

Maven

OOP 2018

What is Maven

Open-source project management framework

Simplifies building, testing and packaging

Standard way of building projects

Sharing generated artifacts across projects

Version 1.0 released in 2004

Features

Standardized directory structure

Declarative dependency management

Plug-ins

Uniform build abstraction

Tools support

Archetypes

Standardized directory structure

project root folder

- pom.xml
- src
 - main
 - java
 - test
 - java
- target

Dependency identification

groupId

- Organization/group identifier

artifactId

- Artifact identifier
- Unique among the projects using the same groupId

version

<dependency>

```
<groupId>commons-cli</groupId>
<artifactId>commons-cli</artifactId>
<version>1.2</version>
</dependency>
```

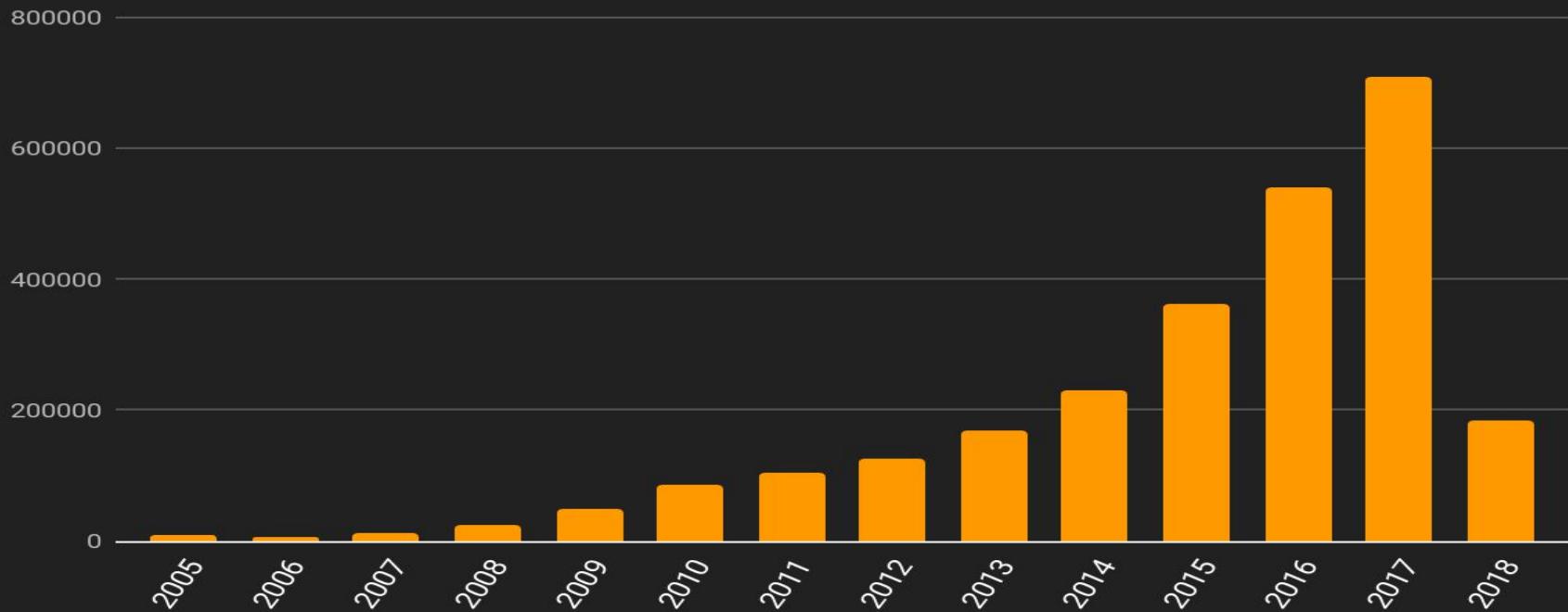
Dependency identification

```
<dependency>
    <groupId>org.projectlombok</groupId>
    <artifactId>lombok</artifactId>
    <version>LATEST</version>
</dependency>

<dependency>
    <groupId>com.icegreen</groupId>
    <artifactId>greenmail</artifactId>
    <version>1.5.5</version>
    <scope>test</scope>
</dependency>
```

Statistics

Central Repository - published jars by year (2,621,454)



Create new maven project

New Project

Project SDK: 1.8 (java version "1.8.0_161") ▾ New...

