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Understanding Maven

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17.03.2022

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Maven basics

Pom.xml

```xml
1 <project xmlns="http://maven.apache.org/POM/4.0.0"
2     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3     xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
4     <modelVersion>4.0.0</modelVersion>
5
6     <groupId>fr.unice.polytech.si3.qgl</groupId>
7     <artifactId>frigates-engine</artifactId>
8     <version>1.0-SNAPSHOT</version>
9     <packaging>jar</packaging>
10
11
12
13     <properties>
14         <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
15         <java.version>11</java.version>
16         <maven.compiler.source>${java.version}</maven.compiler.source>
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target/frigates-engine-1.0-SNAPSHOT.jar

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Dependencies

```xml
<dependencies>
    <!-- Geometry API -->
    <dependency>
        <groupId>fr.unice.polytech.si3.qgl</groupId>
        <artifactId>geometry-api</artifactId>
        <version>1.0-SNAPSHOT</version>
    </dependency>

    <!-- Unit tests -->
    <dependency>
        <groupId>junit</groupId>
        <artifactId>junit</artifactId>
        <version>4.12</version>
        <scope>test</scope>
    </dependency>
</dependencies>
```

Dependencies

```xml
<dependencies>
    <!-- Geometry API -->
    <dependency>
        <groupId>fr.unice.polytech.si3.qgl</groupId>
        <artifactId>geometry-api</artifactId>
        <version>1.0-SNAPSHOT</version>
    </dependency>

    <!-- Unit tests -->
    <dependency>
        <groupId>junit</groupId>
        <artifactId>junit</artifactId>
        <version>4.12</version>
        <scope>test</scope>
    </dependency>
</dependencies>
```
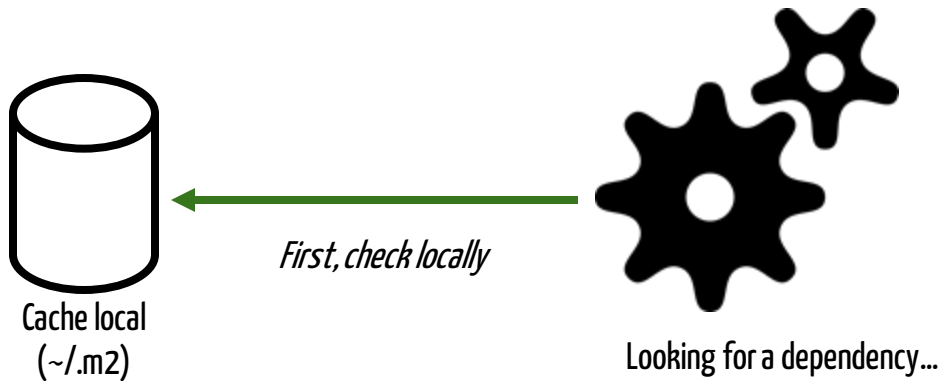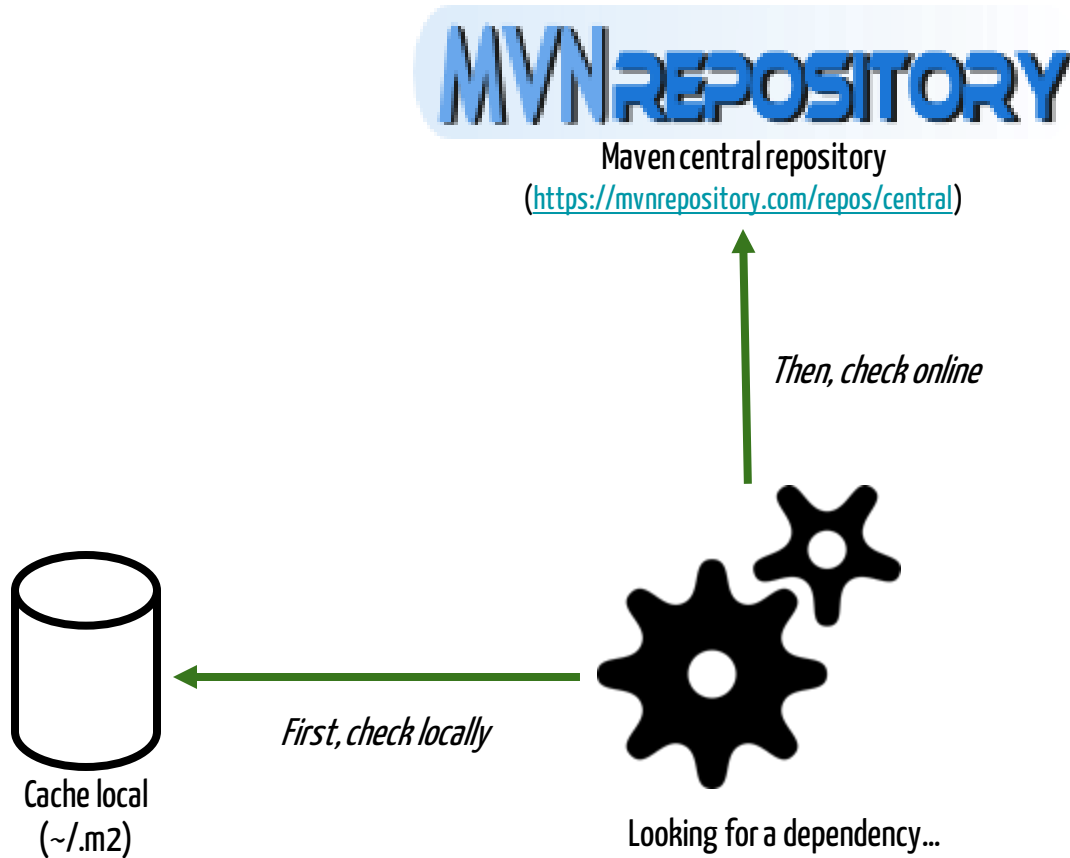
Dependencies

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<dependencies>
    <!-- Geometry API -->
    <dependency>
        <groupId>fr.unice.polytech.si3.qgl</groupId>
        <artifactId>geometry-api</artifactId>
        <version>1.0-SNAPSHOT</version>
    </dependency>

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    <dependency>
        <groupId>junit</groupId>
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        <version>4.12</version>
        <scope>test</scope>
    </dependency>
</dependencies>
```

