**Spring Boot**

1. Spring Boot is a java-based framework.
2. Spring Boot is used for the faster Development and it also reduce the development efforts.
3. Using Spring Boot you can develop a product ready applications.
4. Spring Boot also provides the embedded tomcat server and the database such as H2 Database.
5. Spring Boot provides multiple predefine functionality using which with min configuration you can achieve the maximum functions. This are also customized as per requirement.
6. Spring Boot is based on Spring Framework.
7. Spring Boot is used for Creating Full-stack or Micro services application.
8. Spring boot is easy to learn and also Implement because it is distributed into a multiple modules, and to use spring boot you do not have to lean all the spring modules.
9. You can use the specific module as per your project requirement.
10. Some Examples of spring boot modules
    1. Spring IOC/Core
    2. Spring JDBC
    3. Spring ORM
    4. Spring REST
    5. Spring Batch
    6. Spring MVC etc..
11. Spring Boot is a wrapper of Spring Framework. Spring boot has provided an easy way to create a project, to add multiple modules dependency and configuration.
    1. Spring Boot Provided the starter projects using which you can add the dependencies easily and just by adding single dependency.
    2. Spring boot also provide the auto configuration functionality using with you will get the default configuration from the maven which is highly customizable.
    3. Spring Boot provides the Embedded tomcat server and H2 Database so that you can run the application with minimum setup.

**Create Spring Boot Project**

1. Spring CLI (Command Line Interface)
   1. In this approach you have to install CLI tool and using the command you can create spring boot project.
2. Spring STS (Spring Tool Suit)
   1. Spring suit is and IDE which is created as an extension on eclipse and IntelliJ IDE

<https://spring.io/tools>

1. Spring Initializer
   1. This is an web application provided by spring to create a spring boot project.
   2. Here, you can provide the details for creating spring boot application and you can download the application will all the features provided.

<https://start.spring.io/>

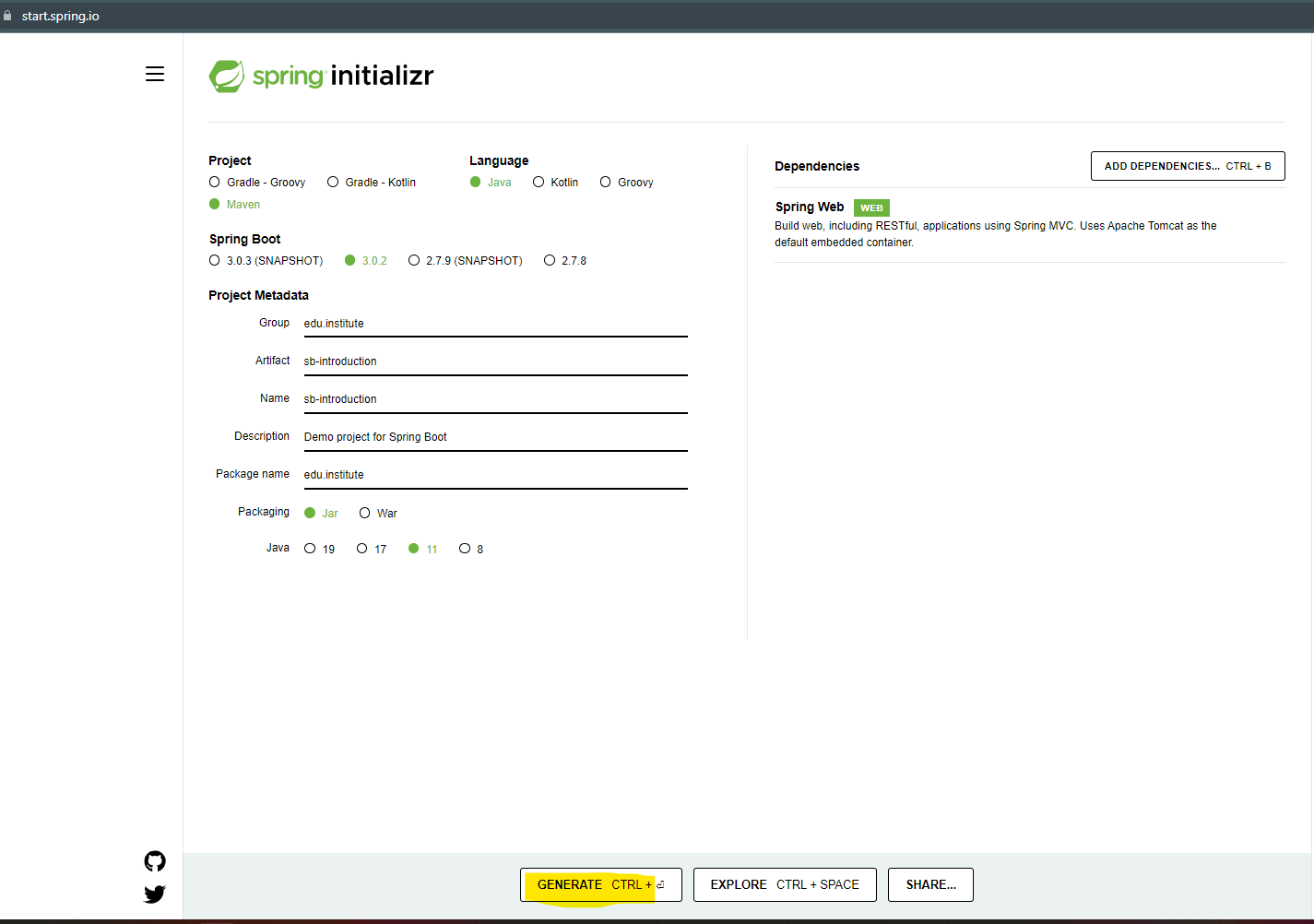
**Steps to create and import Spring boot Project in Eclipse**

