Java 核心技术(进阶)

第一章 Maven

第一节 构建工具

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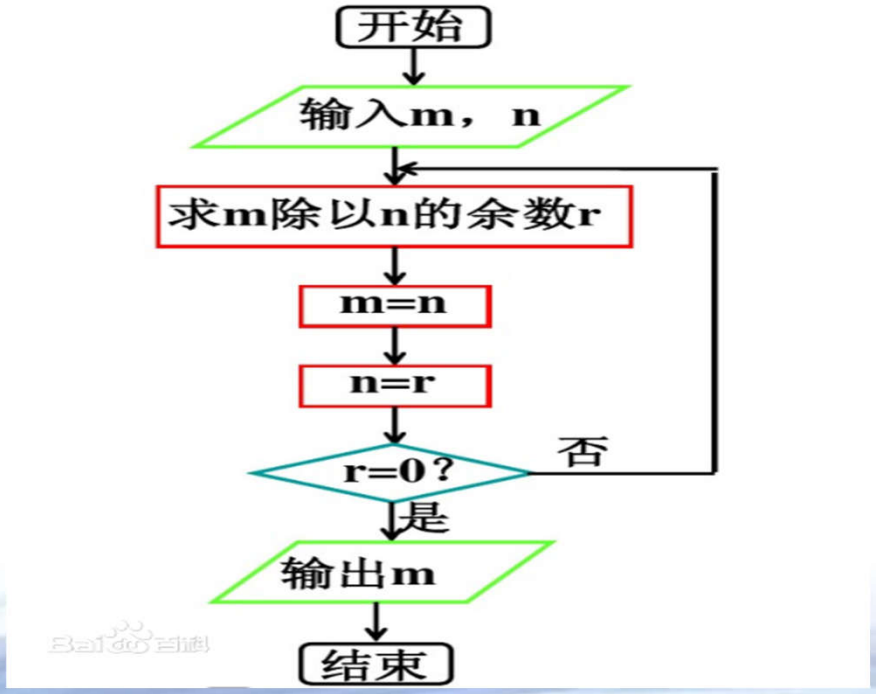
问题(1)

- 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:

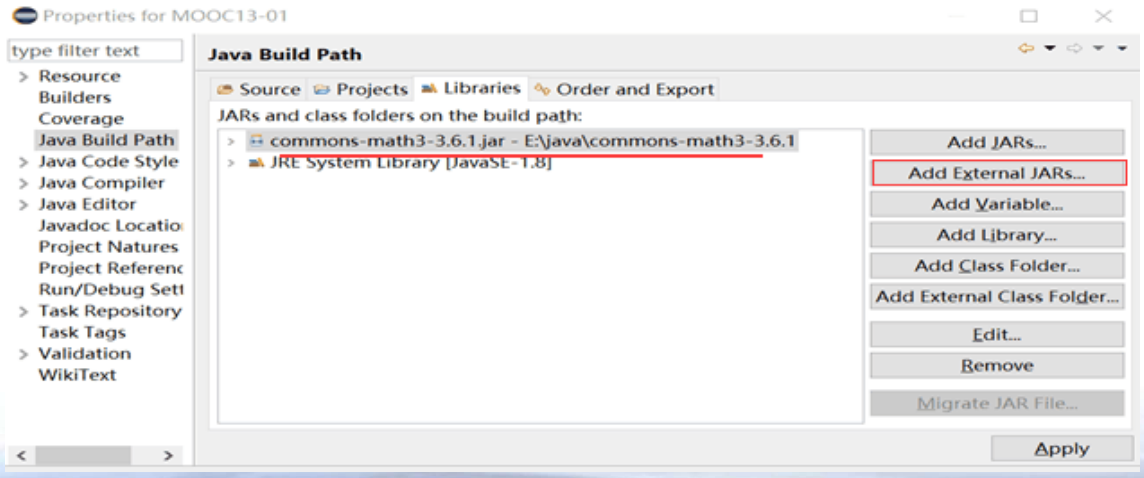
the greatest common divisor (never negative).

