Getting Started

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Spring Boot helps you to create stand-alone, production-grade Spring-based Applications that you can run. We take an opinionated view of the Spring platform and third-party libraries, so that you can get started with minimum fuss. Most Spring Boot applications need very little Spring configuration.

https://docs.spring.io/spring-boot/docs/2.4.3/reference/html/getting-started.html

1. Introducing Spring Boot

- 스프링 부트를 사용하면 요란 떨지 않고 괜찮은 어플리케이션을 개발할 수 있다
- 대부분의 스프링 부트 애플리케이션은 스프링 configuration 을 작성할 필요가 거의 없기 때문에 쉽다.

Spring boot’s primary goal

- 빠르고
- 여기저기 널리 쓰이고
- xml 설정이 필요 없도록!

2. System Requirements

https://docs.spring.io/spring-boot/docs/2.4.3/reference/html/getting-started.html#getting-started-system-requirements

3. Installing Spring Boot

1. Maven or Gradle
2. Spring Boot CLI

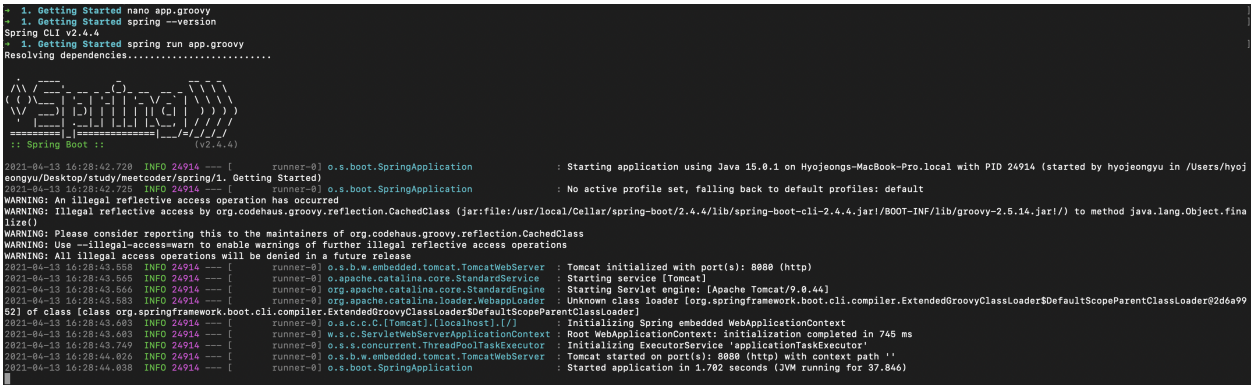
여느 다른 표준 자바 라이브러리와 마찬가지로 .jar 를 이용해서 스프링 부트를 실행할 수 있다.

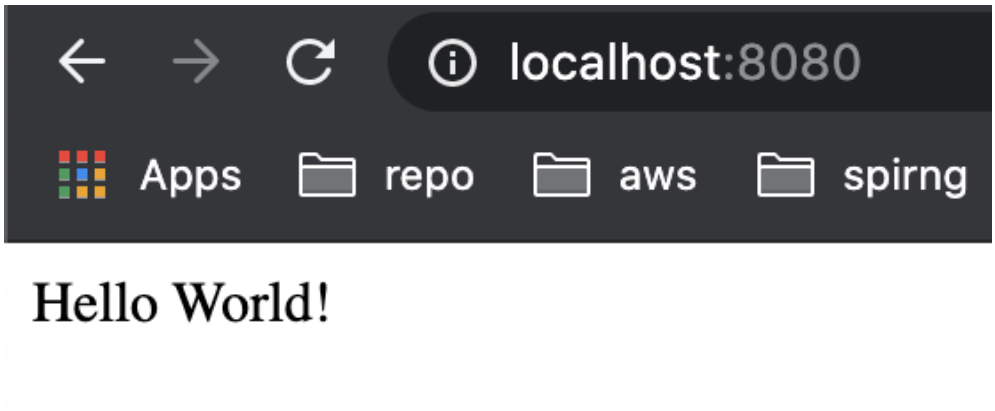
Spring Boot 을 이용해 만든 Jar 파일을 복붙해서 써도 되지만 gradle 이나 maven 같은 툴을 이용하는 것을 추천한다

Quick-start Spring CLI Example

```
// app.groovy

@RestController
class ThisWillActuallyRun {

    @RequestMapping("/")
    String home() {
        "Hello World!"
    }

}
```

```
$ spring run app.groovy
```





