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DATE: 17.12.2023

Topic: How to create a new Maven Project with CRUD REST API, H2 Database, JPA and Spring Boot

Prerequisites

1. Java installed

```
Eingabeaufforderung
Microsoft Windows [Version 10.0.19045.3693]
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C:\Users\Family>java -version
java version "18.0.2.1" 2022-08-18
Java(TM) SE Runtime Environment (build 18.0.2.1+1-1)
Java HotSpot(TM) 64-Bit Server VM (build 18.0.2.1+1-1, mixed mode, sharing)

C:\Users\Family>
```

2. javac - Java compiler installed.

```
C:\Users\Family>javac -version
javac 18.0.2.1

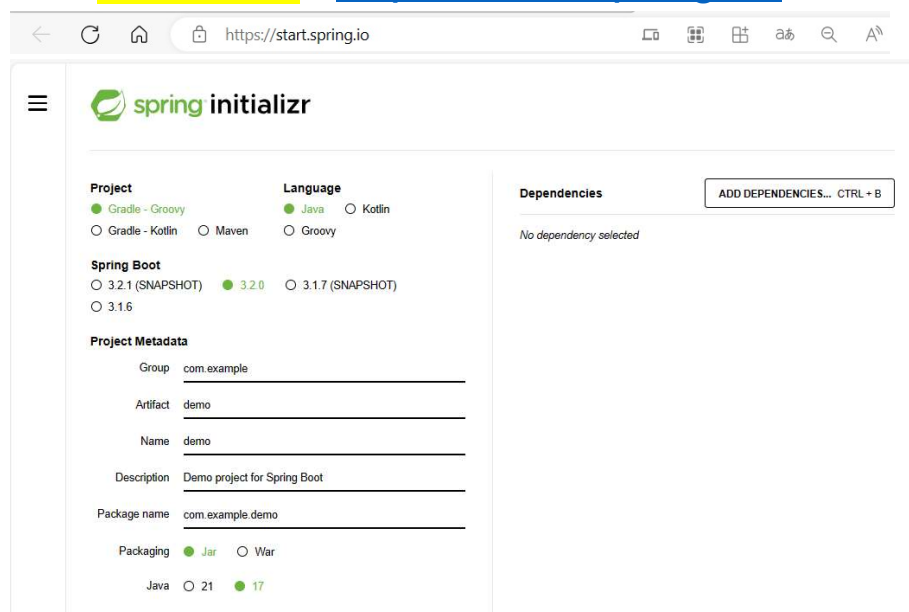
C:\Users\Family>
```

3. Your favorite Java **IDE** installed. IntelliJ-J, Eclipse etc.

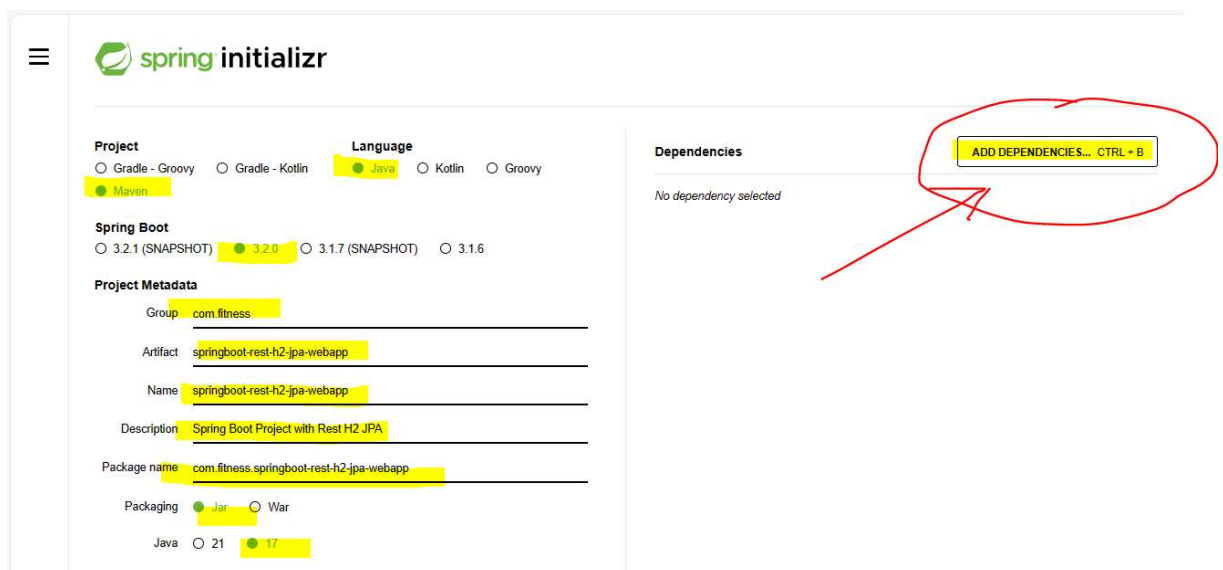
Project setup

The easiest way to create a new spring boot application is to use the **spring initializr**.

- Open **spring initializr** > <https://start.spring.io/> in your web browser.



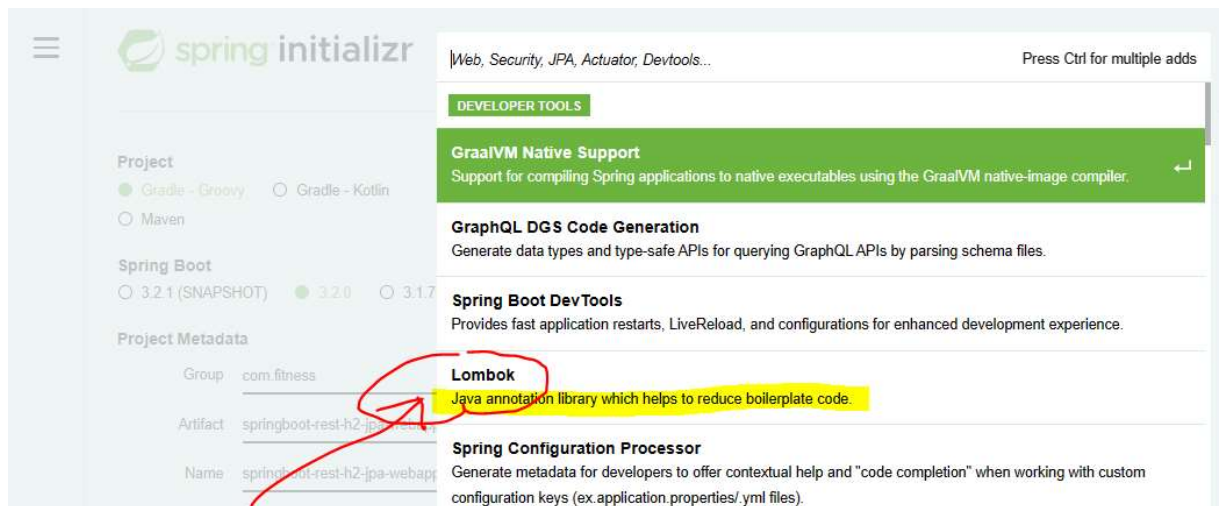
- Choose the **Maven** project.
- Choose **Java** as the language.
- Leave the **default** selected Spring Boot version. **e.g: 3.2.0** (You can change to other version in your pom.xml on the generated Maven project later)
- Provide Group and Artifact Name with some Description.
 - **Example** (You can give any information you want)
 - Group: **come.fitness**
 - Artifact: **springboot-rest-h2-jpa-webapp**
 - Name: **springboot-rest-h2-jpa-webapp**
 - Description: **Spring Boot Project with Rest H2 JPA**
 - Package name: **com.fitness.springboot-rest-h2-jpa-webapp**
- Select Java (**e.g: 17**) as the Java Version. (You can change to other version in your pom.xml on the generated Maven project later)