- **compile**
- **provided**
- **test**

- **runtime**
- **system**
- **import**

Dependencies

Looking for a dependency...

Dependencies

First, check locally

Cache local
(~/.m2)

Looking for a dependency...

Dependencies

MVNREPOSITORY

Maven central repository
(https://mvnrepository.com/repos/central)

Then, check online

First, check locally

Cache local
(~/.m2)

Looking for a dependency...

Phases

- clean

- validate

- compile

- test

- package

- verify

- install

- deploy

Phases

- clean

- validate

- compile

- test

- package

- verify

- install

- deploy

```
~ $ > mvn clean
```

Phases

- clean

- validate

- compile

- test

- package

- verify

- install

- deploy

```
~ $ > mvn validate
```

Phases

- clean

- validate

- compile
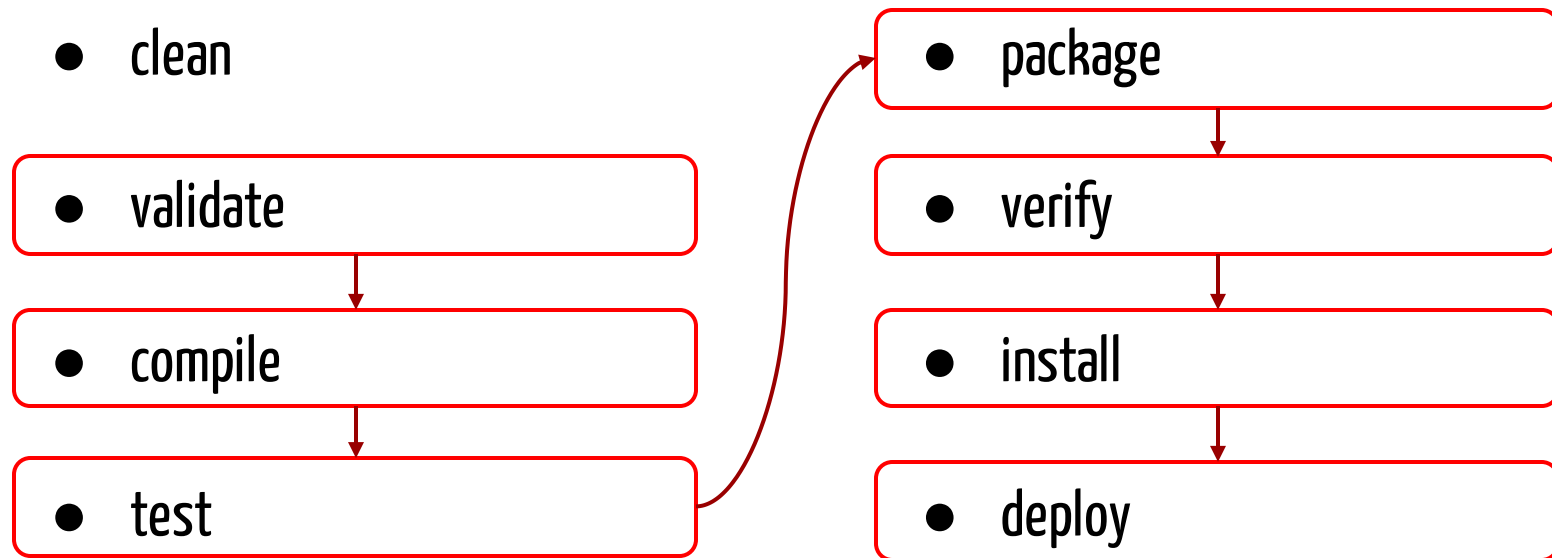
- test

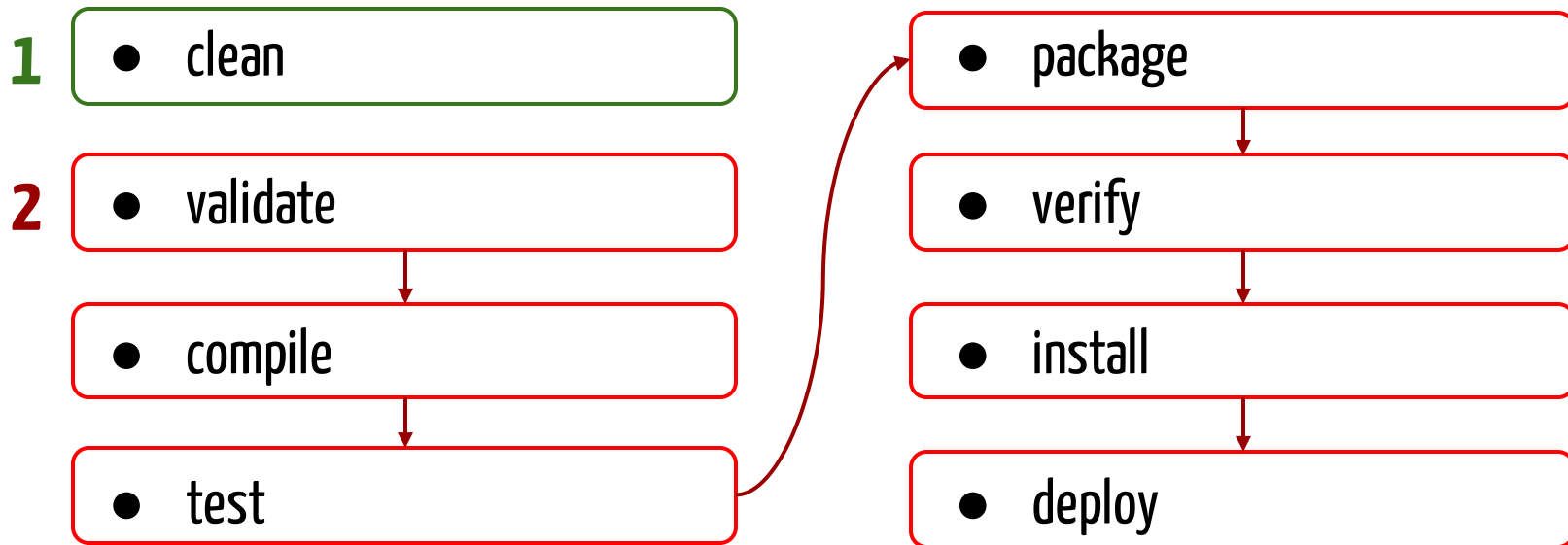- package

- verify

- install

- deploy

```
~ $ > mvn package
```

Phases

- clean

- validate

- compile

- test

- package

- verify

- install

- deploy

```
~ $ > mvn deploy
```

Phases

1 clean

2 validate

compile

test

package

verify

install

deploy

```
~ $ > mvn clean deploy
```

Plugins & executions

```xml
<build>
    <plugins>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-assembly-plugin</artifactId>
            <executions>
                <execution>
                    <phase>package</phase>
                    <goals>
                        <goal>single</goal>
                    </goals>
                    <configuration>
                        <archive>
                            <manifest>
                                <mainClass>
                                    fr.unice.polytech.si3.qgl.frigatesengine.App
                                </mainClass>
                            </manifest>
                        </archive>
                        <descriptorRefs>
                            <descriptorRef>jar-with-dependencies</descriptorRef>
                        </descriptorRefs>
                    </configuration>
                </execution>
            </executions>
