Creating Spring Boot Applications

1. Creating a console application
2. Creating a web application
3. Defining application properties

1. Creating a Console Application

- Overview
- Creating a Spring Boot project
- Specifying project dependencies
- Understanding the application structure
- Understanding the Maven POM file
- Understanding the application code
- Running the application

Demo project: **`demo-simpleapp-console`**

Overview

- IntelliJ IDEA Ultimate has excellent support for Spring
  - Spring Boot and Spring Framework

- IntelliJ Java dependencies:
  - JDK (e.g. JDK 17)
  - Set `JAVA_HOME` to the JDK folder
  - Set `PATH` to include the JDK binary folder

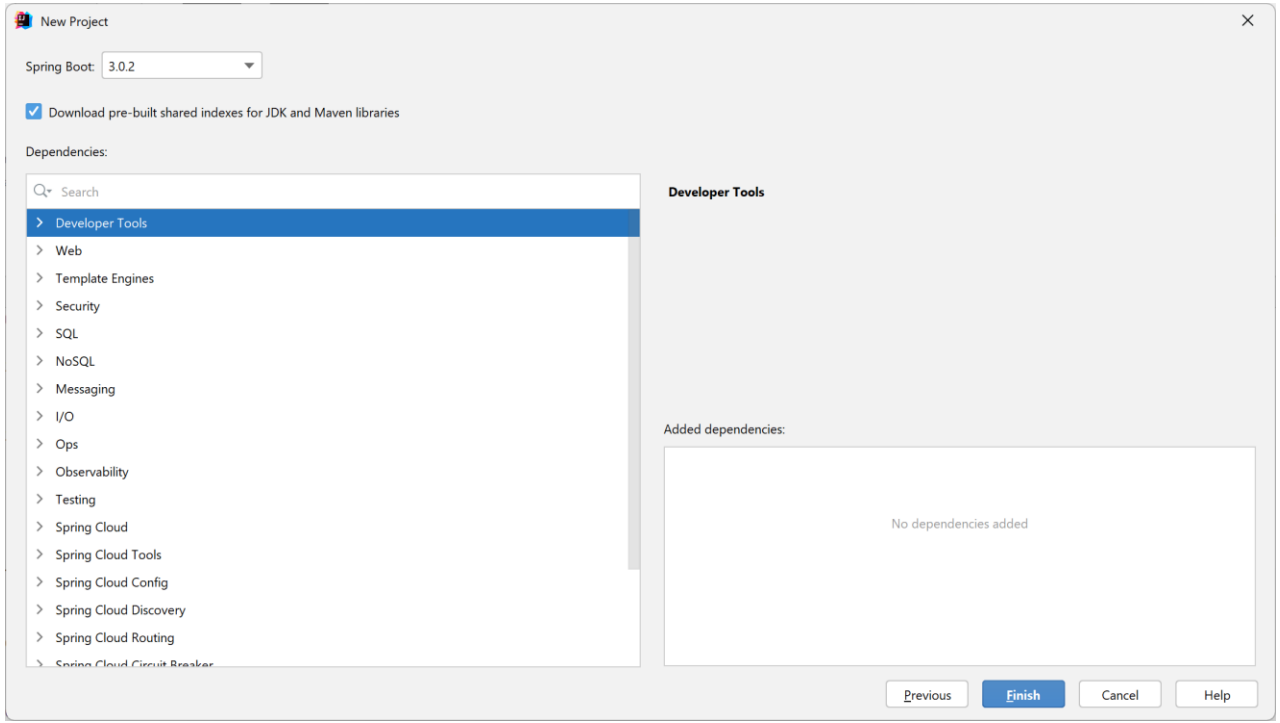
Creating a Spring Boot Project

- Start IntelliJ, click New Project, and select Spring Initializr

- Specify project info as follows:
  - Enter a suitable project name and location
  - Language - Java
  - Type - Maven
  - Enter a suitable group ID, artifact ID, and package name
  - Project SDK - Java 17
  - Java version - 17
  - Packaging - Jar
  - Then click Next