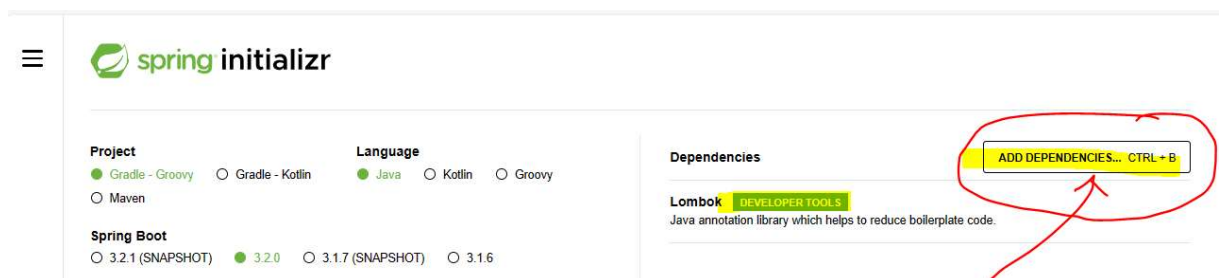
The screenshot shows the Spring Initializr web application interface. The 'Project' section has 'Maven' selected. The 'Language' section has 'Java' selected. The 'Spring Boot' section has '3.2.0' selected. The 'Project Metadata' section contains the following fields: Group (com.fitness), Artifact (springboot-rest-h2-jpa-webapp), Name (springboot-rest-h2-jpa-webapp), Description (Spring Boot Project with Rest H2 JPA), and Package name (com.fitness.springboot-rest-h2-jpa-webapp). The 'Packaging' section has 'jar' selected, and the 'Java' section has '17' selected. The 'Dependencies' section on the right has a button labeled 'ADD DEPENDENCIES... CTRL + B' circled in red with an arrow pointing to it.

- Click **ADD DEPENDENCIES** Button.

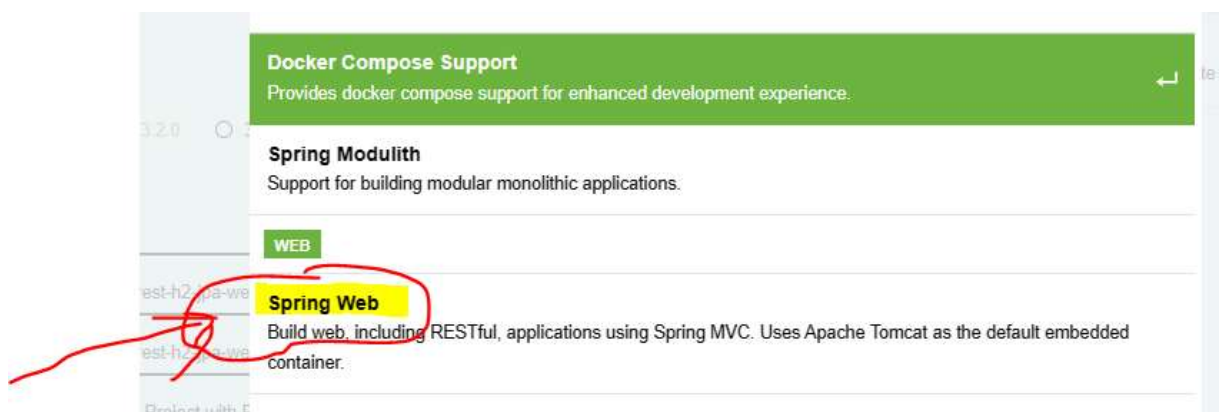
- In the dependencies section add
 - **Lombok**, **Spring Web**, **H2 Database**, **Spring Data JPA** & **Actuator** as the dependencies.
- Click **Lombok**.



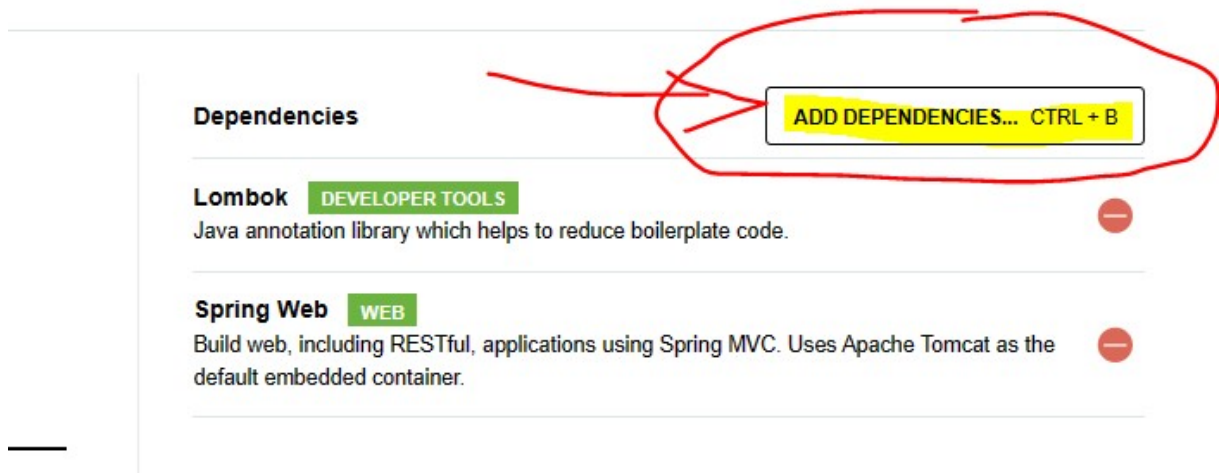
- Lombok is added. Click **ADD DEPENDENCIES** Button