Create from archetype Add Archetype...

- ▶ am.ik.archetype:maven-reactjs-blank-archetype
- ▶ am.ik.archetype:msgpack-rpc-jersey-blank-archetype
- ▶ am.ik.archetype:mvc-1.0-blank-archetype
- ▶ am.ik.archetype:spring-boot-blank-archetype
- ▶ am.ik.archetype:spring-boot-docker-blank-archetype
- ▶ am.ik.archetype:spring-boot-gae-blank-archetype
- ▶ am.ik.archetype:spring-boot-jersey-blank-archetype
- ▶ am.ik.archetype:vanilla-spring-webflux-fn-blank-archetype
- ▶ at.chri.archetypes:chri-spring-sample
- ▶ br.com.address.archetypes:struts2-archetype
- ▶ br.com.address.archetypes:struts2-base-archetype
- ▶ br.com.anteros:Anteros-Archetype
- ▶ br.com.diogoko:maven-doclet-archetype
- ▶ br.com.ingenieux:elasticbeanstalk-docker-dropwizard-webapp-archetype
- ▶ br.com.ingenieux:elasticbeanstalk-javase-archetype
- ▶ br.com.ingenieux:elasticbeanstalk-service-webapp-archetype
- ▶ br.com.ingenieux:elasticbeanstalk-wrapper-webapp-archetype
- ▶ br.com.otavio.vraptor.archetypes:vraptor-archetype-blank
- ▶ br.gov.frameworkdemoiselle.archetypes:demoiselle-html-rest
- ▶ br.gov.frameworkdemoiselle.archetypes:demoiselle-jsf-jpa
- ▶ ca.bc.gov.open.cpf:cpf-archetype-plugin
- ▶ ca.bc.gov.open.cpf:cpf-archetype-web
- ▶ ch.sbb.maven.archetypes:lib9-maven-projects
- ▶ ch.sbb.maven.archetypes:wmb7-maven-projects
- ▶ co.n-tier:spring-mvc-archetype
- ▶ com.abiquo:backup-plugin-archetype
- ▶ com.abiquo:storage-plugin-archetype
- ▶ com.agapsys.archetypes:agreste-app-archetype
- ▶ com.agapsys.archetypes:agreste-lib-archetype
- ▶ com.agapsys.archetypes:rcf-app-archetype

Previous Next Cancel Help



GroupId	sk.stuba.fei	<input checked="" type="checkbox"/> Inherit
ArtifactId	maven-example	<input checked="" type="checkbox"/> Inherit
Version	1.0-SNAPSHOT	

Set artifactId, groupId & version

[Previous](#)[Next](#)[Cancel](#)[Help](#)



Project name: mavenexample

Project location: /mnt/E4B0EFDBB0EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample



Set project name & location

▶ More Settings

Previous

Finish

Cancel

Help

Project name: mavenexample

Project location: /mnt/E4B0EFDBB0EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample



Confirm



▶ More Settings

Previous

Finish

Cancel

Help

Open pom.xml

Enable auto-import (IDEA)

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

mavenexample [/mnt/E4B0EFDB0EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample] - maven-example - IntelliJ IDEA

Project Database

mavenexample

External Libraries

Scratches and Consoles

maven-example

```
<?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>sk.stuba.fei</groupId>
    <artifactId>maven-example</artifactId>
    <version>1.0-SNAPSHOT</version>
</project>
```

Graph Database

Maven Projects

Art Build

Favorites

Structure

project

Maven projects need to be imported

Import Changes Enable Auto-Import

Event Log

Graph Database Console Terminal TODO

Maven projects need to be imported // Import Changes // Enable Auto-Import (moments ago)

11:1 LF+ UTF-8

Add dependency

```
<dependencies>
  <dependency>
    <groupId>commons-cli</groupId>
    <artifactId>commons-cli</artifactId>
    <version>1.2</version>
  </dependency>
</dependencies>
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

mavenexample pom.xml

maven-example