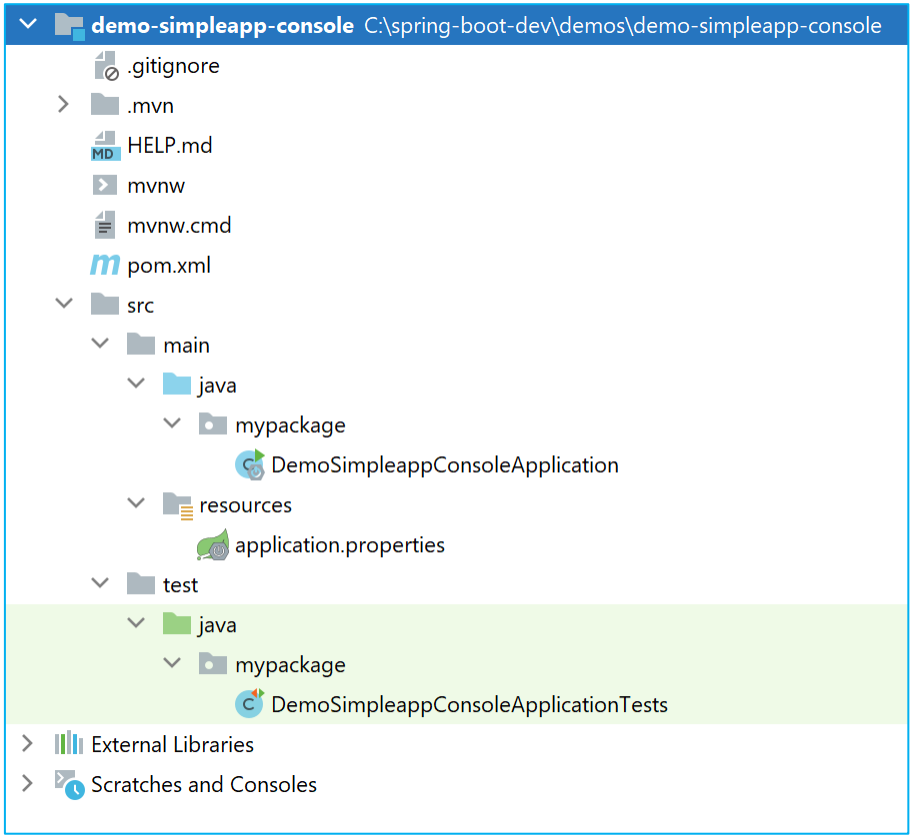
Specifying Project Dependencies

- In the next window you can add dependencies to your project
  - We don't need any dependencies yet, so just click Finish



Understanding the Application Structure

- The generated application is a regular Maven project



Understanding the Maven POM File

- Here are the relevant sections in the Maven POM file:

```
<project … >
    …
    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>3.0.2</version>
        <relativePath/>
    </parent>

    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter</artifactId>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-test</artifactId>
            <scope>test</scope>
        </dependency>
    </dependencies>
    …
```

Parent POM

Spring Boot dependency

Spring Boot test dependency

pom.xml

Understanding the Application Code

- Here's the generated application code:

```
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class DemoSimpleappConsoleApplication {

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

DemoSimpleappConsoleApplication.java

- `@SpringBootApplication` is equivalent to:
  - `@Configuration`
  - `@EnableAutoConfiguration`
  - `@ComponentScan`

Running the Application (1 of 2)

- You can build/run the app via the `mvn` command in the project root directory as follows:

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

- If you don't have Maven installed separately on your machine, you can run the following command instead:

```
mvnw spring-boot:run
```

- It's also possible to run the application directly in IntelliJ
  - Right-click in the main class, and click Run

Running the Application (2 of 2)

- This is the application output
  - Displays a "Spring Boot" banner
  - The app terminates immediately, because it's so simple 😊

```
  .   ____          _            __ _ _
 /\\ / ___'_ __ _ _(_)_ __  __ _ \ \ \ \
( ( )\___ | '_ | '_| | '_ \/ _` | \ \ \ \
 \\/  ___)| |_)| | | | | || (_| |  ) ) ) )
  '  |____| .__|_| |_|_| |_\__, | / / / /
 =========|_|==============|___/=/_/_/_/
 :: Spring Boot ::                (v3.0.2)