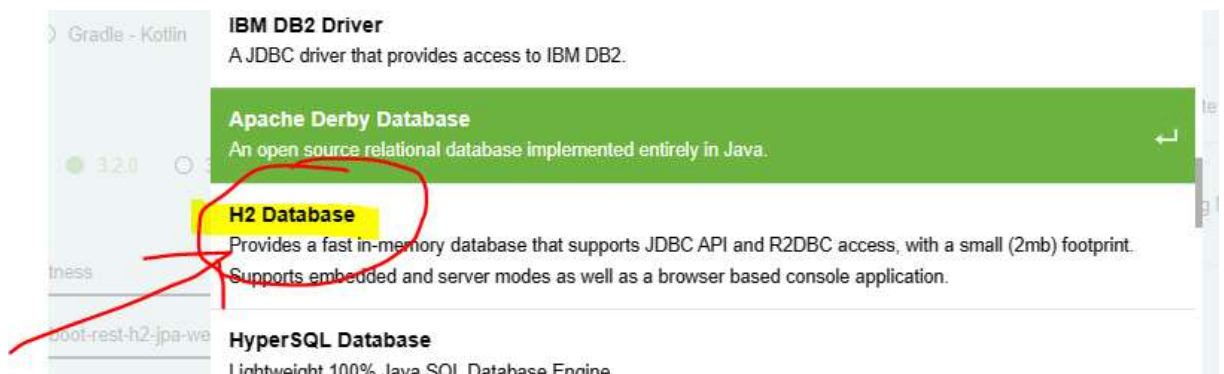
- Click **Spring Web**



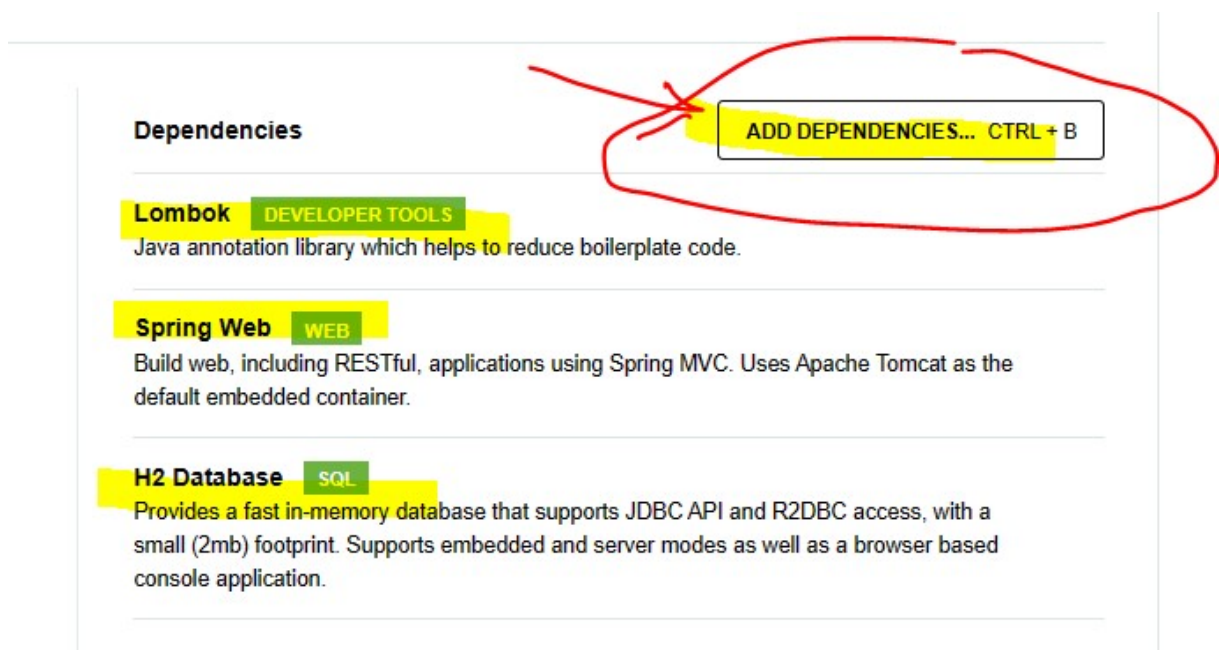
- Sprint Web is added. Click **ADD DEPENDENCIES** Button



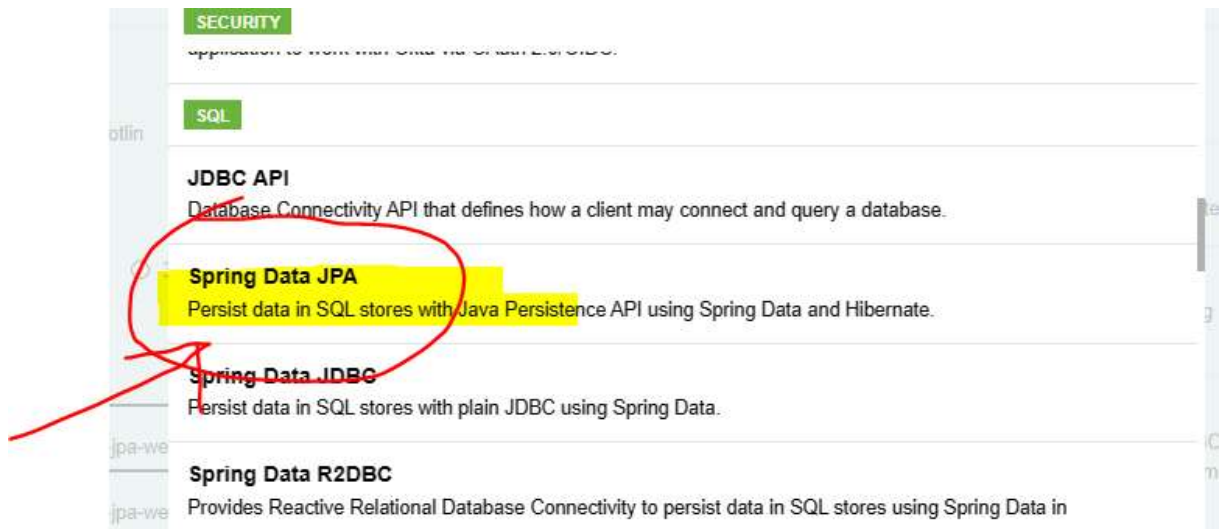
- Click H2 Database.