```
<?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>sk.stuba.fei</groupId>
    <artifactId>maven-example</artifactId>
    <version>1.0-SNAPSHOT</version>
    <dependencies>
        <dependency>
            <groupId>commons-cli</groupId>
            <artifactId>commons-cli</artifactId>
            <version>1.2</version>
        </dependency>
    </dependencies>
</project>
```

Project

mavenexample /mnt/E4B0EFDB0EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample .idea src mavenexample.iml pom.xml External Libraries Scratches and Consoles

Main

Ant Build Database Graph Database Maven Projects

Z: Structure

Favorites

Run TODO Graph Database Console Terminal

All files are up-to-date (24 minutes ago)

Event Log

Create package (if missing)

In folder
src/main/java

Create package
<groupId>.<artifactId>

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

mavenexample pom.xml

Project

mavenexample /mnt/E4B0EFDB0EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample

.idea

src

main

java

resources

test

mavenexample.iml

pom.xml

External Libraries

Scratches and Consoles

maven-example

```
<?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>sk.stuba.fei</groupId>
    <artifactId>maven-example</artifactId>
    <version>1.0-SNAPSHOT</version>
    <dependencies>
        <dependency>
            <groupId>commons-cli</groupId>
            <artifactId>commons-cli</artifactId>
            <version>1.2</version>
        </dependency>
    </dependencies>
</project>
```

New Package

Enter new package name:

sk.stuba.fei.mavenexample

OK Cancel

Z: Structure

2: Favorites

Event Log

All files are up-to-date (20 minutes ago)

Create Main (if missing)

In folder
`src/main/java/<packagename>`

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

mavenexample [/mnt/E4B0EFDB0EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample] - maven-example - IntelliJ IDEA

Project maven-example

src main java sk stuba fei mavenexample

<?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>sk.stubabfei</groupId>
 <artifactId>maven-example</artifactId>
 <version>1.0-SNAPSHOT</version>

 <dependencies>
 <dependency>
 <groupId>commons-cli</groupId>
 <artifactId>commons-cli</artifactId>
 <version>1.2</version>
 </dependency>
 </dependencies>
</project>

Create New Class

Name: Main

Kind: Class

OK Cancel

Z: Structure

2: Favorites

Event Log

All files are up-to-date (26 minutes ago)

Use imported dependency (static methods used for simplicity!)

```
private static CommandLineParser parser = new BasicParser();
private static Options options = new Options();

public static void main(String[] args) {
    try {
        parseArgumentValue(args);
    } catch (ParseException e) {
        printParseException(e);
    }
}

private static void parseArgumentValue(String[] args) throws
    ParseException {
    CommandLine commandLine = parseCommands(args);
    System.out.println("a=" + commandLine.getOptionValue("a"));
}

private static CommandLine parseCommands(String[] args) throws
    ParseException {
    options.addOption("a", true, "an argument");
    return parser.parse(options, args);
}

private static void printParseException(ParseException e) {
    System.out.println(e.getMessage());
    System.out.println("Usage: java -jar -a <value>");
}
```

The screenshot shows the IntelliJ IDEA interface with the following details:

- Project Bar:** Shows the project structure: mavenexample (selected), .idea, src, main, java, sk, stuba, fei, mavenexample.
- Editor:** Displays the Main.java file content. The code uses Apache Commons CLI to parse command-line arguments.
- Side Panels:**
 - Tool Window:** Shows External Libraries (mavenexample), Scratches and Consoles.
 - Right Panel:** Shows Database, Graph Database, and Maven Projects.
- Bottom Navigation:** Includes Run, TODO, Graph Database Console, Terminal, Event Log, and a status bar indicating "All files are up-to-date (28 minutes ago)".