4. Developing Your First Spring Boot Application

간단한 "Hello World" 웹 어플리케이션을 만들어보자

우선 자바와 메이븐이 설치되어 있어야 한다

```
$ java -version
$ mvn -v
```

1. POM 작성
2. Classpath Dependencies 추가
3. 코드 작성하기

   @RestControlelr, @RequestMapping, @EnableAutoConfiguration, main method
4. Run
5. 실행 가능한 jar 파일 만들기

4.1. POM.xml 작성하기

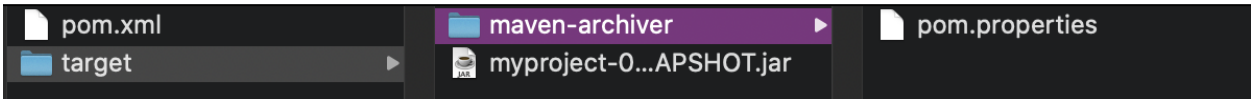
pom.xml: 애플리케이션 빌드에 사용되는 레서피

```
<?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 https://maven.apache.org/xsd/maven-4.0.0.xsd">
```

```
    <modelVersion>4.0.0</modelVersion>

    <groupId>com.example</groupId>
    <artifactId>myproject</artifactId>
    <version>0.0.1-SNAPSHOT</version>

    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>2.4.3</version>
    </parent>

    <description/>
    <developers>
        <developer/>
    </developers>
    <licenses>
        <license/>
    </licenses>
    <scm>
        <url/>
    </scm>
    <url/>

    <!-- Additional lines to be added here... -->

</project>
```

```
$ mvn package
```

```
[INFO] --- maven-jar-plugin:3.2.0:jar (default-jar) @ myproject ---
[WARNING] JAR will be empty - no content was marked for inclusion!
[INFO] Building jar: /Users/hyojeongyu/Desktop/study/meetcoder/spring/1. Getting S
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  16.656 s
[INFO] Finished at: 2021-04-13T16:40:09+09:00
[INFO] ------------------------------------------------------------------------
➜  hello_world
```



성공적으로 빌드 가능. 이 상태에서는 IDE에서 프로젝트를 import 할 수 있다.

4.2 Classpath Dependencies 추가

스프링 부트는 여러 Starter 들을 제공하는데 starter 로 jar들을 classpath에 추가 할 수 있다.

pom.xml 의 parent 부분에서 `spring-boot-starter-parent` 를 사용하고 있다.

이후 추가할 스프링 dependency 들이 있을 때 version 을 명시해야 할 필요가 없어진다.

이외에 여러 starter 들은 특정 타입의 어플리케이션 개발 시 필요한 의존성들을 한방에 제공해주는데

예를 들어 우리가 추가해 볼 `spring-boot-starter-web` 은 web 개발 시 필요한 라이브러리 의존성을 제공한다

현재 프로젝트 의존성

```
$ mvn dependency:tree
```

```
[INFO] com.example:myproject:jar:0.0.1-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  14.031 s
[INFO] Finished at: 2021-04-13T16:43:10+09:00
[INFO] ------------------------------------------------------------------------
➜  hello_world mvn dependency:tree
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.example:myproject >-----------------------
[INFO] Building myproject 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-dependency-plugin:3.1.2:tree (default-cli) @ myproject ---
[INFO] com.example:myproject:jar:0.0.1-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  0.821 s
[INFO] Finished at: 2021-04-13T16:43:17+09:00
[INFO] ------------------------------------------------------------------------
➜  hello_world
```

spring-boot-starter-parent 는 의존성을 제공해주지는 않는다.

pom.xml 수정

```
<?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 https://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>
```

```
    <groupId>com.example</groupId>
    <artifactId>myproject</artifactId>
    <version>0.0.1-SNAPSHOT</version>

    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>2.4.3</version>
    </parent>

    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-web</artifactId>
        </dependency>
    </dependencies>

    <description/>
    <developers>
        <developer/>
    </developers>
    <licenses>
        <license/>
    </licenses>
    <scm>
        <url/>
    </scm>
    <url/>

    <!-- Additional lines to be added here... -->

</project>
```