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

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



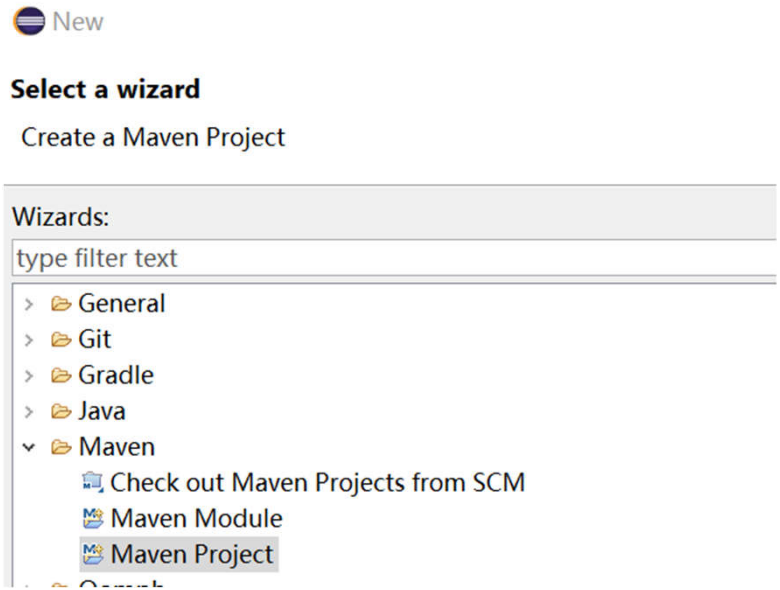

```java
import org.apache.commons.math3.util. ArithmeticUtils;

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);
    }
}
```

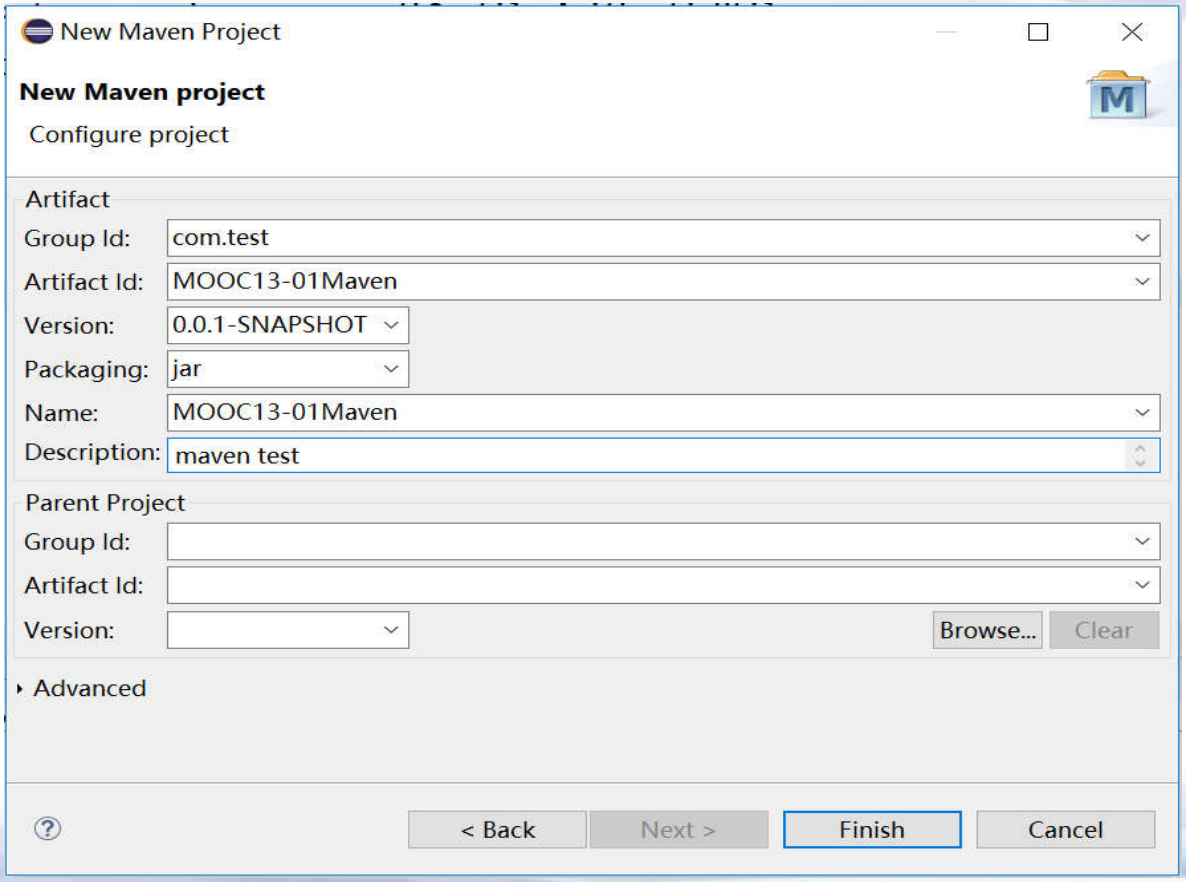
传统方法(3)

- 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)