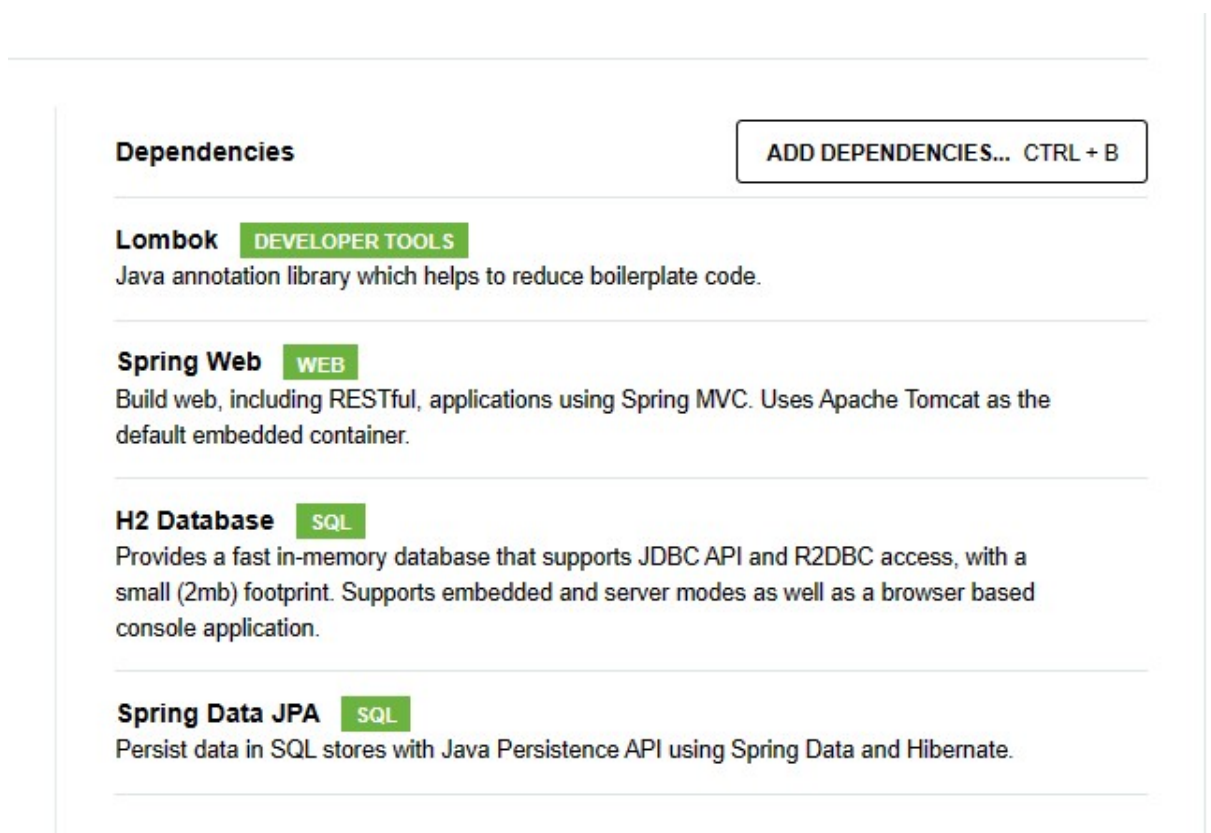
- H2 Database is added. Click **ADD DEPENDENCIES** Button.



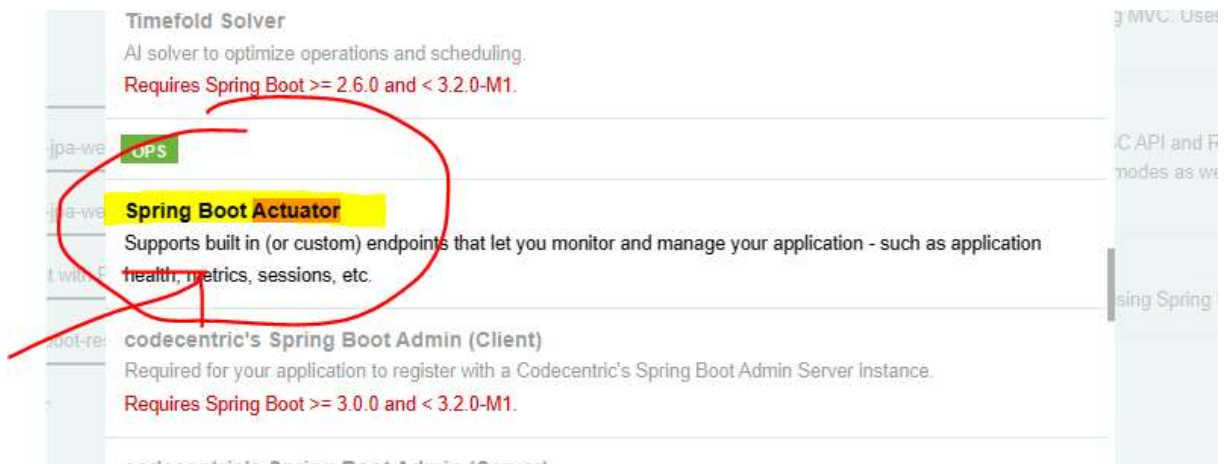
- Click Spring Data JPA



- Spring Data JPA is added. Click **ADD DEPENDENCIES** Button.