2023-02-03T11:08:16.461Z  INFO 23036 --- [           main] m.DemoSimpleappConsoleApplication        : Starting DemoSimpleappConsoleApplication using Java 17.0.1 with PID 23036 (C:\sprin
2023-02-03T11:08:16.465Z  INFO 23036 --- [           main] m.DemoSimpleappConsoleApplication        : No active profile set, falling back to 1 default profile: "default"
2023-02-03T11:08:17.015Z  INFO 23036 --- [           main] m.DemoSimpleappConsoleApplication        : Started DemoSimpleappConsoleApplication in 1.0 seconds (process running for 1.945)
```

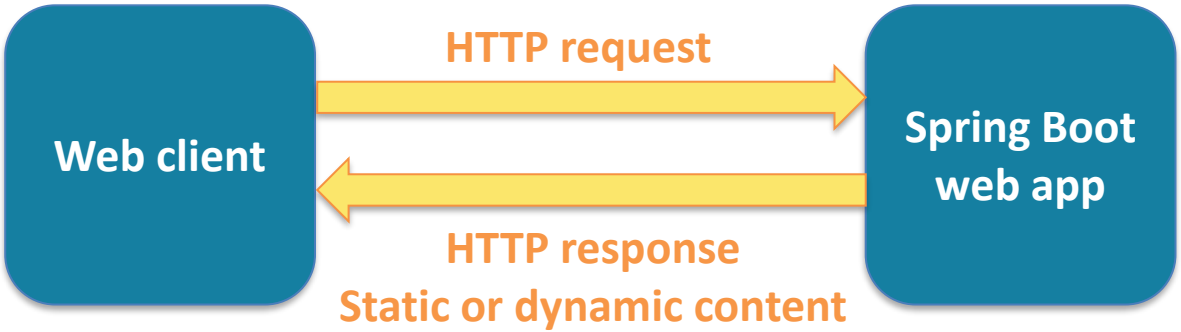
2. Creating a Web Application

- Overview
- Creating a Spring Boot web project
- Specifying project dependencies
- Understanding the web application structure
- Understanding the Maven POM file
- Adding web content
- Running the application
- Pinging the application

Demo project: **`demo-simpleapp-web`**

Overview

- Spring Boot applications are typically "web apps"
  - Listen for HTTP requests from web client (e.g. a browser)
