



Java 核心技术(进阶)

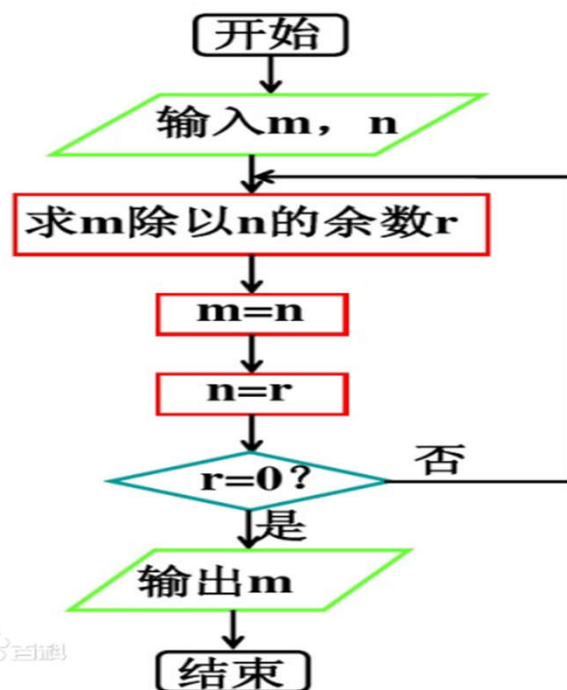
第一章 Maven

第一节 构建工具

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问题(1)

- 求两个整数的最大公约数
 - 辗转相除法(欧几里得算法, Euclidean algorithm)



问题(2)



- 已有的第三方库Apache Commons Math中有现成函数API
 - `org.apache.commons.math3.util.ArithmeticUtils`

gcd

```
public static int gcd(int p,  
    int q)  
    throws MathArithmeticException
```

Computes the greatest common divisor of the absolute value of two numbers, using a modified version of the "binary gcd" method. See Knuth 4.5.2 algorithm B. The algorithm is due to Josef Stein (1961).

Special cases:

- The invocations `gcd(Integer.MIN_VALUE, Integer.MIN_VALUE)`, `gcd(Integer.MIN_VALUE, 0)` and `gcd(0, Integer.MIN_VALUE)` throw an `ArithmeticException`, because the result would be 2^{31} , which is too large for an `int` value.
- The result of `gcd(x, x)`, `gcd(0, x)` and `gcd(x, 0)` is the absolute value of `x`, except for the special cases above.
- The invocation `gcd(0, 0)` is the only one which returns 0.

Parameters:

`p` - Number.

`q` - Number.

Returns:

the greatest common divisor (never negative).



传统方法(1)

- 搜索引擎搜索 Apache Commons Math
- 找到官网
- 确定相应版本和下载路径
- 下载到本地，找到里面的jar文件

Apache Common Math

网页 资讯 贴吧 知道 视频 音乐 图片 地图 文库

百度为您找到相关结果约4,140,000个

您可以仅查看: 英文结果

[Math - Commons Math: The Apache Commons Mathematics Library](#)

查看此网页的中文翻译, 请点击 [翻译此页](#)

2016年8月28日 - Commons Math is a library of lightweight, self-contained mathematical statistics components addressing the most common problems not available in the standard Java library.

[commons.apache.org/pro...](#) - 百度快照

Apache Commons Math 3.6.1 Binaries

[commons-math3-3.6.1-bin.tar.gz](#)

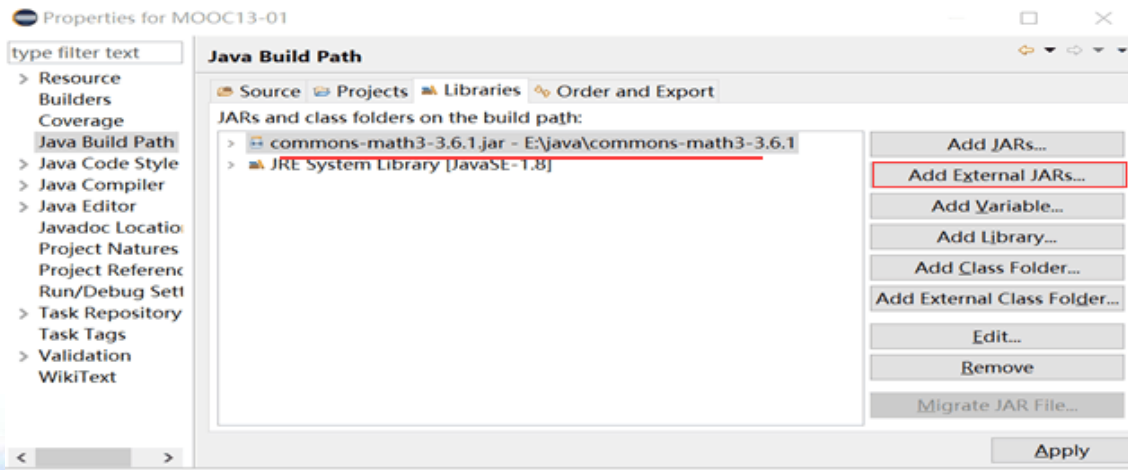
[commons-math3-3.6.1-bin.zip](#)





