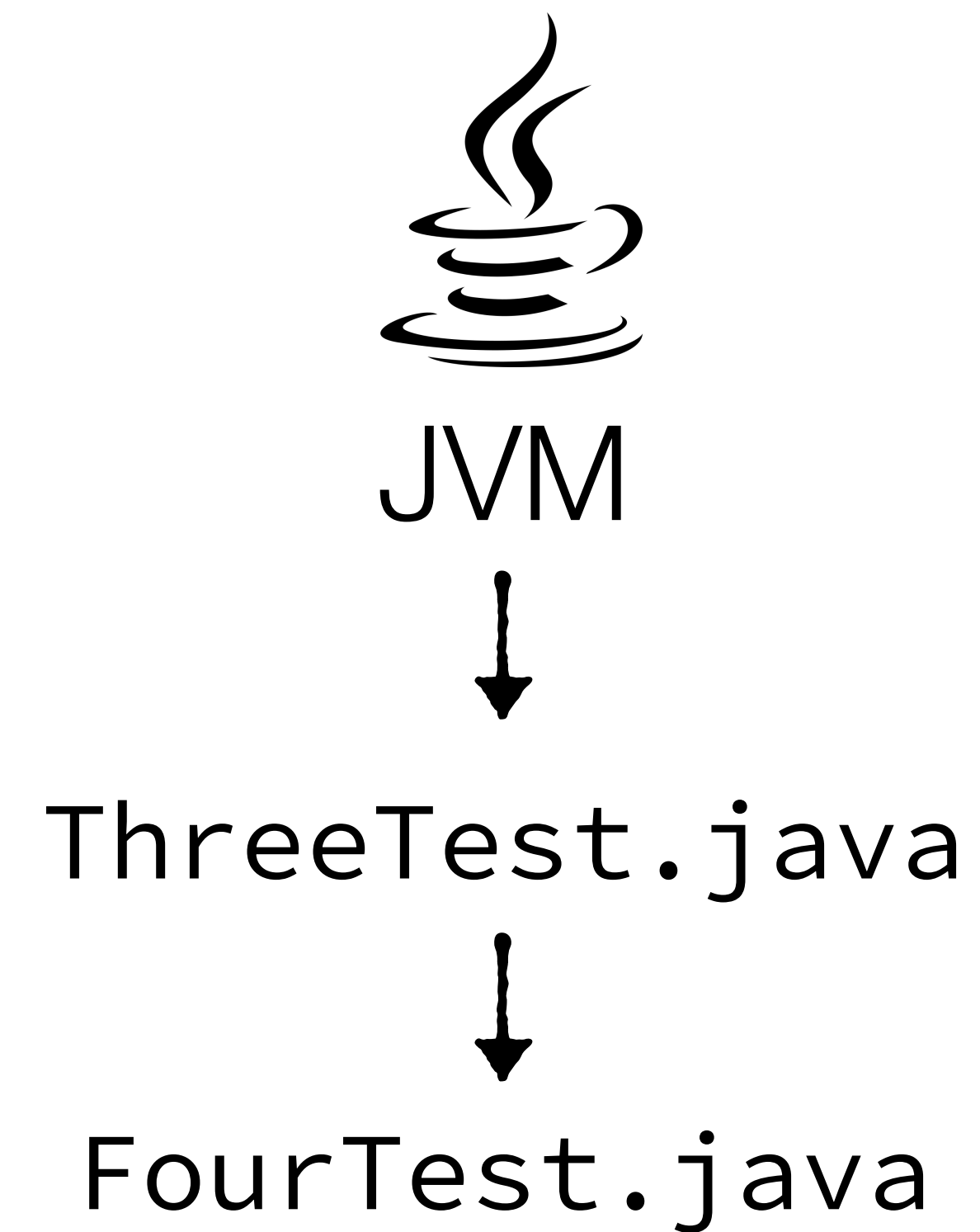