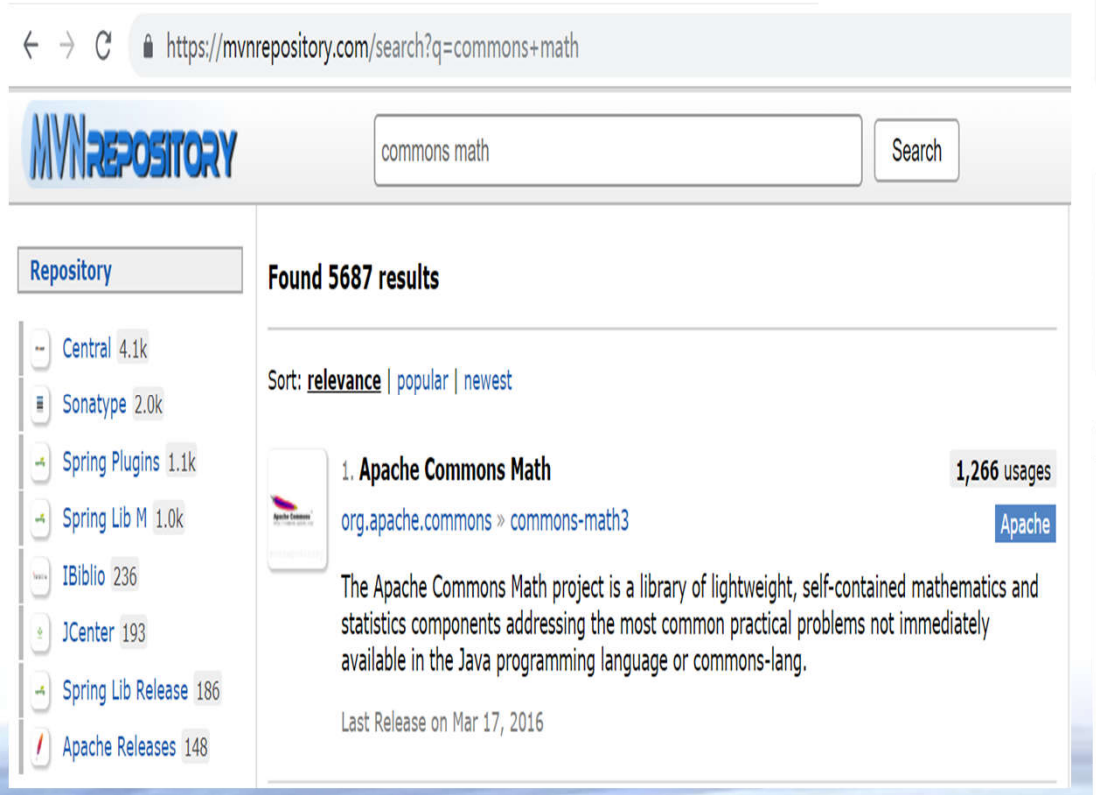
- 创建Maven 项目

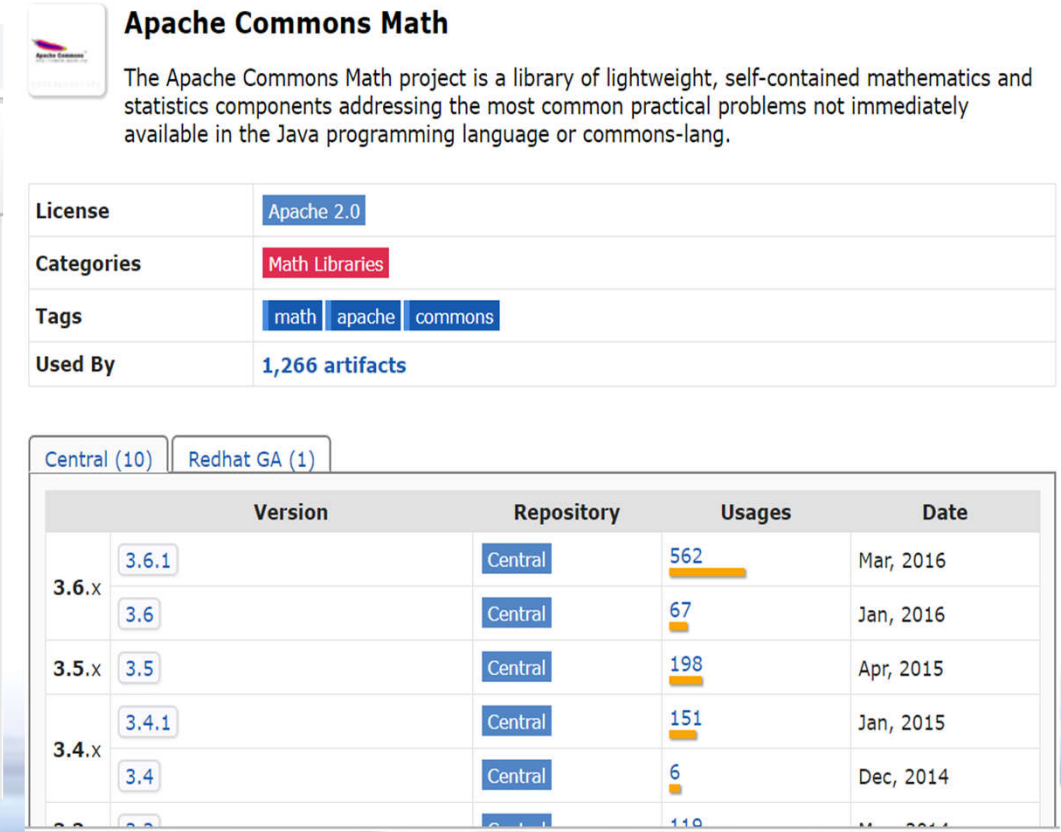




Maven方法(2)

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





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, s
statistics components addressing the most common practical p