1. Create Spring Boot Project

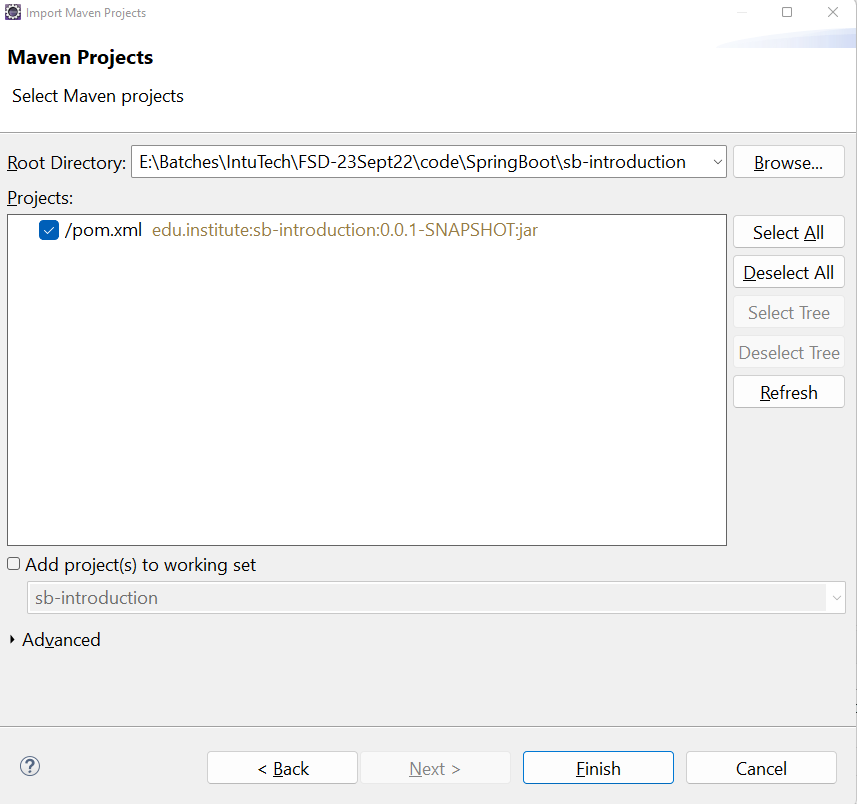
Go to <https://start.spring.io/>

Fill up the project details into form

Click on Generate button. It will download the ZIP file.



1. Import the project into Eclipse
   1. Copy and paste the project ZIP file into eclipse workspace
   2. Extract the ZIP file.
   3. Open an Eclipse workspace
   4. “File” menu -> click “Import” Option
   5. Search for “Maven” Option in the Wizard -> Select the “Existing Maven Projects” option and click on “Next”
   6. Browse for an extracted project location and select the parent folder of the pom.xml file.
   7. Click on Finish



**Spring Boot Application Main Class**

1. This class is present in all the spring boot project
2. This class is use to start/run the spring boot application
3. In this class there are 2 statements which help to start with spring boot project
   1. **@SpringBootApplication** Annotation
      1. This annotation denote the application is a spring boot application.
      2. This annotation is a combination of 3 annotations
      3. **@Configuration** annotation is use to load the configurations. All the configurations are loaded inside spring application at the start of the project.
      4. **@EnableAutoConfiguration** annotation is use to enable the spring boot default configuration. The configuration such as Tomcat Server configuration, DB configurations are added inside application
      5. **@ComponentScan** annotation is use to load all the spring bean class object inside spring container.
4. **Execution of the Run methods**
   1. This method is use to start the spring boot application with the startup arguments.
   2. This method return the Object of Spring Container which is ApplicationConext.