        </plugin>
        <plugin>
            <groupId>org.codehaus.mojo</groupId>
            <artifactId>exec-maven-plugin</artifactId>
            <version>1.2.1</version>
            <executions>
                <execution>
                    <goals>
                        <goal>java</goal>
                    </goals>
                </execution>
            </executions>
            <configuration>
                <mainClass>fr.unice.polytech.si3.qgl.gamerunner.App</mainClass>
            </configuration>
        </plugin>
    </plugins>
</build>
```

Plugins & executions

```xml
<build>
    <plugins>
        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-assembly-plugin</artifactId>
            <executions>
                <execution>
                    <phase>package</phase>
                    <goals>
                        <goal>single</goal>
                    </goals>
                    <configuration>
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                            </manifest>
                        </archive>
                        <descriptorRefs>
                            <descriptorRef>jar-with-dependencies</descriptorRef>
                        </descriptorRefs>
                    </configuration>
                </execution>
            </executions>
        </plugin>
        <plugin>
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            <artifactId>exec-maven-plugin</artifactId>
            <version>1.2.1</version>
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                    </goals>
                </execution>
            </executions>
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            </executions>
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            <executions>
                <execution>
                    <goals>
                        <goal>java</goal>
                    </goals>
                </execution>
            </executions>
            <configuration>
                <mainClass>fr.unice.polytech.si3.qgl.gamerunner.App</mainClass>
