

A photograph of a cemetery at sunset. The ground is covered in fallen brown leaves. Numerous tombstones of various shapes and sizes are scattered across the scene. In the background, several large trees stand against a bright, glowing sunset sky. The overall mood is somber and quiet.

Dead Classes

Sept. 2025, Oli B.

Software rots

How to Find Dead Classes

$$dc = ac - \sum_{t=0}^{\infty} lc$$

dc: dead classes

ac: all classes

lc: loaded classes

How to Get All Classes?

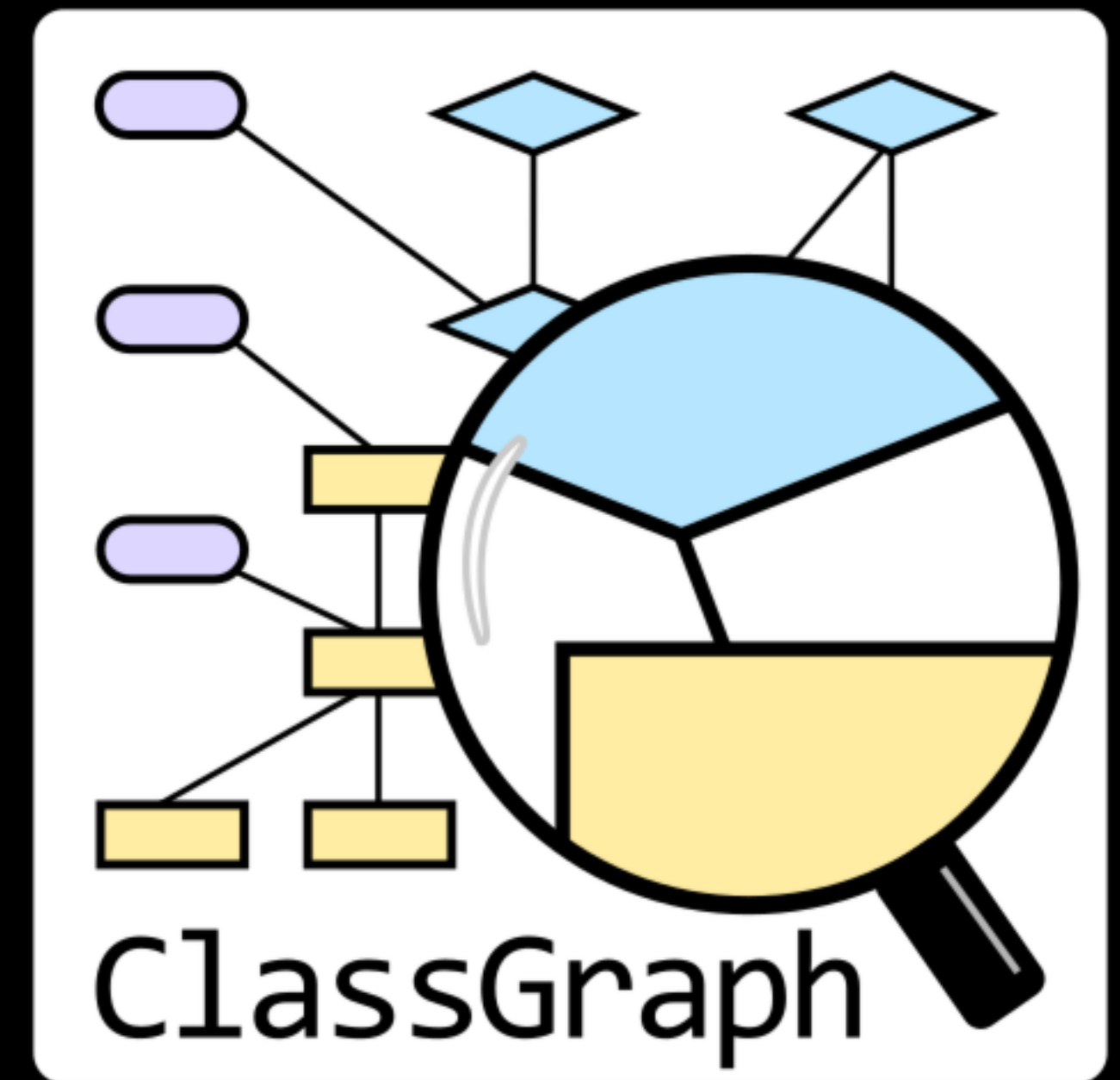
$$dc = ac - \sum_{t=0}^{\infty} lc$$

Get All Classes

- file:/...
 - find .class files in directory
- jar:file:/...
 - simple JAR: find .class files in JAR (ZIP)
 - nested JARs (JAR, WAR, EAR):
 - find simple JARs, inspect it

Libs for Classpathes

- <https://github.com/classgraph>
- `com.google.common.reflect.ClassPath` (Guava)



How to Get Loaded Classes?

Ask the Classloader

```
/**
 * Returns the class with the given binary name if this
 * loader has been recorded by the Java virtual machine as an initiating
 * loader of a class with that binary name. Otherwise
 * {@code null} is returned.
 *
 * @param name
 *         The binary name of the class
 *
 * @return The {@code Class} object, or {@code null} if the class has
 *         not been loaded
 *
 * @since 1.1
 */
protected final Class<?> findLoadedClass(String name) {
    if (!checkName(name))
        return null;
    return findLoadedClass0(name);
}

private final native Class<?> findLoadedClass0(String name);
```

Ask the Classloader

SystemClassLoader

WebClassLoader

Which Classloader?

ContextClassLoader

AppClassLoader

Ask the GC

jmap -histo:all <pid>

```
oboehm@PLTCM7002$ jmap -histo:all 9668
```

num	#instances	#bytes	class name (module)
1:	182752	15764168	[B (java.base@17.0.6)
2:	17269	8513224	[I (java.base@17.0.6)
3:	135138	3243312	java.lang.String (java.base@17.0.6)
4:	14721	1177680	java.net.URI (java.base@17.0.6)
5:	32078	1026496	java.util.concurrent.ConcurrentHashMap\$Node (java.base@17.0.6)
6:	21455	858200	java.util.TreeMap\$Entry (java.base@17.0.6)
...			
1372:	1	16	sun.util.resources.LocaleData (java.base@17.0.6)
1373:	1	16	sun.util.resources.LocaleData\$LocaleDataStrategy (java.base@17.0.6)
1374:	1	16	sun.util.resources.cldr.provider.CLDRLocaleDataMetaInfo (jdk.localedata@17.0.6)
Total	627763	42881928	

```
oboehm@PLTCM7002$
```


Ask DiagnosticCommand II



Use JVM Log

</

Ask DiagnosticCommand IV

The Official Way...

Hooks

<

Agent Calling...</

How to Get

How to Get

How to Get