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

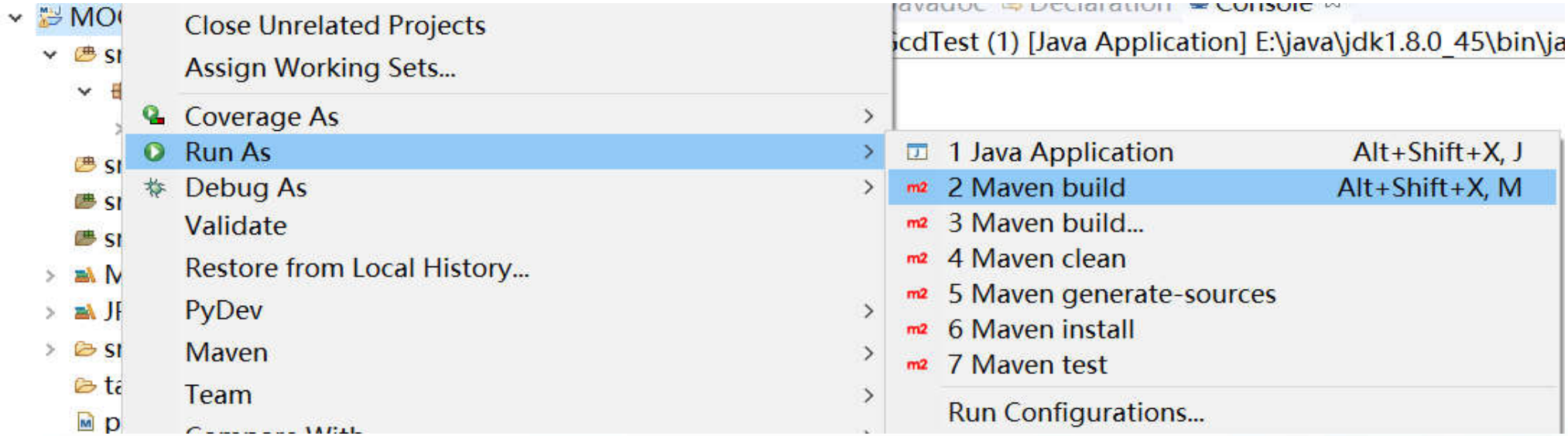
Maven | Gradle | SBT | Ivy | Grape | Leiningen | Buildr

```
<!-- 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>
```

```
1  <project xmlns="http://maven.apache.org/POM/4.0.0" x
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>
```