            </configuration>
        </plugin>
    </plugins>
</build>
```

mvn exec:java

Plugins & executions

```xml
<plugin>
    <groupId>org.codehaus.mojo</groupId>
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    <version>1.2.1</version>
    <executions>
        <execution>
            <goals>
                <goal>java</goal>
            </goals>
            <configuration>
                <mainClass>fr.unice.polytech.si3.qgl.gamerunner.App</mainClass>
            </configuration>
        </execution>
        <execution>
            <goals>
                <goal>mytool</goal>
            </goals>
            <configuration>
                <mainClass>fr.unice.polytech.si3.qgl.gamerunner.MyTool</mainClass>
            </configuration>
        </execution>
    </executions>
</plugin>
```

mvn exec:java

```xml
<plugin>
    <groupId>org.codehaus.mojo</groupId>
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    <version>1.2.1</version>
    <executions>
        <execution>
            <goals>
                <goal>java</goal>
            </goals>
            <configuration>
                <mainClass>fr.unice.polytech.si3.qgl.gamerunner.App</mainClass>
            </configuration>
        </execution>
        <execution>
            <goals>
                <goal>mytool</goal>
            </goals>
            <configuration>
                <mainClass>fr.unice.polytech.si3.qgl.gamerunner.MyTool</mainClass>
            </configuration>
        </execution>
    </executions>
</plugin>
```

mvn exec:mytool

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Maven advanced

Add private repositories

In the pom.xml:

```xml
<repositories>
    <repository>
        <id>io-labs-snapshots</id>
        <url>https://nexus.io-labs.fr/repository/maven-snapshots/</url>
    </repository>
</repositories>
```

Add private repositories

Maven central repository
(https://mvnrepository.com/repos/central)

3 *Then, check online*

2 *Then, check on private repository*

Sonatype
Nexus

1 *First, check locally*

Cache local
(~/.m2)

Looking for a dependency...