다시

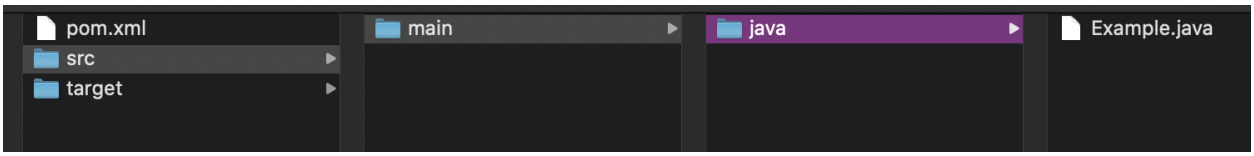
```
$ mvn dependency:tree
```

```
➜  hello_world mvn dependency:tree
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.example:myproject >-----------------------
[INFO] Building myproject 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
Downloading from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter-web/2.4.3/spring-boot-starter-web-2.4.3.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter-web/2.4.3/spring-boot-starter-web-2.4.3.pom (3.0 kB at 3.2 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter/2.4.3/spring-boot-starter-2.4.3.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter/2.4.3/spring-boot-starter-2.4.3.pom (3.1 kB at 11 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot/2.4.3/spring-boot-2.4.3.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot/2.4.3/spring-boot-2.4.3.pom (2.2 kB at 7.7 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/springframework/spring-core/5.3.4/spring-core-5.3.4.pom
```

```
[INFO] com.example:myproject:jar:0.0.1-SNAPSHOT
[INFO] \- org.springframework.boot:spring-boot-starter-web:jar:2.4.3:compile
[INFO]    +- org.springframework.boot:spring-boot-starter:jar:2.4.3:compile
[INFO]    |  +- org.springframework.boot:spring-boot:jar:2.4.3:compile
[INFO]    |  +- org.springframework.boot:spring-boot-autoconfigure:jar:2.4.3:compile
[INFO]    |  +- org.springframework.boot:spring-boot-starter-logging:jar:2.4.3:compile
[INFO]    |  |  +- ch.qos.logback:logback-classic:jar:1.2.3:compile
[INFO]    |  |  |  +- ch.qos.logback:logback-core:jar:1.2.3:compile
[INFO]    |  |  |  \- org.slf4j:slf4j-api:jar:1.7.30:compile
[INFO]    |  |  +- org.apache.logging.log4j:log4j-to-slf4j:jar:2.13.3:compile
[INFO]    |  |  |  \- org.apache.logging.log4j:log4j-api:jar:2.13.3:compile
[INFO]    |  |  \- org.slf4j:jul-to-slf4j:jar:1.7.30:compile
[INFO]    |  +- jakarta.annotation:jakarta.annotation-api:jar:1.3.5:compile
[INFO]    |  +- org.springframework:spring-core:jar:5.3.4:compile
[INFO]    |  |  \- org.springframework:spring-jcl:jar:5.3.4:compile
[INFO]    |  \- org.yaml:snakeyaml:jar:1.27:compile
[INFO]    +- org.springframework.boot:spring-boot-starter-json:jar:2.4.3:compile
[INFO]    |  +- com.fasterxml.jackson.core:jackson-databind:jar:2.11.4:compile
[INFO]    |  |  +- com.fasterxml.jackson.core:jackson-annotations:jar:2.11.4:compile
[INFO]    |  |  \- com.fasterxml.jackson.core:jackson-core:jar:2.11.4:compile
[INFO]    |  +- com.fasterxml.jackson.datatype:jackson-datatype-jdk8:jar:2.11.4:compile
[INFO]    |  +- com.fasterxml.jackson.datatype:jackson-datatype-jsr310:jar:2.11.4:compile
[INFO]    |  \- com.fasterxml.jackson.module:jackson-module-parameter-names:jar:2.11.4:compi
[INFO]    +- org.springframework.boot:spring-boot-starter-tomcat:jar:2.4.3:compile
[INFO]    |  +- org.apache.tomcat.embed:tomcat-embed-core:jar:9.0.43:compile
[INFO]    |  +- org.glassfish:jakarta.el:jar:3.0.3:compile
[INFO]    |  \- org.apache.tomcat.embed:tomcat-embed-websocket:jar:9.0.43:compile
[INFO]    +- org.springframework:spring-web:jar:5.3.4:compile
[INFO]    |  \- org.springframework:spring-beans:jar:5.3.4:compile
[INFO]    \- org.springframework:spring-webmvc:jar:5.3.4:compile
[INFO]       +- org.springframework:spring-aop:jar:5.3.4:compile
[INFO]       +- org.springframework:spring-context:jar:5.3.4:compile
[INFO]       \- org.springframework:spring-expression:jar:5.3.4:compile
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  9.308 s
[INFO] Finished at: 2021-04-13T16:46:29+09:00
[INFO] ------------------------------------------------------------------------
➜  hello_world
```

톰캣 웹 서버를 비롯해 여러 다른 의존성들이 추가되었다.