传统方法(2)

- 新建Java项目
- 将jar文件添加到Java Build Path
 - 右键项目，Properties->Libraries标签页->Add External JARs, 添加
- 开始编码、测试



```
import org.apache.commons.math3.util. ArithmeticUtils;
```

```
public class GcdTest {
```

```
    public static void main(String[] args) {
```

```
        //计算两个整数的公约数
```

```
        int a = ArithmeticUtils.gcd(361, 285);
```

```
        System.out.println(a);
```

```
    }
```

```
}
```



传统方法(3)

- 优点：
 - 第三方库很强大，要学会在巨人肩膀上工作
- 缺点
 - 搜索、确定版本、下载jar包，工作量大且不易
 - 需要手动把jar包添加到项目build path
 - 代码拷贝到别人的机器，需要同样的配置路径
- 反思：是否存在一种自动下载、管理jar包又能配置build path的构建工具呢？

Maven方法(1)



• 创建Maven 项目



New

Select a wizard

Create a Maven Project

Wizards:

type filter text

- > General
- > Git
- > Gradle
- > Java
- ▼ Maven
 - Check out Maven Projects from SCM
 - Maven Module
 - Maven Project

New Maven Project

New Maven project

Configure project

Artifact

Group Id: com.test

Artifact Id: MOOC13-01Maven

Version: 0.0.1-SNAPSHOT

Packaging: jar

Name: MOOC13-01Maven

Description: maven test

Parent Project

Group Id:

Artifact Id:

Version: Browse... Clear

Advanced

< Back Next > Finish Cancel

Maven方法(2)



- 在mvn中央仓库(mvnrepository.com)中搜索 Commons Math

← → ↻ <https://mvnrepository.com/search?q=commons+math>

MVNREPOSITORY commons math Search

Repository

- Central 4.1k
- Sonatype 2.0k
- Spring Plugins 1.1k
- Spring Lib M 1.0k
- IBiblio 236
- JCenter 193
- Spring Lib Release 186
- Apache Releases 148

Found 5687 results

Sort: **relevance** | popular | newest

1. **Apache Commons Math** 1,266 usages

[org.apache.commons » commons-math3](#) **Apache**

The Apache Commons Math project is a library of lightweight, self-contained mathematics and statistics components addressing the most common practical problems not immediately available in the Java programming language or commons-lang.

Last Release on Mar 17, 2016



Apache Commons Math

The Apache Commons Math project is a library of lightweight, self-contained mathematics and statistics components addressing the most common practical problems not immediately available in the Java programming language or commons-lang.

License	Apache 2.0
Categories	Math Libraries
Tags	math apache commons
Used By	1,266 artifacts

Central (10)		Redhat GA (1)	
Version	Repository	Usages	Date
3.6.x	3.6.1	Central 562	Mar, 2016
	3.6	Central 67	Jan, 2016
3.5.x	3.5	Central 198	Apr, 2015
3.4.x	3.4.1	Central 151	Jan, 2015
	3.4	Central 6	Dec, 2014
3.3.x	3.3	Central 118	Mar, 2014

Maven方法(3)



- 将Apache Commons Math依赖文本加到项目pom.xml中



Apache Commons Math » 3.6.1

The Apache Commons Math project is a library of lightweight, statistics components addressing the most common practical problems available in the Java programming language or commons-lang.

License	Apache 2.0
Categories	Math Libraries
HomePage	http://commons.apache.org/proper/commons-math/
Date	(Mar 17, 2016)
Files	pom (28 KB) jar (2.1 MB) View All
Repositories	Central Spring Plugins
Used By	1,266 artifacts