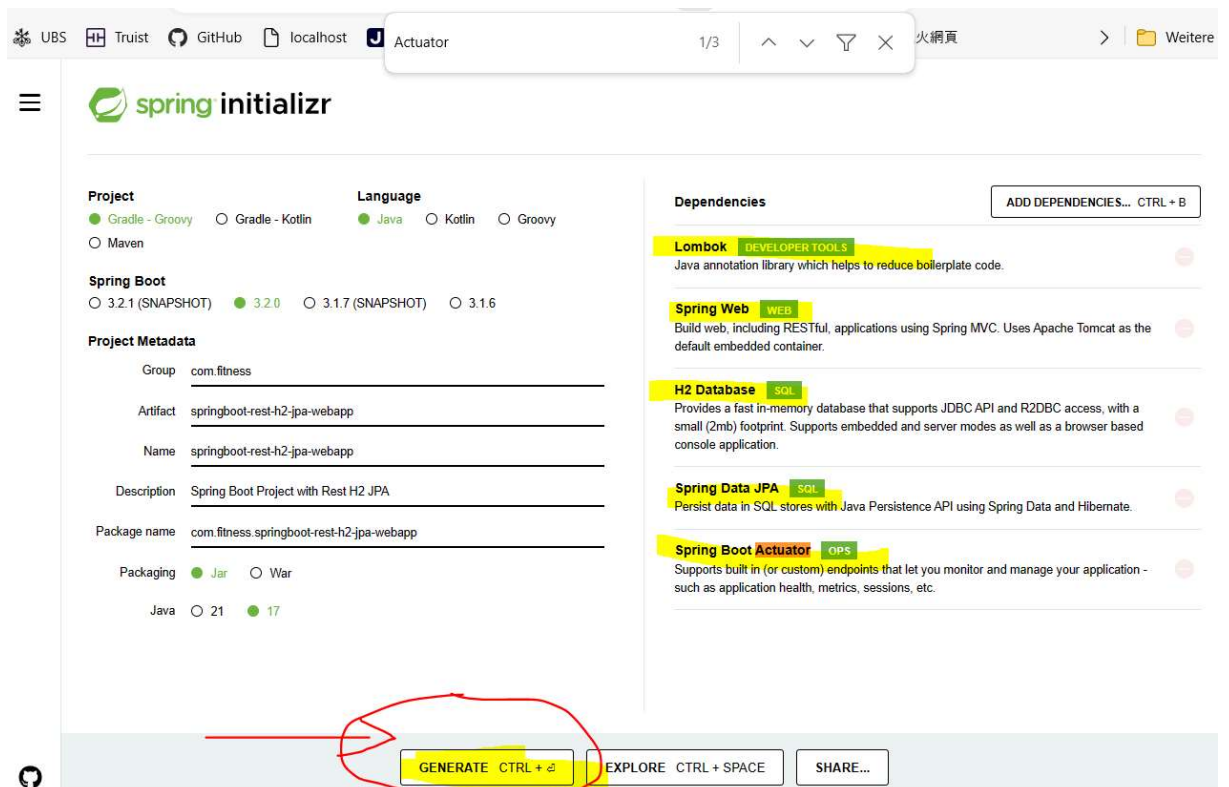


- Click **Spring Boot Actuator**



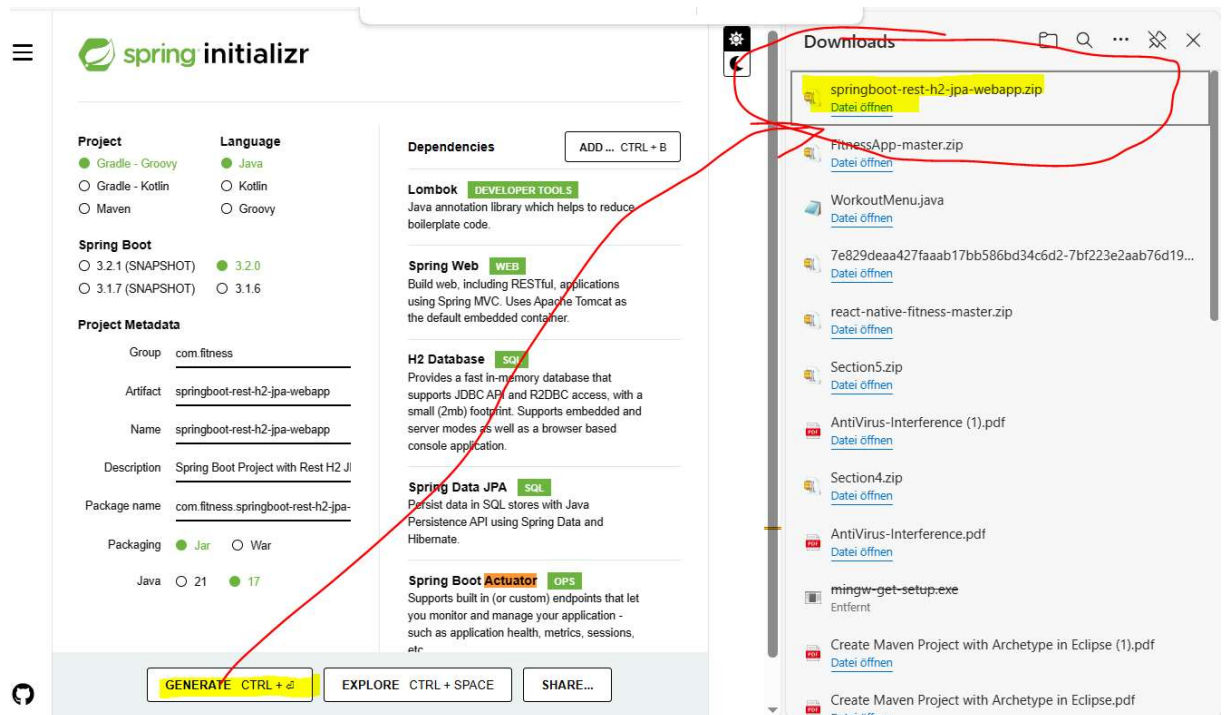
- Spring Boot Actuator** is added. **All Dependencies are added.** OK 😊

- In the dependencies section add **Lombok**, **Spring Web**, **H2 Database**, **Spring Data JPA** & **Actuator** as the dependencies.



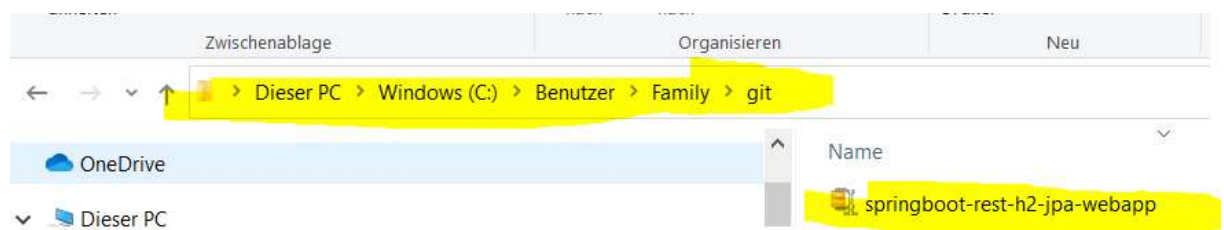
- Click on the **GENERATE** Button to download the project as a zip file.

- A **springboot-rest-h2-jpa-webapp.zip** is generated and can see in the **Downloads**.

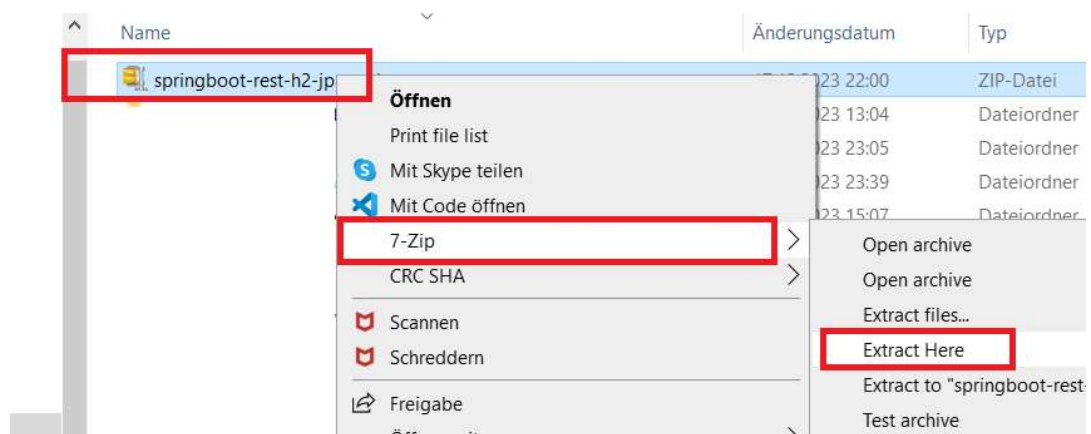


- Extract the zip file and open the project in your favorite IDE (**IntelliJ**, **Eclipse** etc.)