4.3 코드 작성하기



maven 이 사용하는 구조 src/main/java

```
// Example.java

import org.springframework.boot.*;
```

```
import org.springframework.boot.autoconfigure.*;
import org.springframework.web.bind.annotation.*;

@RestController
@EnableAutoConfiguration
public class Example {

    @RequestMapping("/")
    String home() {
        return "Hello World!";
    }

    public static void main(String[] args) {
        SpringApplication.run(Example.class, args);
    }

}
```

@RestController

stereotype annotation 중 하나(특별한 역할을 하는 클래스라는 힌트를 주는 어노테이션)

해당 클래스는 web controller 라는 역할을 한다는 것을 알려준다

웹 요청이 들어올 때 해당 클래스를 사용한다

@RequestMapping

라우팅 정보를 준다: / 로 HTTP 요청이 들어오면 home() 메소드로 매핑한다

@RestController

return 되는 문자열을 그대로 요청을 보낸 사람한테 보여준다

@EnableAutoConfiguration

이 어노테이션을 사용하면 jar dependency 에 기반해서 스프링부트가 스프링을 어떻게 설정해야 하는지를 추측하게 한다.

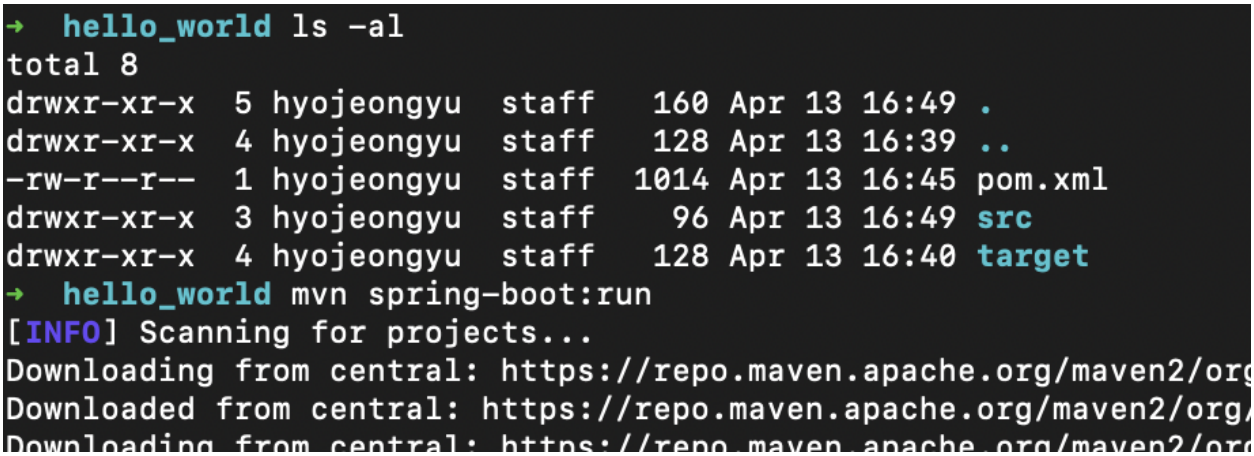
우리는 spring-boot-starter-web 이 톰캣과 스프링MVC 의존성을 추가했기 때문에 웹 어플리케이션으로 자동 설정한다.