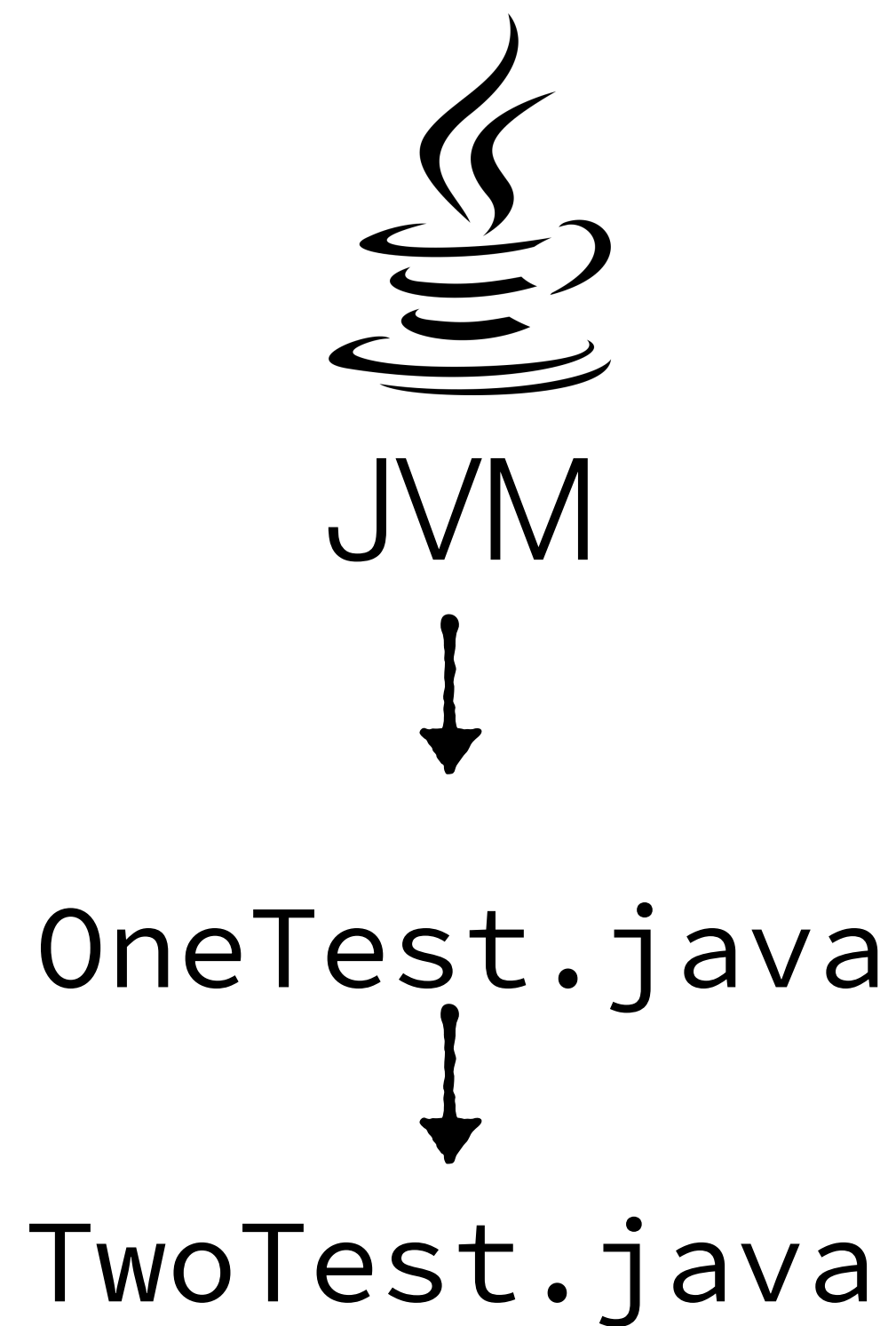
 webapp