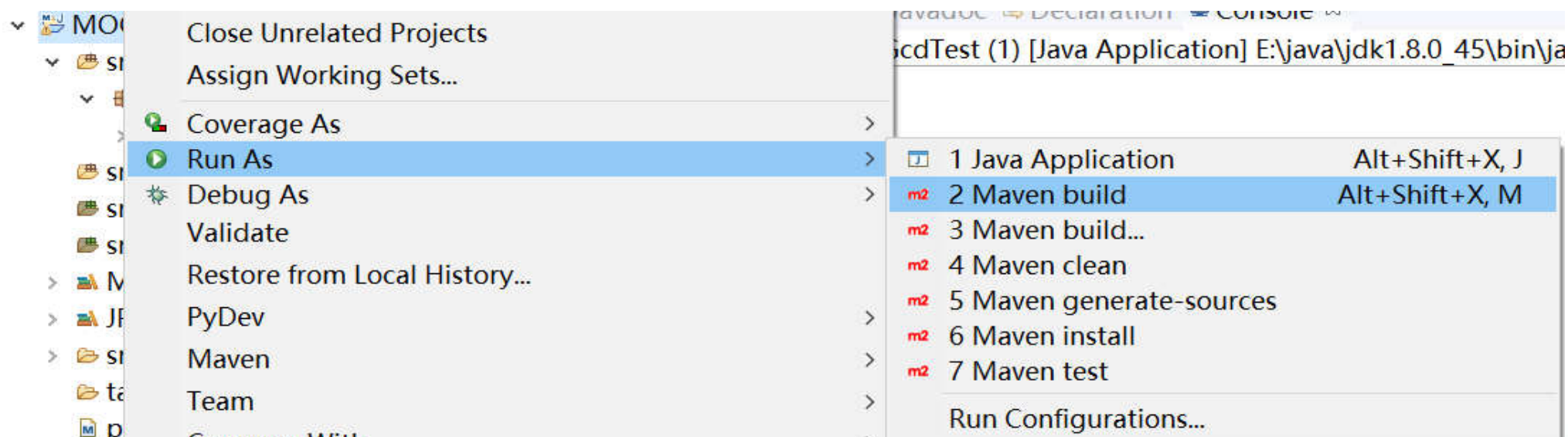
Maven	Gradle	SBT	Ivy	Grape	Leiningen	Buildr
<pre><!-- https://mvnrepository.com/artifact/org.apache.commons/commons-math3 --> <dependency> <groupId>org.apache.commons</groupId> <artifactId>commons-math3</artifactId> <version>3.6.1</version> </dependency></pre>						

```
1 <project xmlns="http://maven.apache.org/POM/4.0.0" >
2   <modelVersion>4.0.0</modelVersion>
3   <groupId>com.test</groupId>
4   <artifactId>MOOC13-01Maven</artifactId>
5   <version>0.0.1-SNAPSHOT</version>
6   <name>MOOC13-01Maven</name>
7   <description>maven test</description>
8   <dependencies>
9     <dependency>
10       <groupId>org.apache.commons</groupId>
11       <artifactId>commons-math3</artifactId>
12       <version>3.6.1</version>
13     </dependency>
14   </dependencies>
15 </project>
```



Maven方法(4)

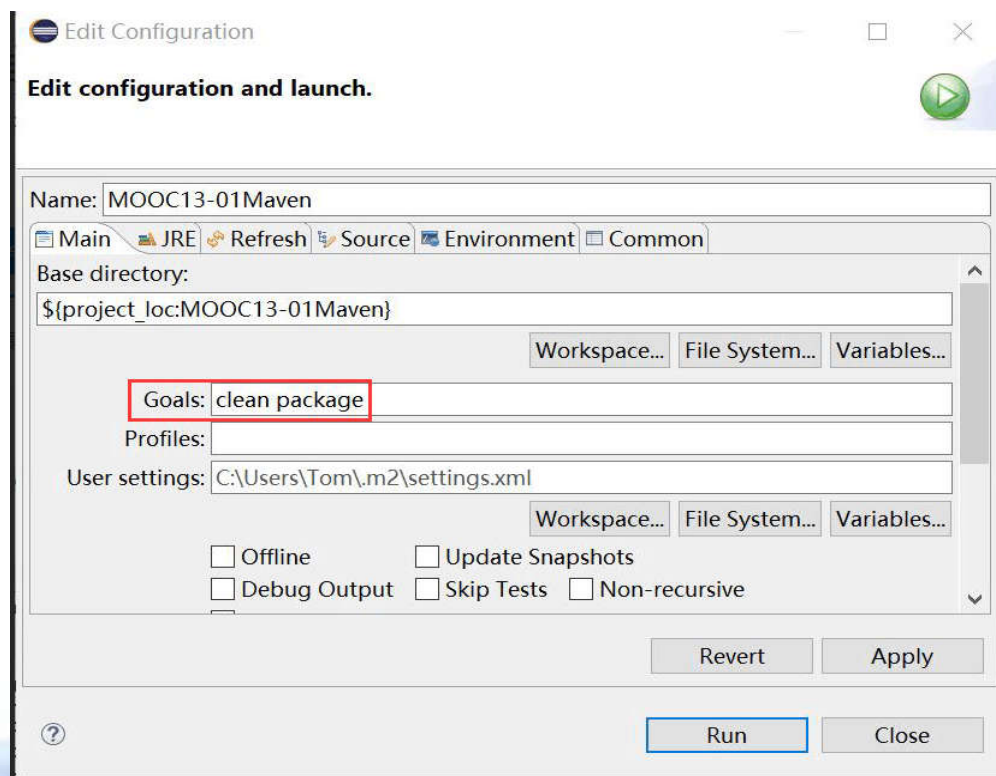
- 使用Apache Commons Math类进行编码
- Maven编译和运行：右键项目->Run as ->Maven Build