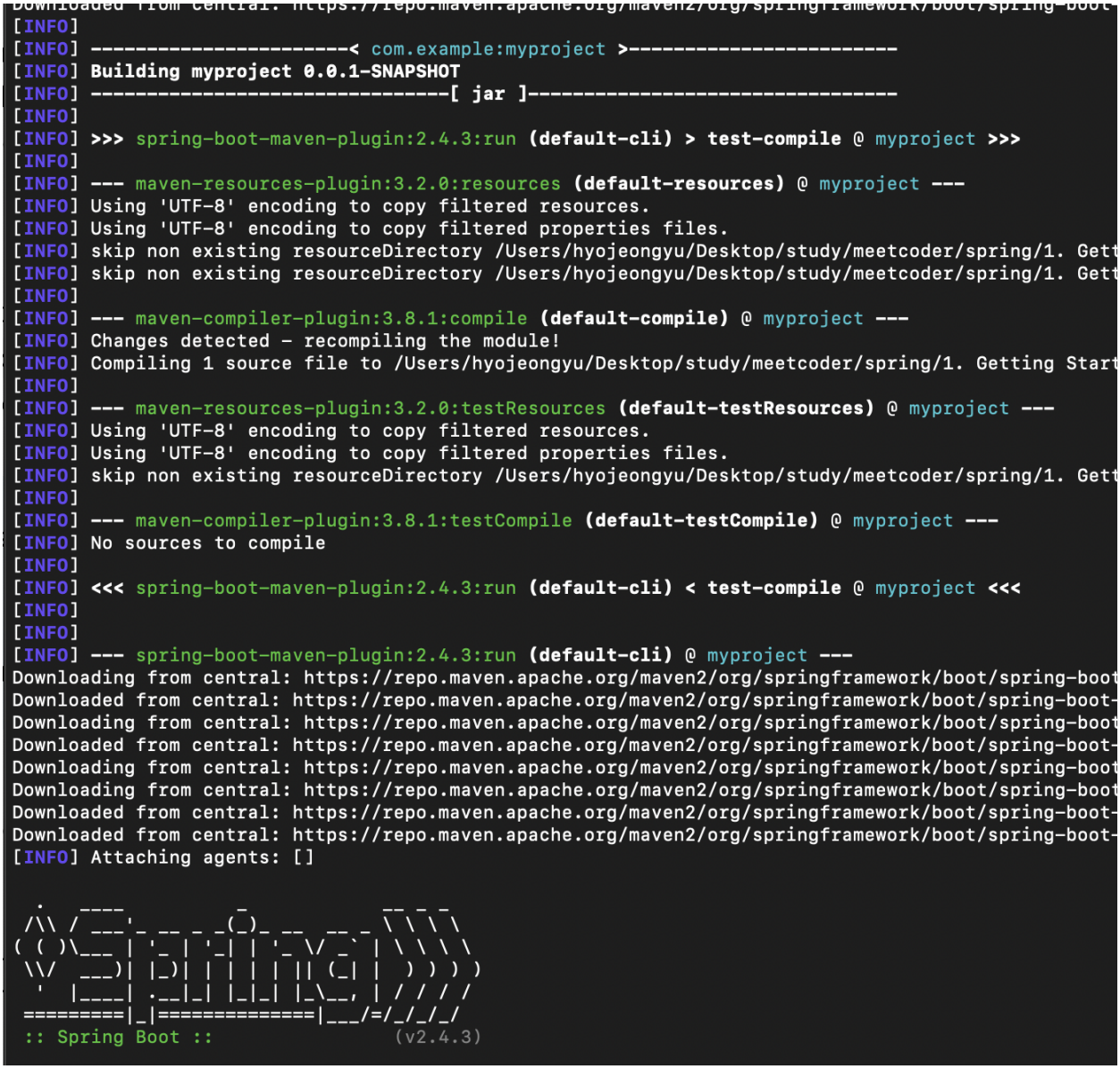
💡 Starters and Auto-configuration

starter 를 사용하지 않고 우리가 jar dependency 를 원하는 대로 추가하더라도 스프링 부트는 애플리케이션 자동설정을 알아서 잘 할 것이다. 꼭 starter 를 사용해야만 자동 설정이 되는 것은 아니다.