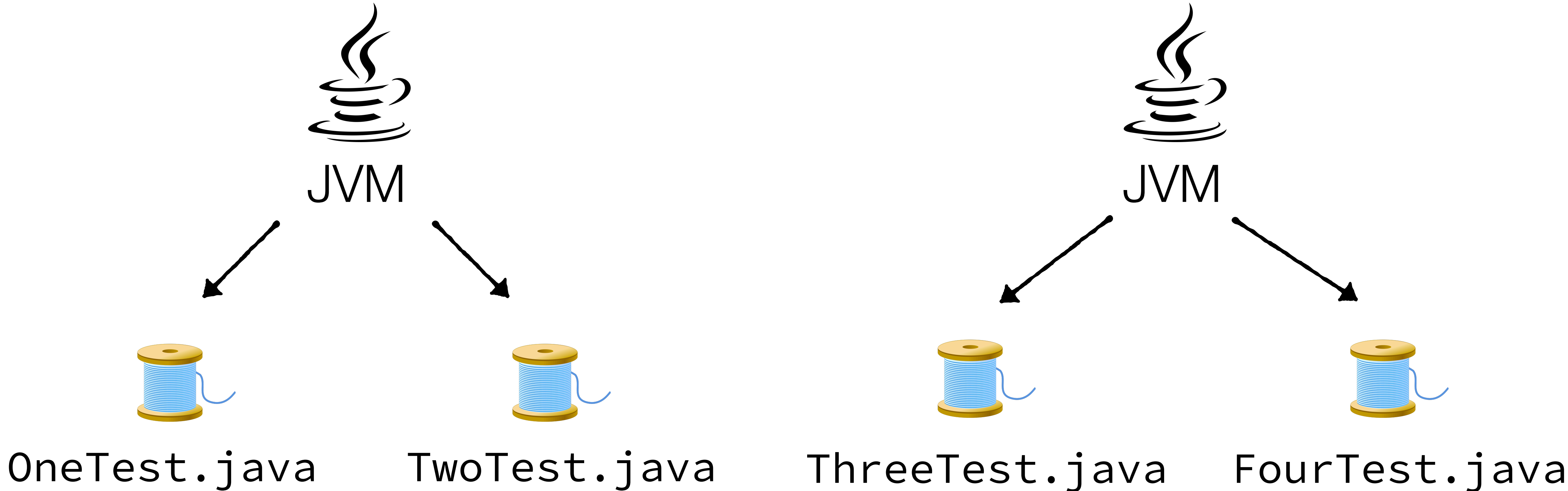
Test w/ Multiple Threads



Test w/ Multiple JVMs (forkCount)



Test w/ Multiple JVMs & Multiple Threads



Just add `.parallel()`
and everything will be all right



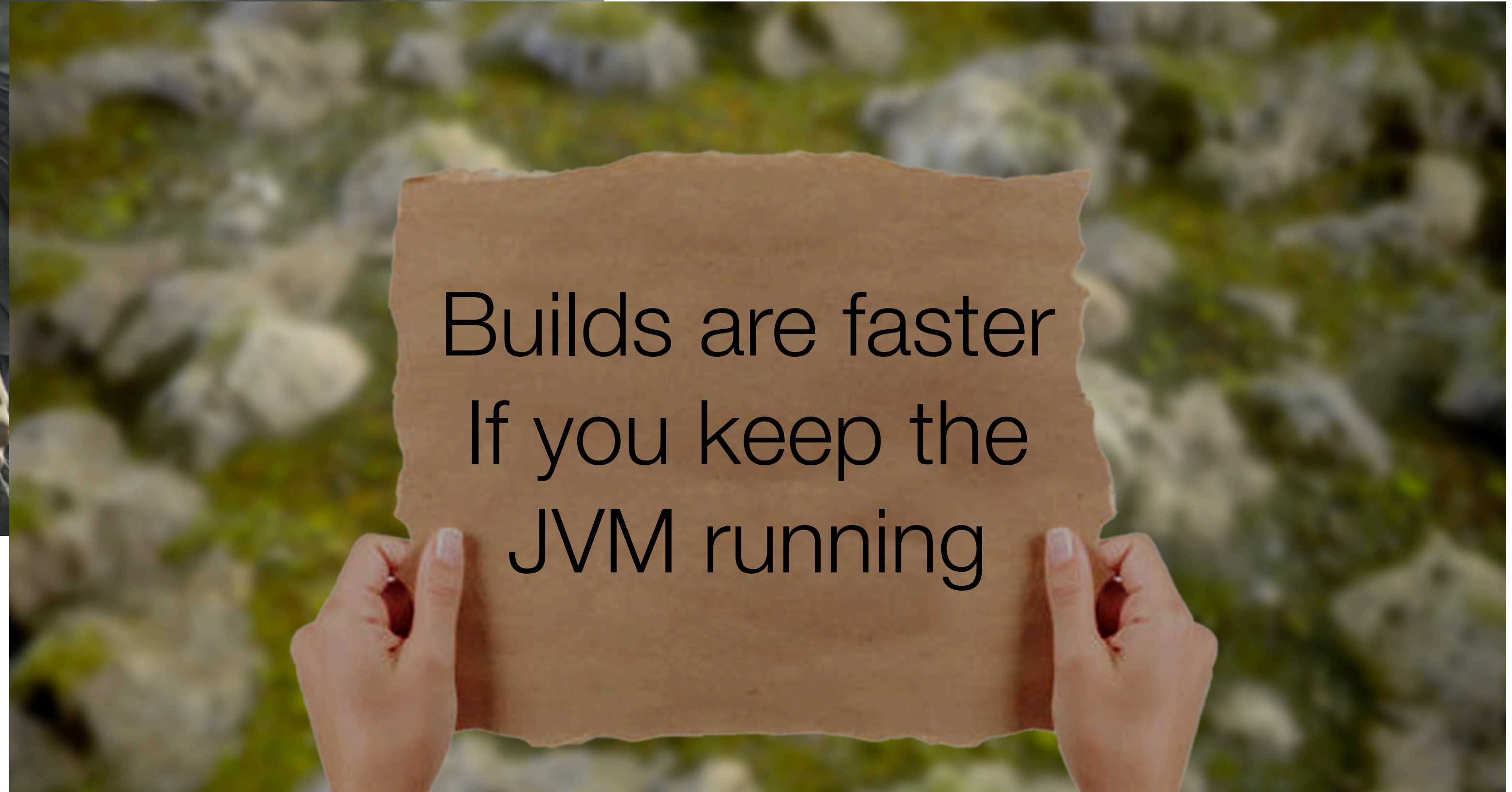
source: <https://levelup.gitconnected.com/be-careful-with-java-parallel-streams-3ed0fd70c3d0>

“The future is always beginning now.”