Maven方法(5)

- Maven编译和运行：右键项目->Run as ->Maven Build

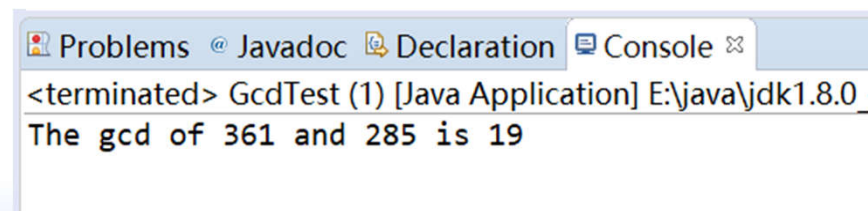
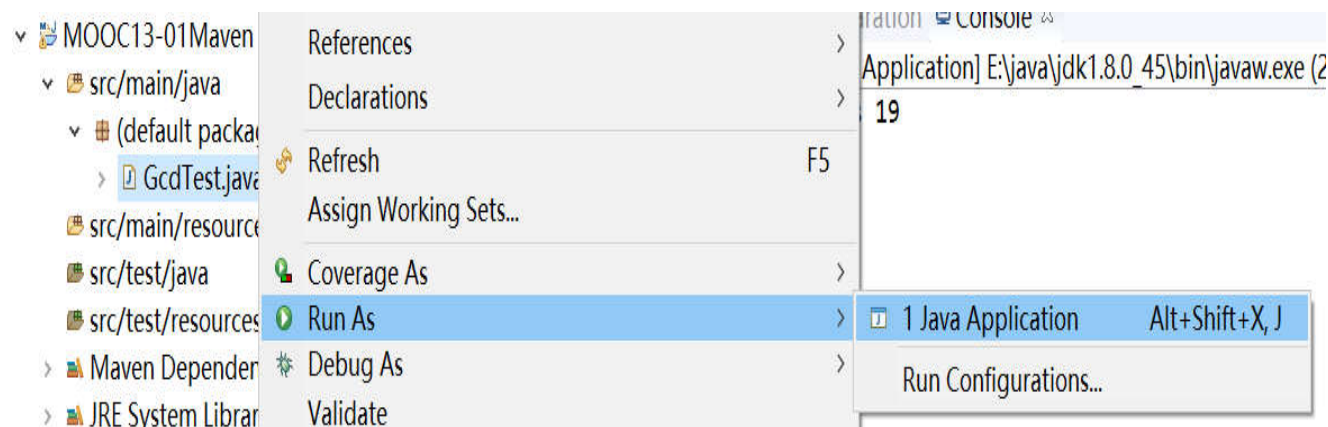


```
[INFO] --- maven-resources-plugin:2.6:testResources
[WARNING] Using platform encoding (GBK actually)
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test)
[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar)
[INFO] Building jar: E:\java\source\MOOC13-01Maven\MOOC13-01Maven.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 1.499 s
[INFO] Finished at: 2018-12-13T16:09:02+08:00
[INFO] -----
```




Maven方法(6)

- 程序运行：右键GcdTest，选择Run as -> Java Application





Java构建工具

- 构建工具功能
 - 自动帮程序员甄别和下载第三方库(jar)
 - 完成整个项目编译(调用javac.exe)
 - 完成整个项目单元测试流程(调用JUnit工具)
 - 完成项目打包(jar/war等格式, 调用jar.exe)
 -
- 当前主要的Java构建工具
 - Maven, Gradle, Ivy, Buildr, Ant 等

总结



- 总结

- 了解传统模式下使用第三方库的痛点
- 了解构建工具在项目开发中的作用
- 初步了解Maven的构建过程



代码(1) GCDTest.java

```
import org.apache.commons.math3.util. ArithmeticUtils;

public class GcdTest {

    public static void main(String[] args) {
        //计算两个整数的公约数
        int a = ArithmeticUtils.gcd(361, 285);
        System.out.println(a);
    }
}
```



代码(2) pom.xml

```
<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>MOOC13-01Maven</groupId>
  <artifactId>MOOC13-01Maven</artifactId>
  <version>0.0.1-SNAPSHOT</version>

  <dependencies>
    <dependency>
      <groupId>org.apache.commons</groupId>
      <artifactId>commons-math3</artifactId>
      <version>3.6.1</version>
    </dependency>
  </dependencies>
</project>
```




谢谢!