```
1 package sk.stuba.fei.mavenexample;
2
3 import org.apache.commons.cli.*;
4
5 public class Main {
6
7     private static final String ARGUMENT_A = "a";
8     private static final String ARGUMENT_A_DESC = "an argument";
9
10    private static CommandLineParser parser = new BasicParser();
11    private static Options options = new Options();
12
13    public static void main(String[] args) {
14        try {
15            parseArgumentValue(args);
16        } catch (ParseException e) {
17            printParseException(e);
18        }
19    }
20
21    private static void parseArgumentValue(String[] args) throws ParseException {
22        CommandLine commandLine = parseCommands(args);
23
24        System.out.println(ARGUMENT_A + "=" + commandLine.getOptionValue(ARGUMENT_A));
25    }
26
27    private static CommandLine parseCommands(String[] args) throws ParseException {
28        options.addOption(ARGUMENT_A, hasArg: true, ARGUMENT_A_DESC);
29        return parser.parse(options, args);
30    }
31
32    private static void printParseException(ParseException e) {
33        System.out.println(e.getMessage());
34        System.out.println("Usage: java -jar -a <value>");
35    }
36}
```

Create run configuration

Set program arguments to:

-a 10

or execute jar from command line

java -jar <name>.jar -a 10

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

mavenexample src main java sk stuba fei mavenexample

Project

mavenexample /mnt/E4B0EFD80EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample

- .idea
- src
- main
- java
- sk.stuba.fei.mavenexample
- Main
- resources
- test
- mavenexample.iml
- pom.xml

External Libraries

Scratches and Consoles

maven-example Main.java

```
1 package sk.stuba.fei.mavenexample;
2
3 import org.apache.commons.cli.*;
4
5 public class Main {
```

Run/Debug Configurations

Name: Main

Configuration Code Coverage Logs

Main class: sk.stuba.fei.mavenexample.Main

VM options:

Program arguments: -a 10

Working directory: /mnt/E4B0EFD80EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample

Environment variables:

Use classpath of module: mavenexample

Include dependencies with "Provided" scope

IRE: Default (1.8 - SDK of 'mavenexample' module)

Shorten command line: user-local default: none -java [options] classname [args]

Enable capturing form snapshots

Before launch: Build, Activate tool window

Show this page Activate tool window

OK Cancel Apply

Z: Structure

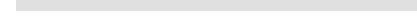
2: Favorites

4: Run 6: TODO Graph Database Console Terminal

All files are up-to-date (30 minutes ago)

Event Log

362 LF: UTF-8



Run

mavenexample [/mnt/E4B0EFD80EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample] - .../src/main/java/sk/stuba/fei/mavenexample/Main.java [mavenexample] - IntelliJ IDEA

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

mavenexample target

Project

mavenexample /mnt/E4B0EFD80EFB1EA/STU FEI/2017 - 2018/OOP/zad1/mavenexample

- idea
- src
 - main
 - java
 - sk.stuba.fei.mavenexample
- test
- target
 - mavenexample.iml
 - pom.xml

External Libraries

Scratches and Consoles

maven-example Main.java

```
1 package sk.stuba.fei.mavenexample;
2
3 import org.apache.commons.cli.*;
4
5 public class Main {
6
7     private static final String ARGUMENT_A = "a";
8     private static final String ARGUMENT_A_DESC = "an argument";
9
10    private static CommandLineParser parser = new BasicParser();
11    private static Options options = new Options();
12
13    public static void main(String[] args) {
14        try {
15            parseArgumentValue(args);
16        } catch (ParseException e) {
17            printParseException(e);
18        }
19    }
20
21    private static void parseArgumentValue(String[] args) throws ParseException {
22        CommandLine commandLine = parseCommands(args);
23
24        System.out.println(ARGUMENT_A + "=" + commandLine.getOptionValue(ARGUMENT_A));
25    }
26
27    private static CommandLine parseCommands(String[] args) throws ParseException {
28        options.addOption(ARGUMENT_A, hasArg: true, ARGUMENT_A_DESC);
29
30        return parser.parse(options, args);
31    }
32
33    private static void printParseException(ParseException e) {
34        System.out.println(e.getMessage());
35        System.out.println("Usage: java -jar -a <value>");
36    }
}
```

Main > options

Run: Main

```
/opt/java/jdk1.8.0_161/bin/java ...
a=10
```

Process finished with exit code 0

Z: Structure

2: Favorites

4: Run 6: TODO 8: Graph Database Console 10: Terminal 12: Messages

Compilation completed successfully with 3 warnings in 2s 798ms (moments ago)

Event Log

Further reading

Varanasi, B., Belida, S.:
Introducing Maven.
Apress (2014)

Sonatype Company:
Maven: The Definitive Guide.
O'Reilly Media, Inc. (2008)