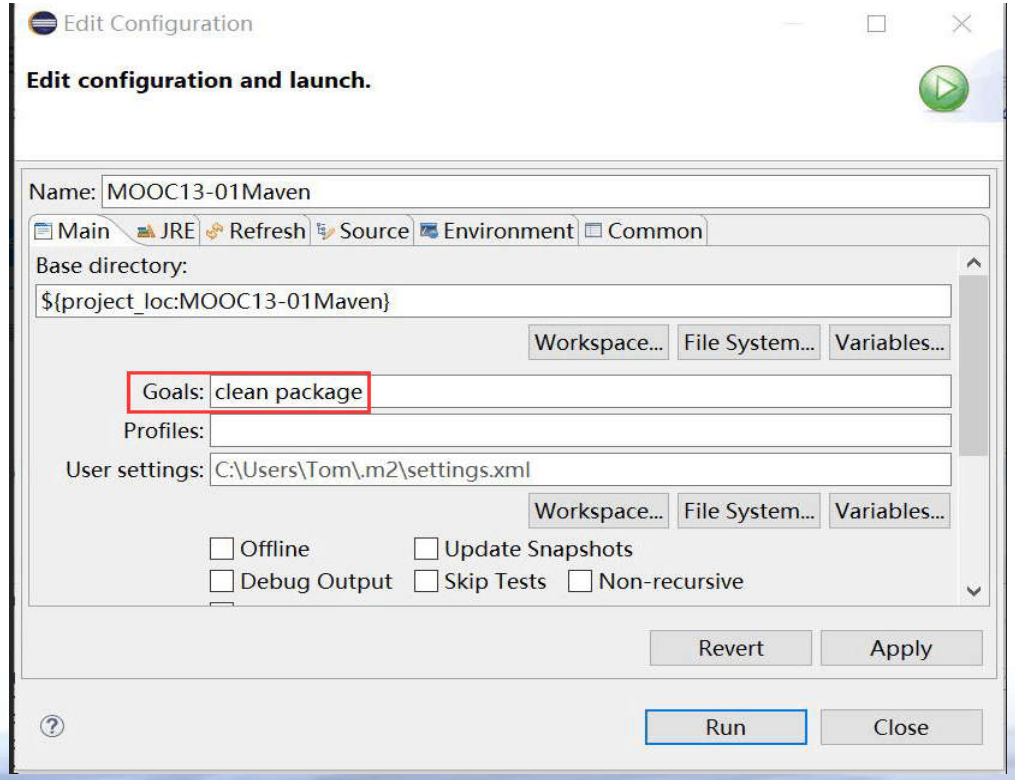
Maven方法(4)

- 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)

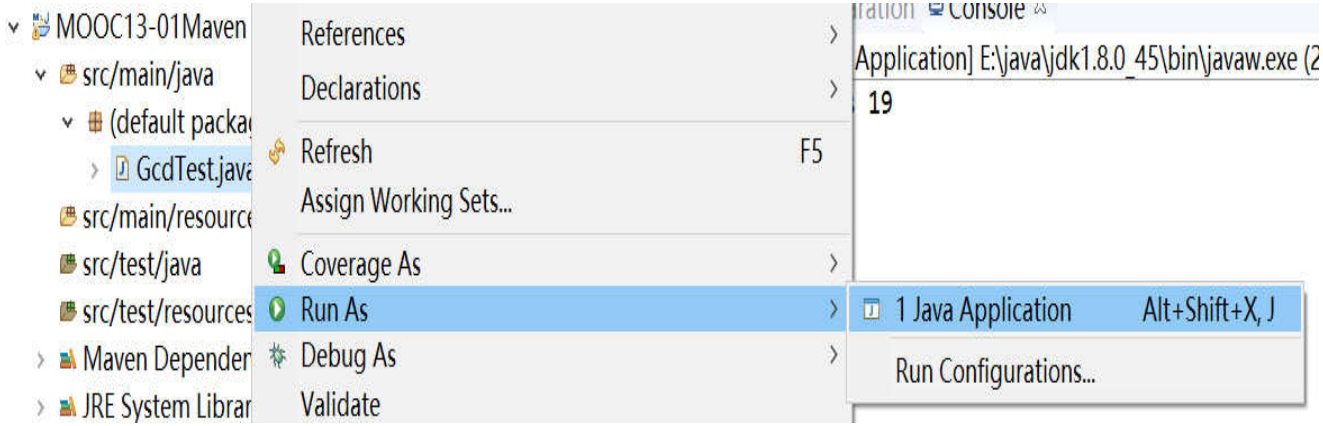
- Maven编译和运行：右键项目->Run as ->Maven Build

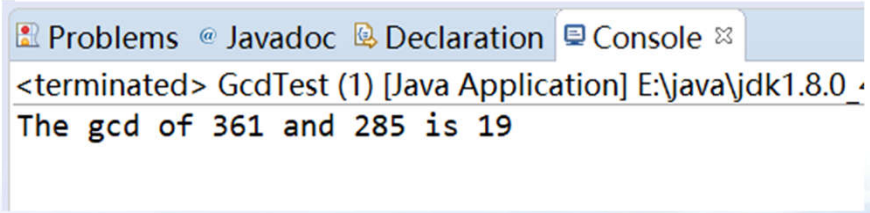



```
[INFO] --- maven-resources-plugin:2.6:testResourc
[WARNING] Using platform encoding (GBK actually)
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile
[INFO] Nothing to compile - all classes are up to
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (def
[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar)
[INFO] Building jar: E:\java\source\MOOC13-01Mave
[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


```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！