4.4 Run

```
$ mvn spring-boot:run
```





이제 스프링이 떠 있는 localhost:8080 으로 접속하면 `Hello World!` 문자열이 보인다

4.5 Creating an Executable jar

`self-contained executable jars`, `Fat jars`

(컴파일한 클래스 + 애플리케이션 구동에 필요한 jar dependency)를 아카이빙한 파일

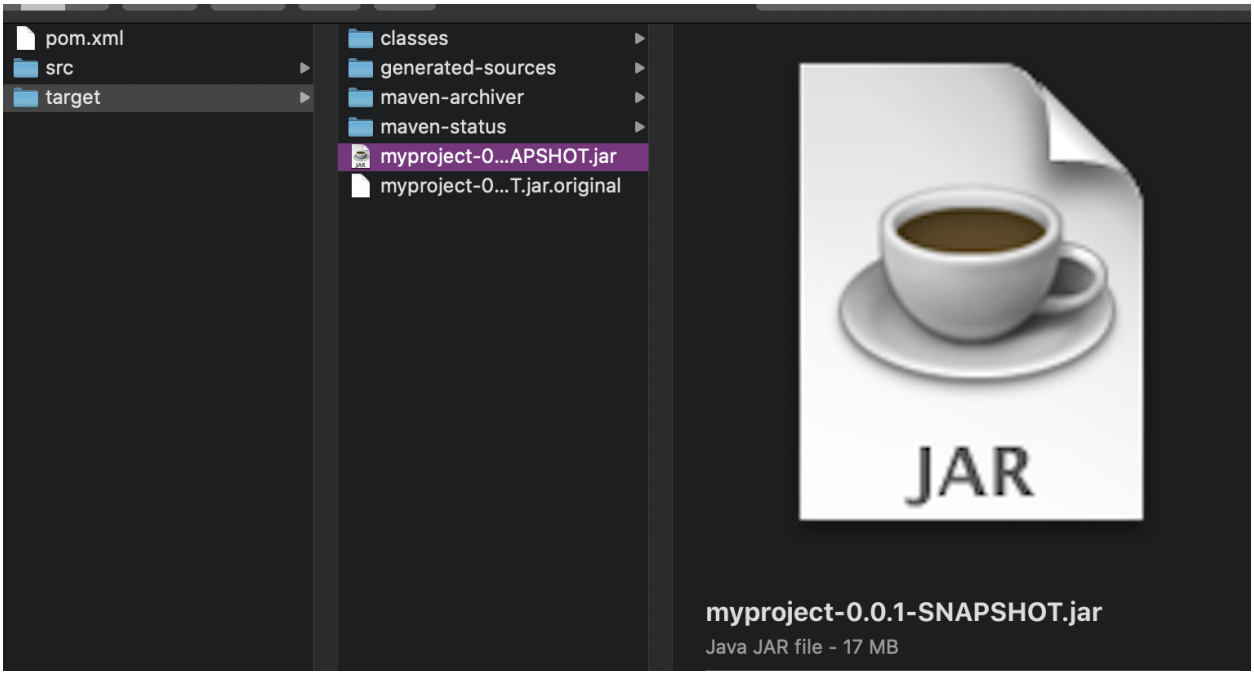
spring-boot-maven-plugin 을 pom.xml 에 추가하면 executable jar 를 만들 수 있다.

```
<?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 https://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <groupId>com.example</groupId>
    <artifactId>myproject</artifactId>
    <version>0.0.1-SNAPSHOT</version>

    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>2.4.3</version>
    </parent>

    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-web</artifactId>
        </dependency>
    </dependencies>

    <build>
        <plugins>
            <plugin>
                <groupId>org.springframework.boot</groupId>
                <artifactId>spring-boot-maven-plugin</artifactId>
            </plugin>
        </plugins>
    </build>

    <description/>
    <developers>
        <developer/>
    </developers>
    <licenses>
        <license/>
    </licenses>
    <scm>
        <url/>
    </scm>
    <url/>

    <!-- Additional lines to be added here... -->

</project>
```

jar 아카이빙 하기

```
$ mvn package
```

```
→  hello_world mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------< com.example:myproject >-------------------------
[INFO] Building myproject 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:resources (default-resources) @ myproject ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] skip non existing resourceDirectory /Users/hyojeongyu/Desktop/study/meetcoder/spring/1. Getting Started/hello_world/src/main/resources
[INFO] skip non existing resourceDirectory /Users/hyojeongyu/Desktop/study/meetcoder/spring/1. Getting Started/hello_world/src/main/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile) @ myproject ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:testResources (default-testResources) @ myproject ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Using 'UTF-8' encoding to copy filtered properties files.
[INFO] skip non existing resourceDirectory /Users/hyojeongyu/Desktop/study/meetcoder/spring/1. Getting Started/hello_world/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ myproject ---
[INFO] No sources to compile
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @ myproject ---
[INFO] No tests to run.
[INFO]
[INFO] --- maven-jar-plugin:3.2.0:jar (default-jar) @ myproject ---
[INFO] Building jar: /Users/hyojeongyu/Desktop/study/meetcoder/spring/1. Getting Started/hello_world/target/myproject-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- spring-boot-maven-plugin:2.4.3:repackage (repackage) @ myproject ---
[INFO] Replacing main artifact with repackaged archive
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  1.127 s
[INFO] Finished at: 2021-04-13T16:53:58+09:00
[INFO] ------------------------------------------------------------------------
```



target 폴더에 `myproject-0.0.1-SNAPSHOT.jar` 이 생겨난다

peek inside jar

```
$ jar tvf target/myproject-0.0.1-SNAPSHOT.jar
```

run

```
$ java -jar target/myproject-0.0.1-SNAPSHOT.jar
```

ctrl-c 로 종료할 수 있다.