-Mark Strand

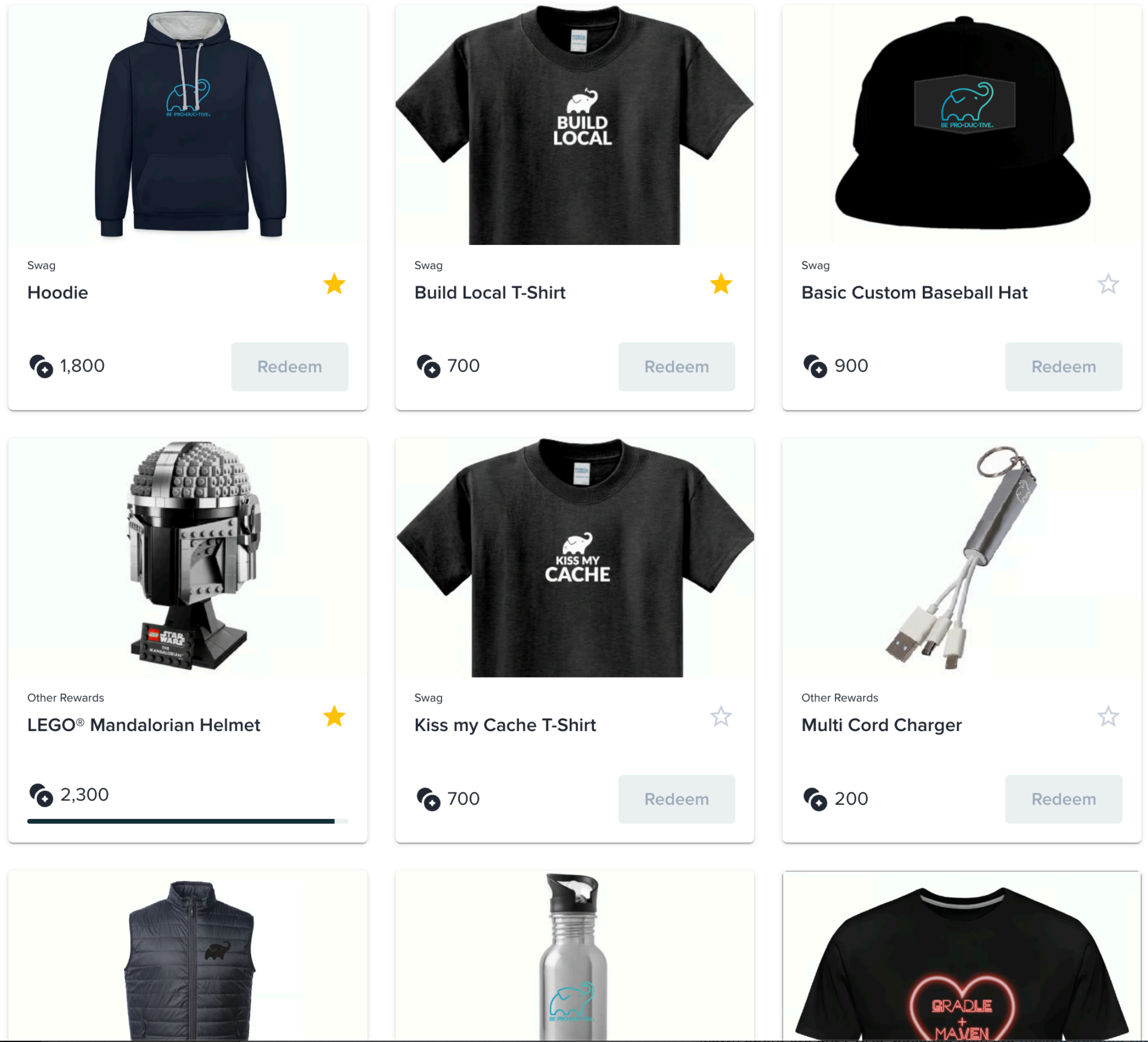
Maven™

Daemon



MavenTM

4.0.0



 **BrianDemers**

 **bdemers**

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