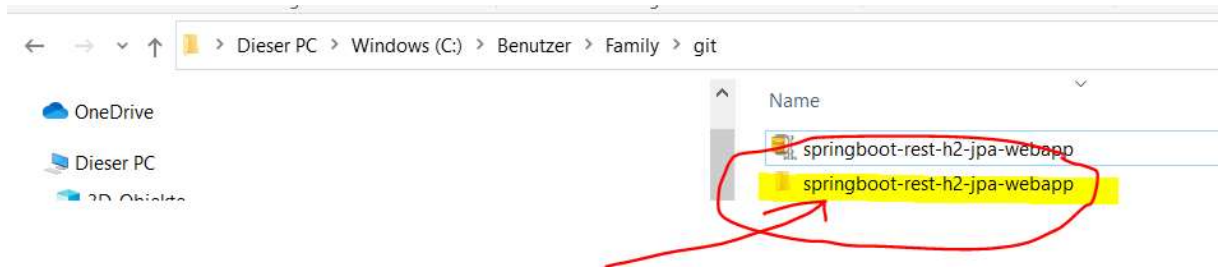
For instant: Put the **springboot-rest-h2-jpa-webapp.zip** under my folder:
C:\Users\Family\git



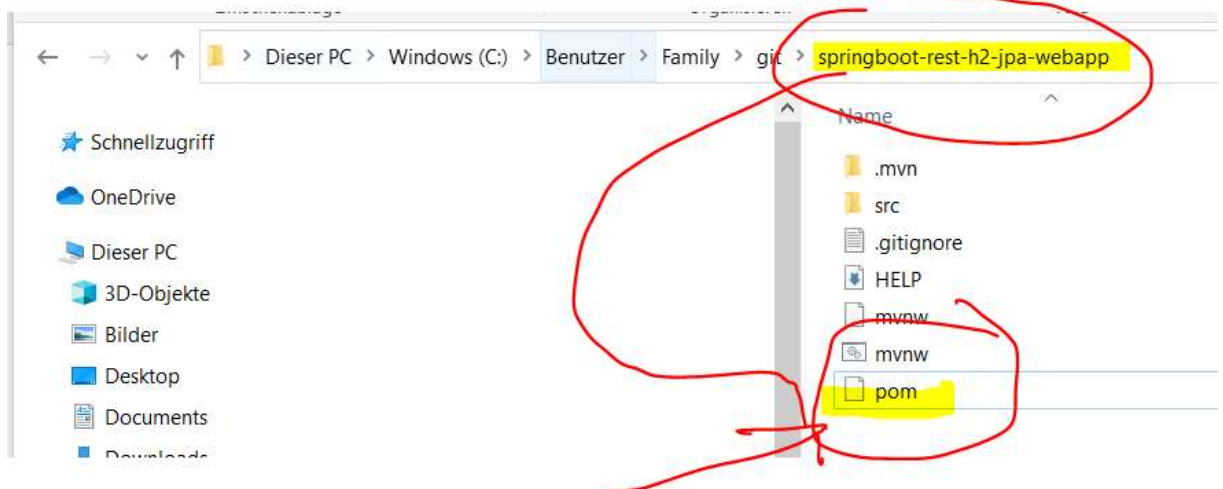
- Unzip **springboot-rest-h2-jpa-webapp.zip**



- A new “Maven Project with CRUD REST API with H2 Database and JPA and with Spring Boot” is created with project name: **springboot-rest-h2-jpa-webapp**



- Click on Maven script **pom.xml**



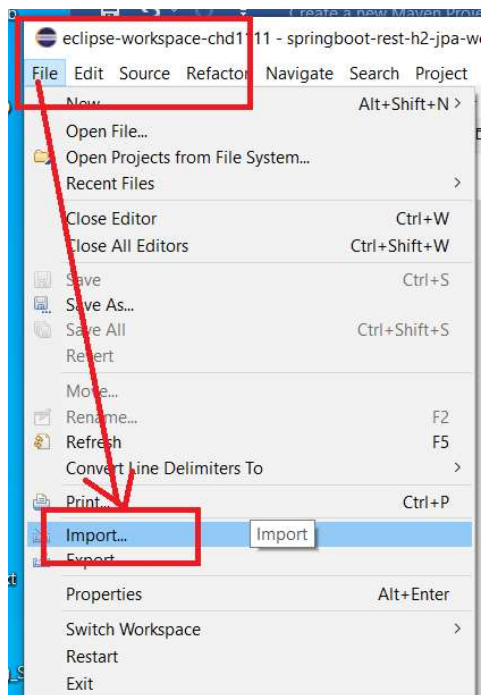
pom.xml included all the selected dependencies:

- In the dependencies section add **Lombok**, **Spring Web**, **H2 Database**, **Spring Data JPA** & **Actuator** as the dependencies.

