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What is Maven?

Maven is a powerful tool for the automatization of processes in the Java software development, simplifying the management, and complexity of complex projects promoting good software development practices and a standard for building them.

Why use Maven?

- It makes teamwork easier by having a standard everyone will follow, getting rid of redundancy and improving collaboration inside the project
- Automate repetitive tasks
- Manage dependencies automatically without the need of you to do anything.

Main Features

- **Dependency Management**
  - Maven facilitates the inclusion of external libraries in a project, downloading them automatically from remote repositories, making sure that the correct versions are being used in the project.
- **Project Construction**
  - Maven uses a configuration file named **"pom.xml"** (Project Object Model) where the structure of the project, dependencies and task construction are defined.
- **Standardization**
  - It provides a standard for project building allowing teams to be coherent and improving teamwork
- **Plugins**
  - Maven is extensible through plugins that allow adding additional functionalities, like documentation generation, project implementation in servers, and the execution of code analysis.
- **Repositories**
  - **Local Repositories:** Maven stores all dependencies downloaded in local repository in your machine which avoids the redundancy of downloading the same dependencies over and over again.
  - **Remote Repositories:** Maven download the dependencies from remote repositories like Maven Central or private repositories configured by the company
  - **Snapshot Repositories:** Maven uses snapshot versions to manage versions in the artifact development allowing to try different versions that haven't been launched officially.
- **Super POM**

- o This is like the normal POM file that all the other POM files inherit from, providing configurations and predetermined values that can be overwritten by the project's POM

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POM Template Example

(https://github.com/felix-seifert/java-17-maven-project/blob/main/pom.xml)

```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>

  <groupId>se.kth.compilers</groupId>
  <artifactId>java-17-maven-project</artifactId>
  <version>1.0-SNAPSHOT</version>

  <properties>
    <maven.compiler.source>17</maven.compiler.source>
    <maven.compiler.target>17</maven.compiler.target>
  </properties>

  <dependencies>
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter-api</artifactId>
      <version>5.8.1</version>
      <scope>test</scope>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-compiler-plugin</artifactId>
        <version>3.8.1</version>
        <configuration>
          <source>17</source>
          <target>17</target>
          <compilerArgs>
            <arg>--enable-preview</arg>
          </compilerArgs>
        </configuration>
      </plugin>
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-shade-plugin</artifactId>
        <version>3.2.4</version>
        <executions>
          <execution>
            <phase>package</phase>
```

```
            <goals>
               <goal>shade</goal>
            </goals>
            <configuration>
               <transformers>
                  <transformer

implementation="org.apache.maven.plugins.shade.resource.ServicesResourceTransformer"/>
                  <transformer

implementation="org.apache.maven.plugins.shade.resource.ManifestResourceTransformer">
                     <mainClass>se.kth.compilers.Hello</mainClass>
                  </transformer>
               </transformers>
            </configuration>
         </execution>
      </executions>
   </plugin>
   <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-surefire-plugin</artifactId>
      <version>3.0.0-M5</version>
      <configuration>
         <argLine>--enable-preview</argLine>
      </configuration>
   </plugin>
  </plugins>
 </build>

</project>
```