Maven site

~ $ > mvn site:site

Javadoc

frigates-core 1.0-SNAPSHOT API

Package	Description
fr.unice.polytech.si3.qgl.core	
fr.unice.polytech.si3.qgl.core.domain.sea	
fr.unice.polytech.si3.qgl.core.domain.sea.entities	
fr.unice.polytech.si3.qgl.core.domain.shapes	
fr.unice.polytech.si3.qgl.core.domain.ship	
fr.unice.polytech.si3.qgl.core.domain.ship.entities	
fr.unice.polytech.si3.qgl.core.game	
fr.unice.polytech.si3.qgl.core.game.actions	
fr.unice.polytech.si3.qgl.core.interfaces	
fr.unice.polytech.si3.qgl.core.serialization	

```
~ $ > mvn javadoc:javadoc
```

Javadoc

OVERVIEW   PACKAGE   CLASS   USE   TREE   DEPRECATED   INDEX   HELP

SUMMARY: NESTED | FIELD | CONSTR | METHOD   DETAIL: FIELD | CONSTR | METHOD   SEARCH: 🔍 Search   ✕

Package fr.unice.polytech.si3.qgl.core.domain.shapes

Class Circle

java.lang.Object
    fr.unice.polytech.si3.qgl.core.domain.shapes.Shape
        fr.unice.polytech.si3.qgl.core.domain.shapes.Circle

```
public class Circle
extends Shape
```

Field Summary

Fields

Modifier and Type	Field	Description
protected double	radius	

Fields inherited from class fr.unice.polytech.si3.qgl.core.domain.shapes.Shape		
type		

Constructor Summary

Constructors

Constructor	Description
Circle()	

`~ $ > mvn javadoc:javadoc`

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Pom parent

```xml
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <parent>
        <artifactId>runners.aggregator</artifactId>
        <groupId>fr.unice.polytech.si3.qgl</groupId>
        <version>1.0</version>
    </parent>

    <artifactId>playertest</artifactId>
    <version>1.0-SNAPSHOT</version>

    <name>playertest</name>
```

Pom parent

Pom parent allows you to inherit some definitions from another pom:

- Dependencies

- Plugins

- Profiles

- Builds

- Distribution management

- Versions numbers

- *not properties*

Profiles

"A Build profile is a set of configuration values, which can be used to set or override

default values of Maven build.

Using a build profile, you can customize build for different environments such as

Production v/s Development environments."

Profiles declaration

```xml
<profiles>
    <profile>
        <id>develop</id>
        <activation>
            <activeByDefault>true</activeByDefault>
        </activation>
    </profile>
    <profile>
        <id>prod</id>
    </profile>
</profiles>
```

Profiles activation

```xml
<profiles>
    <profile>
        <id>profileId</id>
        <activation>
            <activeByDefault>true</activeByDefault>

            <jdk>11</jdk>

            <property>
                <name>environment</name>
                <value>test</value>
            </property>
        </activation>
    </profile>
</profiles>
```

