MODULE 4

INTRODUCTION TO SPRING

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JavaBean

- **Plain Old Java Object** (POJO) is an ordinary Java Object
  - A POJO class does not have
    - extends
    - implements
    - annotations
- JavaBean is a POJO that
  - Has a no-argument constructor
  - Allows access to properties using getter and setter methods
  - Is serializable

Spring

- Open source application framework
- To simplify development of enterprise application
  - POJO-oriented development
- Dependency injection (DI) and aspect-oriented programming
  - Lightweight development with POJOs
  - Loose coupling through DI and interface orientation
- Inversion of control container for the Java platform

Spring – *Inversion of Control (IoC)*

- **Inversion of control container**
  - To manage Java object lifecycles
    - Creating objects
    - Calling initialization methods
    - Configuring objects by wiring them together
  - Done mainly via **dependency injection**
- The container can be configured by providing the information required to create the beans
  - Through XML files
  - Through Java annotations in classes

Spring – *Dependency Injection*

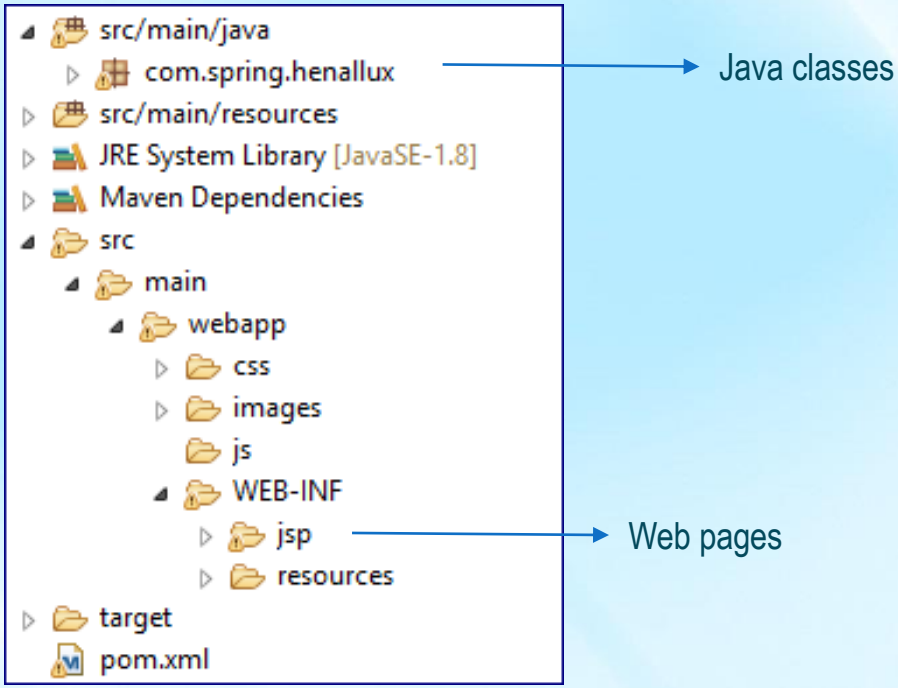
- Dependency Injection
  - The ability to inject components into an application in a typesafe way
  - The ability to choose at deployment time which implementation of a particular interface to inject
- The programmer does no longer create **objects**
  - But describes how they should be created
- The programmer does no longer call **services** and **components**
  - But tells which services and components must be called
- Benefit
  - Code easier to maintain
  - Code easier to test

Spring – *Dependency Injection*

- DI involves four elements
  - The implementation of a service object
  - The client object depending on the service
  - The interface the client uses to communicate with the service
  - The injector object responsible for injecting the service into the client
    - Also referred to as an assembler, provider, container, factory, or spring

Project Structure

- In Package Explorer View



Maven

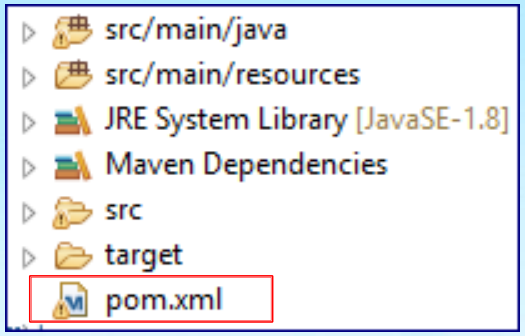
- Software project management and comprehension tool
  - Describes how software is built
  - Describes its dependencies
- Maven can manage
  - Project's build
  - Reporting
  - Documentation

Maven

- To simplify the build processes
  - Making the build process easy
  - Providing a uniform build system
  - Providing project information
  - Providing guidelines for best practices development
  - Allowing transparent migration to new features

Maven – *pom.xml*

- Maven is based on the concept of a Project Object Model (POM)
- pom.xml used to build the project
  - Contains information about the project and configuration details
  - Default values for most projects