  - Return static or dynamic content



- We'll see how to return **static content** for now
  - Later we'll see how to return dynamic content, via REST services

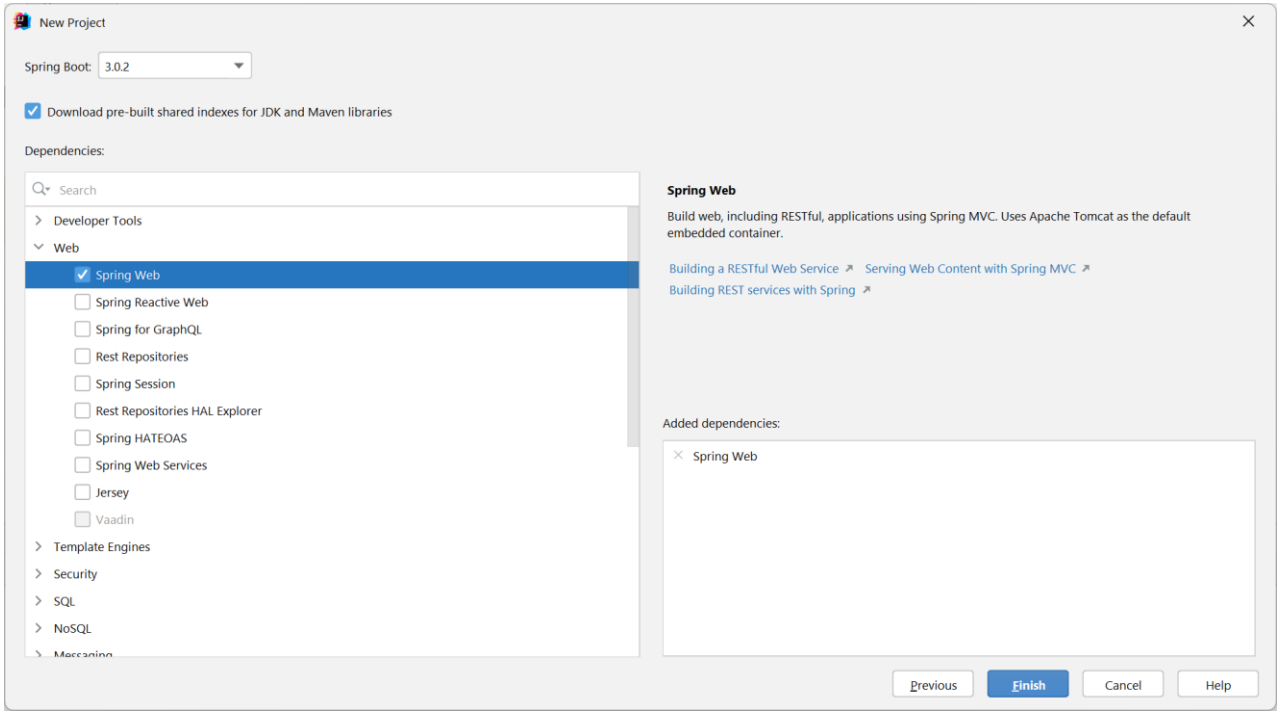
Creating a Spring Boot Web Project

- Start IntelliJ, click New Project, and select Spring Initializr

- Specify project info as follows:
  - Enter a suitable project name and location
  - Language - Java
  - Type - Maven
  - Enter a suitable group ID, artifact ID, and package name
  - Project SDK - Java 17
  - Java version - 17
  - Packaging - Jar
  - Then click Next

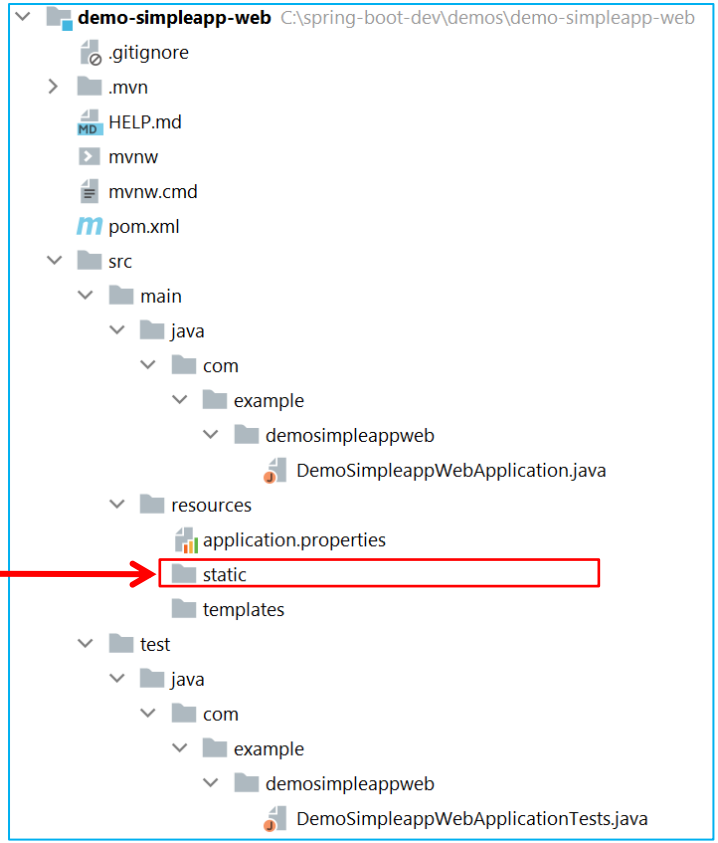
Specifying Project Dependencies

- In the next window you can add dependencies to your project
  - Expand **Web** and select **Spring Web**



Understanding the Web Application Structure

- The generated application is a regular Maven **web** project:



Put static web content here

Understanding the Maven POM File

- Here's the relevant section in the Maven POM file:

```
<project … >
    …

    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-web</artifactId>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-test</artifactId>
            <scope>test</scope>
        </dependency>
    </dependencies>
    …
```

pom.xml

Adding Web Content

- You can add static web content in the following directory:
  - `src\main\resources\static`

- For example, add an `index.html` file:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Home</title>
</head>
<body>
    Hello world!
</body>
</html>
```

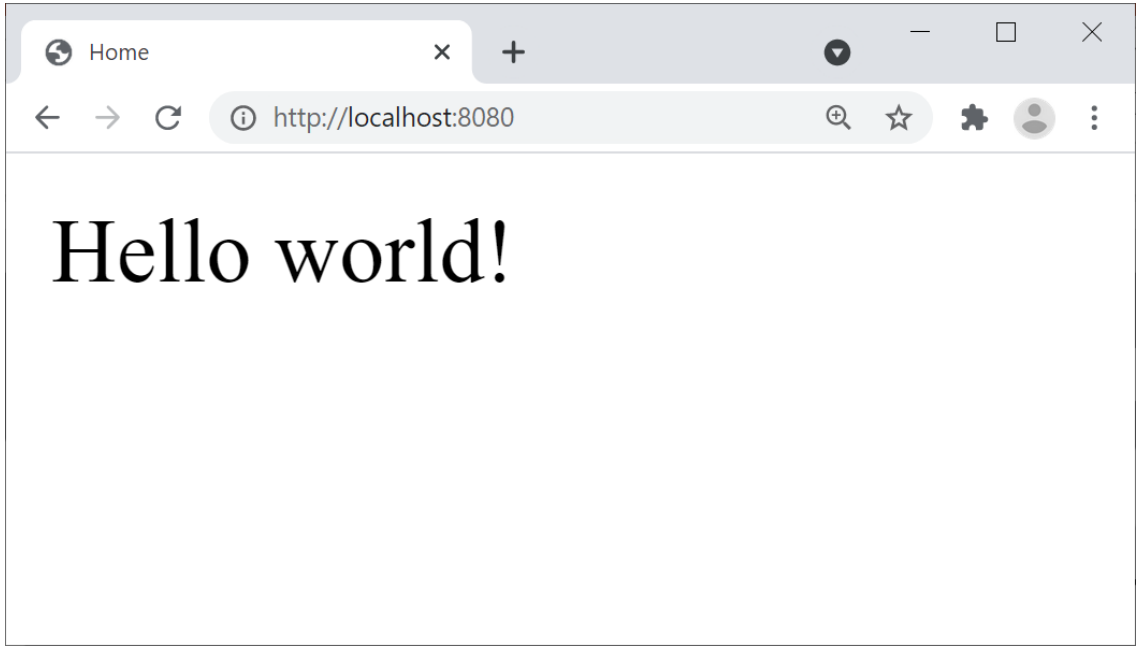
index.html

Running the Application

- To run the application:
  - Right-click the Java app file, then click Run
  - Compiles the code, bundles into a JAR, then runs the JAR
  - The application has an embedded Tomcat web server

Pinging the Application

- Open a browser and go to `http://localhost:8080`
  - Renders `index.html` (a standard welcome page in Java web)



3. Defining Application Properties

- Overview of application properties
- Editing application properties
- Restarting the application