Profiles activation

```
~ $ > mvn package -P myProfile,mySecondProfile
```

Profiles usages

```xml
<profile>
    <id>develop</id>
    <activation>
        <activeByDefault>true</activeByDefault>
    </activation>
    <build>
        <plugins>
            <plugin>
                <groupId>org.codehaus.mojo</groupId>
                <artifactId>exec-maven-plugin</artifactId>
                <executions>
                    <execution>
                        <goals>
                            <goal>exec</goal>
                        </goals>
                    </execution>
                </executions>
                <configuration>
                    <arguments>
                        <argument>--logs</argument>
                        <argument>debug</argument>
                    </arguments>
                </configuration>
            </plugin>
        </plugins>
    </build>
</profile>
```

```xml
<profile>
    <id>prod</id>
    <build>
        <plugins>
            <plugin>
                <groupId>org.codehaus.mojo</groupId>
                <artifactId>exec-maven-plugin</artifactId>
                <executions>
                    <execution>
                        <goals>
                            <goal>exec</goal>
                        </goals>
                    </execution>
                </executions>
                <configuration>
                    <arguments>
                        <argument>--logs</argument>
                        <argument>error</argument>
                    </arguments>
                </configuration>
            </plugin>
        </plugins>
    </build>
</profile>
```

Archetypes

How to generate a maven project from an existing template?

Archetypes

```
~ $ > mvn archetype:generate
```

Archetypes

Generate a simple jar project:

```
~ $ > mvn archetype:generate -DarchetypeGroupId=org.apache.maven.archetypes  -DarchetypeArtifactId=maven-archetype-quickstart -DarchetypeVersion=1.4
```

Generate an executable jar project:

```
~ $ > mvn archetype:generate -DarchetypeGroupId=com.github.igor-petruk.archetypes  -DarchetypeArtifactId=maven-archetype-executable -DarchetypeVersion=1.4
```

Generate a maven plugin project:

```
~ $ > mvn archetype:generate -DarchetypeGroupId=org.apache.maven.archetypes  -DarchetypeArtifactId=maven-archetype-plugin -DarchetypeVersion=1.4
```

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Multi-modules projects

Why multiple-modules

How to isolate my tools if I created more than just the required jar for QGL ?

How to run all by builds in one command ?

Can I isolate my geometry utils code from the rest of my project so I can reuse it later ?

How to define some modules?

```xml
1   <?xml version="1.0" encoding="UTF-8" standalone="no"?>
2   <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSche
3     <modelVersion>4.0.0</modelVersion>
4
5     <groupId>fr.unice.polytech.si3.qgl</groupId>
6     <artifactId>runners.aggregator</artifactId>
7     <version>1.0</version>
8     <packaging>pom</packaging>
9
10    <modules>
11      <module>geometry-api</module>
12      <module>frigates-core</module>
13      <module>frigates-dump-api</module>
14      <module>frigates-engine</module>
15      <module>player-test</module>
16      <module>weeklyrunner</module>
17      <module>frigates-dump-viewer</module>
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5     <groupId>fr.unice.polytech.si3.qgl</groupId>
6     <artifactId>runners.aggregator</artifactId>        By convention, use "aggregator" in your name
7     <version>1.0</version>
8     <packaging>pom</packaging>
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```
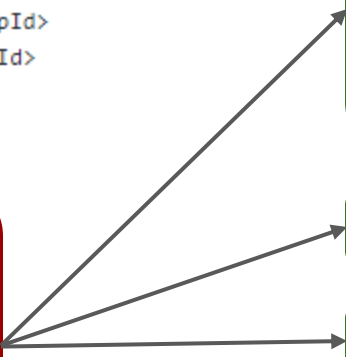
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6    <artifactId>runners.aggregator</artifactId>
7    <version>1.0</version>
8    <packaging>pom</packaging>        Use pom as packaging
9
10   <modules>
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Declare your modules

How to define some modules?

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```

📁 config	4 days ago
📁 frigates-core	4 days ago
📁 frigates-dump-api	4 days ago
📁 frigates-dump-viewer	6 days ago
📁 frigates-engine	4 days ago
📁 geometry-api	4 days ago
📁 git-retrieve	5 days ago
📁 player-test	23 days ago
📁 scripts	last month
📁 weeklyrunner	6 days ago
📄 .gitignore	3 months ago
📄 LICENSE	6 months ago
📄 README.md	3 months ago
📄 output.bump	last month
📄 pom.xml	2 months ago

Dependencies between modules

```xml
1    <?xml version="1.0" encoding="UTF-8" standalone="no"?>
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needs

Dependencies between modules

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18    </modules>
19  </project>
20
```

needs

Q&A