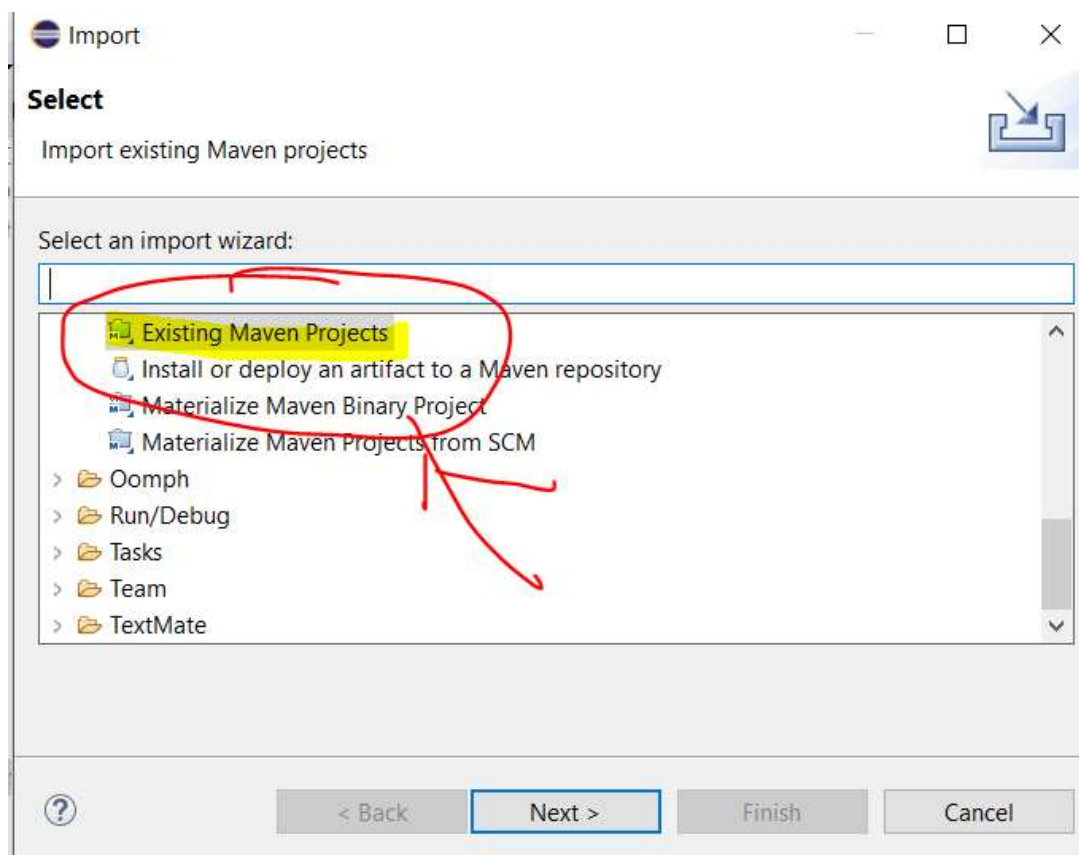
This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?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>
  <parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-parent</artifactId>
    <version>3.2.0</version>
    <relativePath/>
    <!-- lookup parent from repository -->
  </parent>
  <groupId>com.fitness</groupId>
  <artifactId>springboot-rest-h2-jpa-webapp</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <name>springboot-rest-h2-jpa-webapp</name>
  <description>Spring Boot Project with Rest H2 JPA</description>
  <properties>
    <java.version>17</java.version>
  </properties>
  <dependencies>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-actuator</artifactId>
    </dependency>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-data-jpa</artifactId>
    </dependency>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-web</artifactId>
    </dependency>
    <dependency>
      <groupId>com.h2database</groupId>
      <artifactId>h2</artifactId>
      <scope>runtime</scope>
    </dependency>
    <dependency>
      <groupId>org.projectlombok</groupId>
      <artifactId>lombok</artifactId>
      <optional>true</optional>
    </dependency>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-test</artifactId>
      <scope>test</scope>
    </dependency>
  </dependencies>
  <build>
    <plugins>
      <plugin>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-maven-plugin</artifactId>
        <configuration>
          <excludes>
            <exclude>
              <groupId>org.projectlombok</groupId>
              <artifactId>lombok</artifactId>
            </exclude>
          </excludes>
        </configuration>
      </plugin>
    </plugins>
  </build>
</project>
```

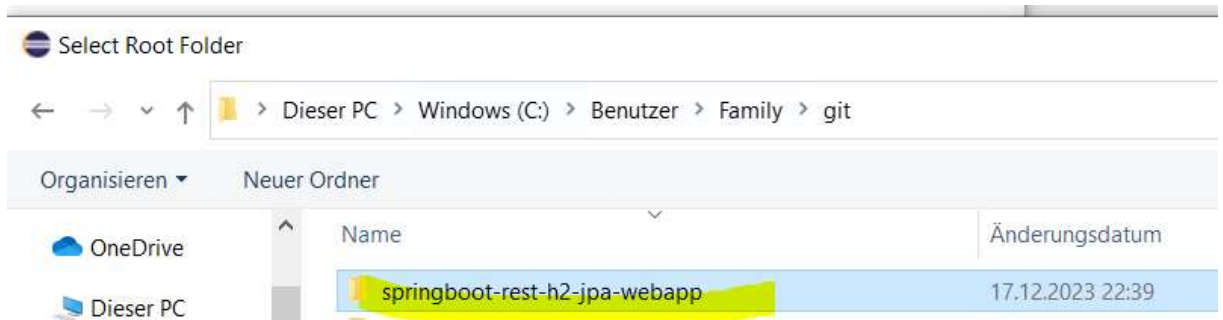
I use Eclipse, on Eclipse clicking Import.



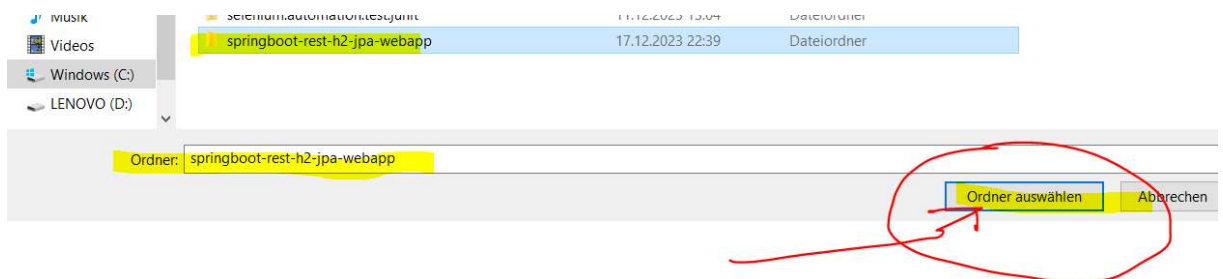
- Click **Existing Maven Projects**.



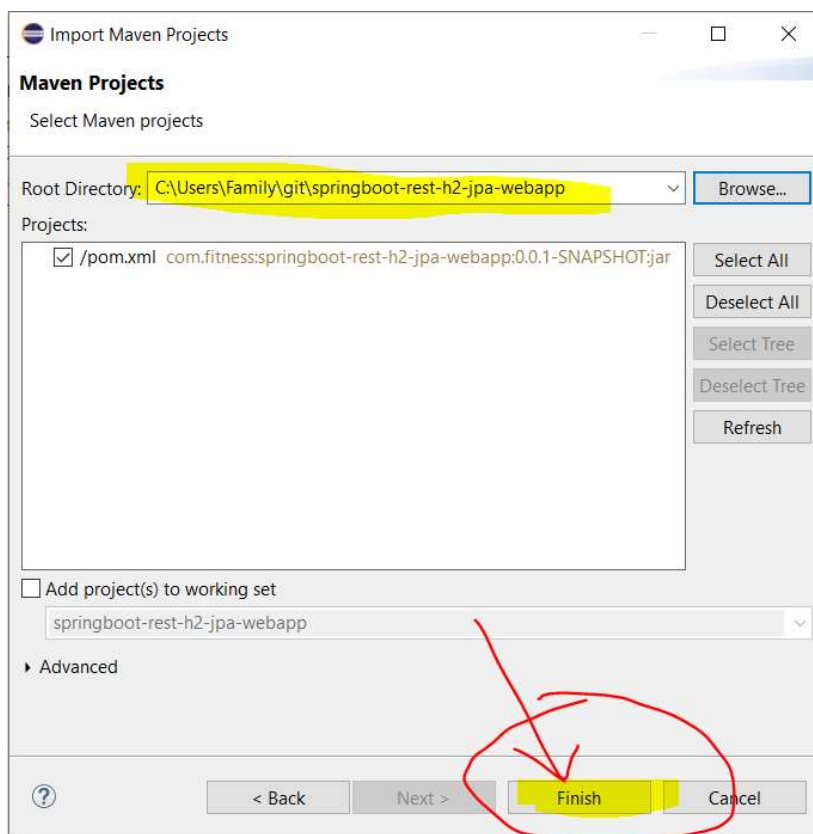
- Select generated Maven project **springboot-rest-h2-jpa-webapp** under my folder **C:\Users\Family\git**



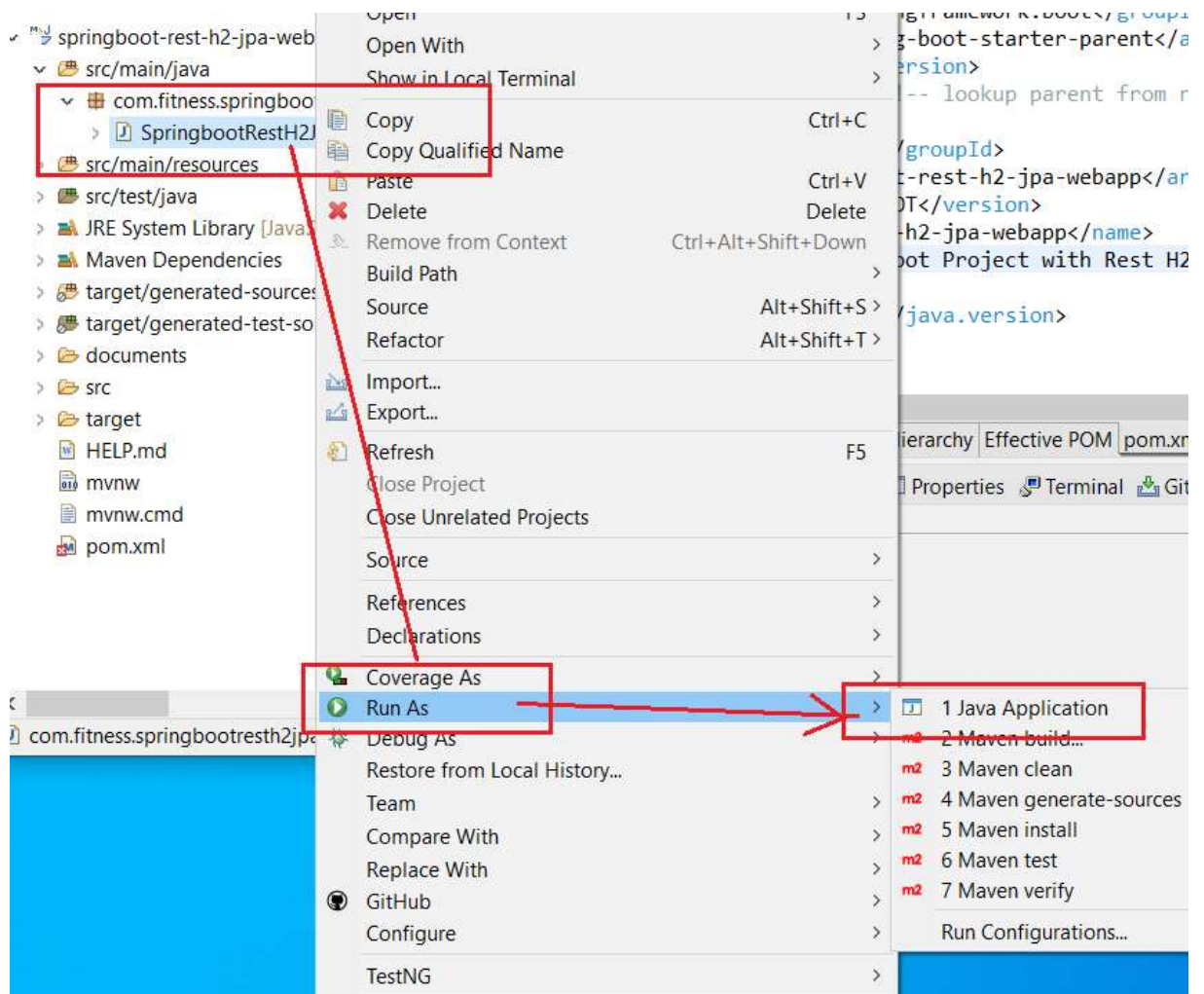
- Click **Ordner auswählen** (English: **Select folder**)



- Click Finish



- On generated Maven **springboot-rest-h2-jpa-webapp** project. Under `../src/main/java > com.fitness.springbootresth2jpawebapp >` Right Click **SpringbootRestH2JpaWebappApplication** > Select **Run As** > Click **Java Application**



- The **SpringbootRestH2JpaWebappApplication** is running successfully on **Port 8080**.