Spring Boot

- To create easily Spring based Application
  - Needs very little Spring configuration
- Lets the developer focus on the application's development
  - Removes the need to be concerned with other aspects of application lifecycle
    - Like deployment and management

Spring Boot

- Features
  - Create stand-alone Spring applications
  - Embed Tomcat
  - Provide 'starter' POMs to simplify Maven configuration
  - Automatically configure Spring whenever possible
  - Provide production-ready features
  - No code generation and no requirement for XML configuration

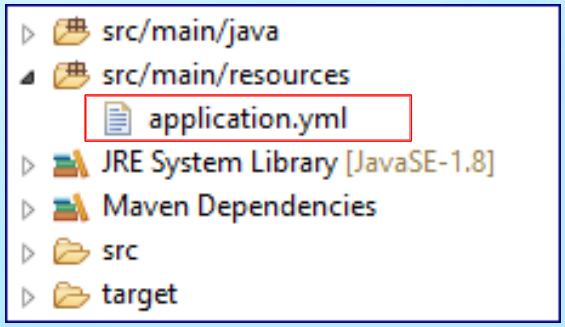
Spring Boot

- Add a dependency in pom.xml

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

Yaml Property File

- Use yaml file for external properties



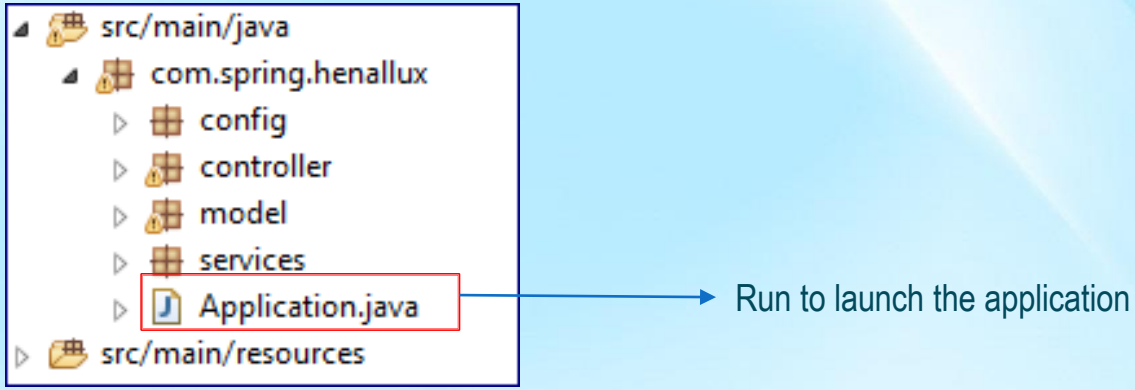
- YAML is a superset of JSON
  - Convenient syntax for storing external properties in a hierarchical format
  - E.g,

```
1 # Local server
2 server:
3   # port is used by spring-boot-admin
4   port: 8080
5   contextPath: /first
```

Root of the project

Application Class

- In the root package ***above all other java classes***



Application Class

- Class Annotations
- ***@Configuration*** 
  - Tags the class as a source of bean definitions for the application context
- ***@EnableAutoConfiguration*** 
  - Tells Spring Boot to start adding beans
    - Based on classpath settings, other beans, and various property settings
- ***@ComponentScan*** 
  - Tells Spring to look for other components, configurations, and services in the the package

Application Class

- Main method
  - Uses Spring Boot's ***SpringApplication.run()*** method to launch the application

```
@Configuration
@EnableAutoConfiguration
@ComponentScan
public class Application {

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

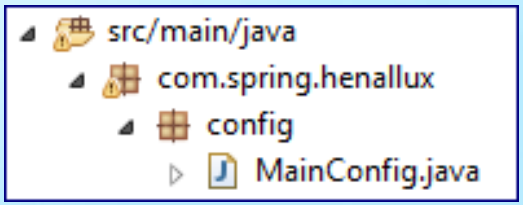
Configuration Class

- Spring Boot favors Java-based configuration
- One or more Configuration classes
  - Contains bean definitions
- Class annotation: ***@Configuration***
  - Indicates that the class can be used by the Spring IoC container as a source of bean definitions
- Bean definition
  - Method Annotation: ***@Bean*** 

⇨The method will return an object that should be registered as a bean in the Spring application context

Configuration Class

- E.g, MainConfig



Configuration Class

```
@Configuration
public class MainConfig extends WebMvcConfigurerAdapter {

        @Bean
        public ViewResolver viewResolver ()
        {
                InternalResourceViewResolver resolver = new InternalResourceViewResolver();
                resolver.setPrefix("/WEB-INF/jsp/");
                resolver.setSuffix(".jsp");

                return resolver;
        }
}
```