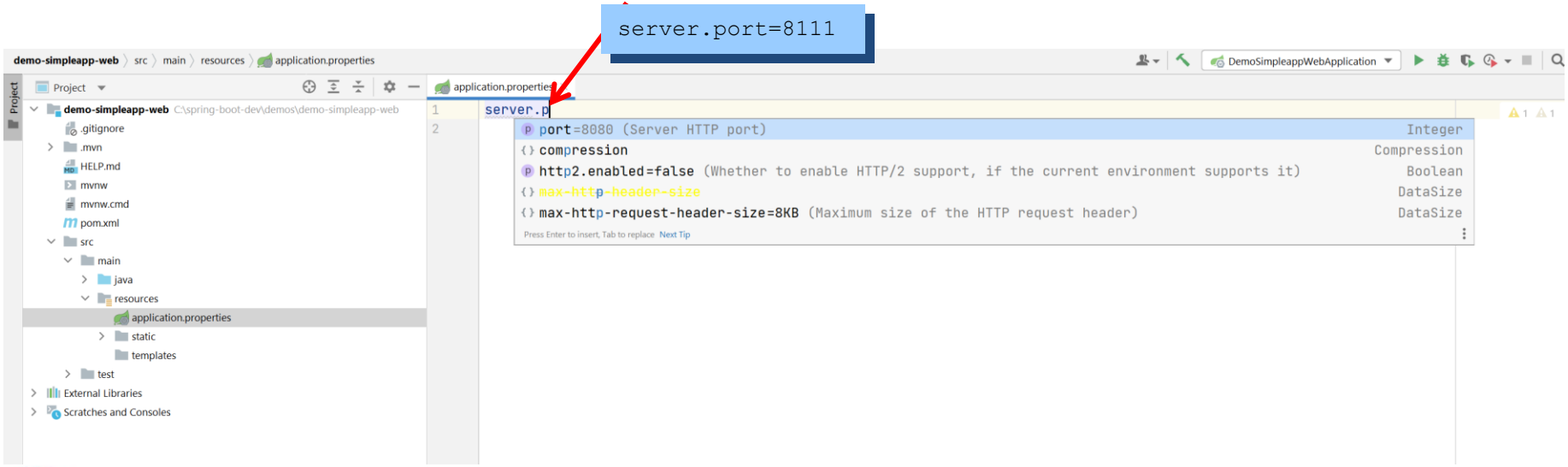
Overview of Application Properties

- Spring Boot applications have a standard text file named `application.properties`
  - Very important!
  - The recommended place to set application properties
  - i.e. name=value pairs

- You can also use YAML if you like
  - YAML = "YAML Ain't Markup Language"
  - More on YAML files later…

Editing Application Properties

- To help you edit `application.properties`, IntelliJ provides a Spring Properties Editor tool
  - Provides nice content assistance and error checking

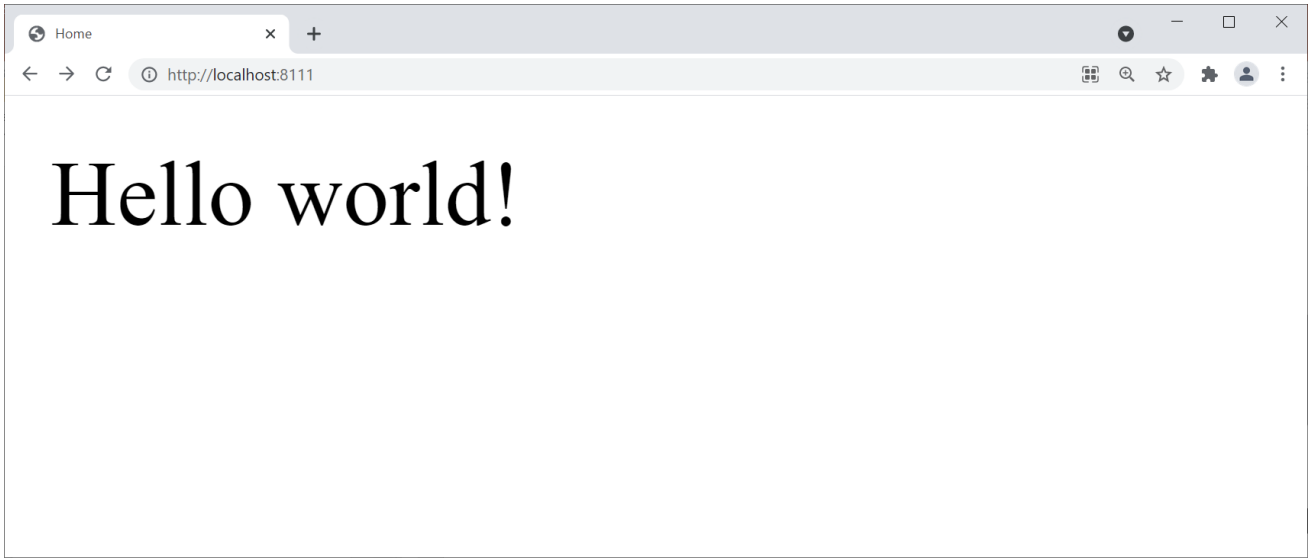


Restarting the Application

- Restart the application, and verify Tomcat starts on the new port number, 8111

```
main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat started on port(s): 8111 (http) with context path ''
```

- Ping the Web server using the new port number, 8111



Summary

- Creating a console application
- Creating a web application
- Defining application properties