```

springboot-rest-h2-jpa-webapp
src/main/java
  com.fitness.springbootresth2jpaWebapp
    SpringbootRestH2JpaWebappApplication
src/main/resources
src/test/java
JRE System Library (JavaSE-17)
Maven Dependencies
target/generated-sources/annotations
target/generated-test-sources/test-annotations
documents
src
target
HELP.md
mvnw
mvnw.cmd
pom.xml

16 System.out.println("==> http://localhost:8080");
17 System.out.println("==> To Open H2 Database on Browser type URL as below:");

SpringbootRestH2JpaWebappApplication [Java Application] C:\Program Files\Java\jdk-18.0.2\bin\javaw.exe (17.12.2023, 23:09:25) [pid: 30496]
o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.10]
o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 2289 ms
com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
com.zaxxer.hikari.pool.HikariPool : HikariPool-1 - Added connection conn0: url=jdbc:h2:mem:601000c3-0233-45bd-a3e1-adad03892080
com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
o.hibernate.jpa.internal.util.LogHelper : Processing PersistenceUnitInfo [name: default]
org.hibernate.Version : HHH0000412: Hibernate ORM core version 6.3.1.Final
o.h.c.internal.RegionFactoryInitiator : HHH000026: Second-level cache disabled
o.s.o.j.p.SpringPersistenceUnitInfo : No LoadTimeWeaver setup; ignoring JPA class transformer
o.h.e.t.j.p.i.JtaPlatformInitiator : HHH000489: No JTA platform available (set 'hibernate.transaction.jta.platform' to enable JTA)
j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'default'
JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore, database queries may be performed
o.s.b.a.w.endpoint.EndpointLinksResolver : Exposing 1 endpoint(s) beneath base path '/actuator'
o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8080 (http) with context path ''
f.s.SpringbootRestH2JpaWebappApplication : Started SpringbootRestH2JpaWebappApplication in 5.766 seconds (process running for 6.219)
  
```

- Open Browser (**Google Chrome oder Edge etc.**) type **<http://localhost:8080/actuator>**. If you see the following information. then Well DONE. 😊

```

1 {
2   "_links": {
3     "self": {
4       "href": "http://localhost:8080/actuator",
5       "templated": false
6     },
7     "health-path": {
8       "href": "http://localhost:8080/actuator/health/{*path}",
9       "templated": true
10    },
11    "health": {
12      "href": "http://localhost:8080/actuator/health",
13      "templated": false
14    }
15  }
16 }
  
```


- If The Port 8080 was already use.

```
<terminated> SpringbootRestH2JpaWebappApplication [Java Application] C:\Program Files\Java\jdk-18.0.2.1\bin\javaw.exe (17.12.2023, 23:47:48 – 23:47:54) [pid: 8440]
Error starting ApplicationContext. To display the condition evaluation report re-run your application with 'debug' enabled.
2023-12-17T23:47:54.801+01:00 ERROR 8440 --- [main] o.s.b.d.LoggingFailureAnalysisReporter :

*****
APPLICATION FAILED TO START
*****


Description:

Web server failed to start. Port 8080 was already in use.

Action:

Identify and stop the process that's listening on port 8080 or configure this application to listen on another port.
```

- On Window, you can use `netstat -ano | findstr :8080` to find out the PID Process-ID (In my case is 19992) then use `taskkill /PID 19992 /F` to kill the PID, and then run the SpringbootRestH2JpaWebappApplication again and all will be ok.

 Eingabeaufforderung

```
Microsoft Windows [Version 10.0.19045.3693]
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C:\Users\Family>netstat -ano | findstr :8080
TCP    0.0.0.0:8080      0.0.0.0:0        ABHÖREN        19992
TCP    [::]:8080       [::]:0           ABHÖREN        19992

C:\Users\Family>taskkill /PID 19992 /F
ERFOLGREICH: Der Prozess mit PID 19992 wurde beendet.
```

-- FINISH --