**Spring IOC/Core**

* + - 1. Spring IOC is an invers of Control
      2. In this module you can learn how to create spring bean classes.
      3. Spring container which is use to create and maintain the object of spring bean classes
      4. In this module you can perform the Dependency Injection (DI) process which is equivalent to HAS-A relation in java.
      5. The Dependency Injection process can be automated using the Autowire process

**Spring Bean Class**

1. It is a java class (build-in or custom class) whose object will be created and maintain by the spring.
2. To mark your custom class as a spring bean class you can use following annotation
   1. @Component
   2. @Controller
   3. @RestController
   4. @Service
   5. @Repository
   6. @ControllerAdvice

**Spring Container**

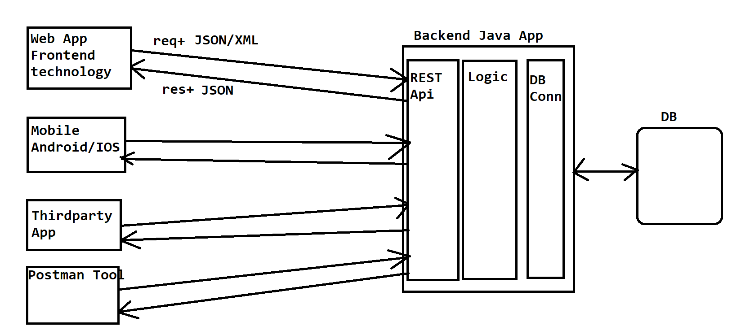
1. Spring Container is a predefine component of the spring
2. Spring container is responsible to scan all the bean classes and create and manage object of Spring Bean class.
3. You can get the Object of the class using spring container
4. ApplicationContext is a container which can be use to get a spring bean objects.

**Spring Dependency Injection (DI) and Autowire**

1. Dependency Inject (DI) is a process in which you can create object of one class into another class. In Java it is also known as HAS-A relation.
2. To automate the DI process you can use autowire concept.
3. TO perform the auto wiring you have to use @Autowire annotation.
4. You can use the autowire annotation only for the spring bean class.

**REST API**

1. REST API is also known as Restful APIs
2. Using REST API you can create a web services which can be consume by frontend application or any other application or any third party.
3. REST stands for **RE**presentational **S**tate **T**ransport
4. This use to manage the communication over a network.



**JSON**

1. JSON is a JavaScript Object Notation
2. JSON is use to exchange the data between two application which is developed in different technologies and languages.
3. JSON is used in the form of Key and Value pair which is also as element.
4. Where Key is in String format and values can be string, numeric, Boolean, JSON object or JSON array.
5. JSON can be use in two forms
   1. JSON Object
   2. JSON Array
6. Example of JSON

{

"name":"John",

"age":30,

"car":null,

"flag":false

}

**JSON Object**

1. JSON Object can be represented as curly brackets

Symbol:

{

JSON Elements

}

**JSON Array**

1. JSON Array represented as a square bracket

Symbol:

[

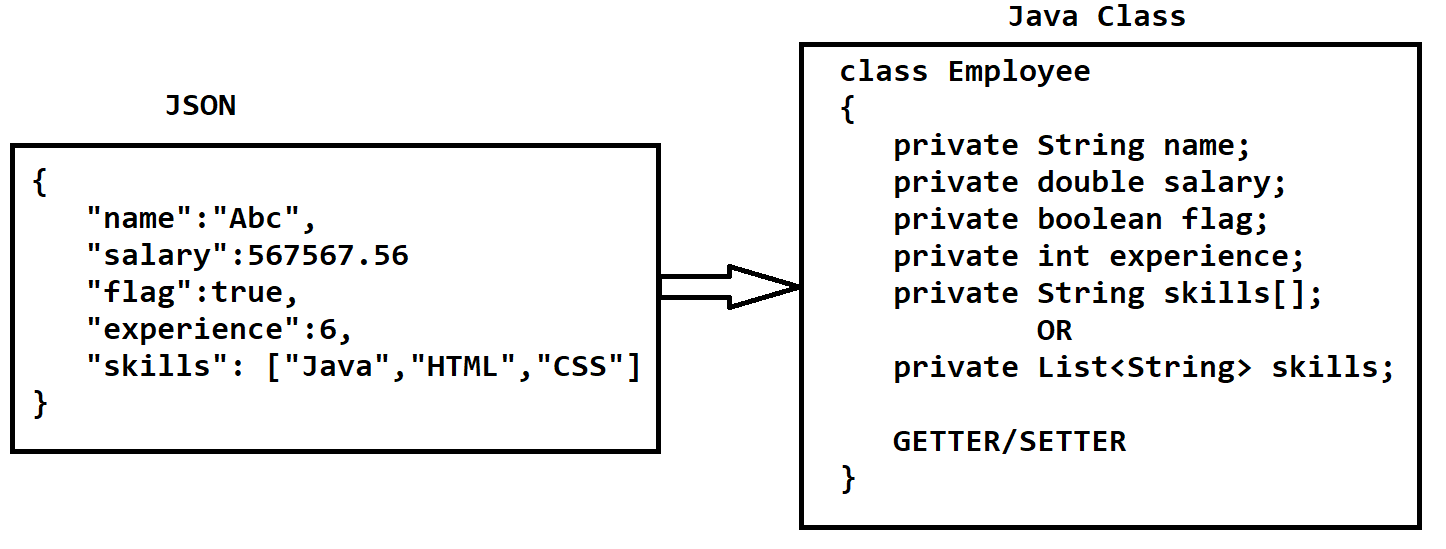
Value/JSON Object

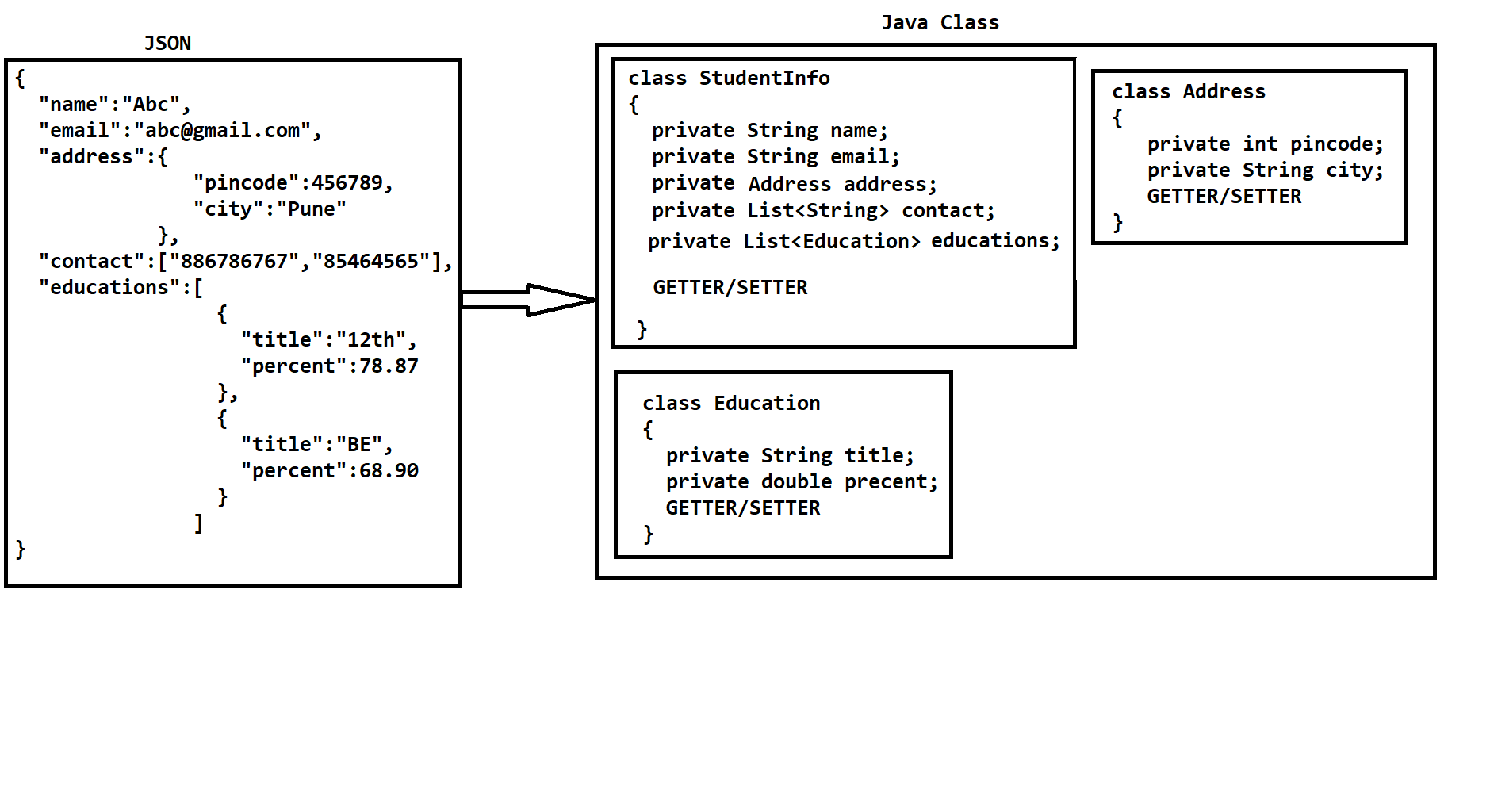
]

In Spring/Java application JSON can be convert into Java format

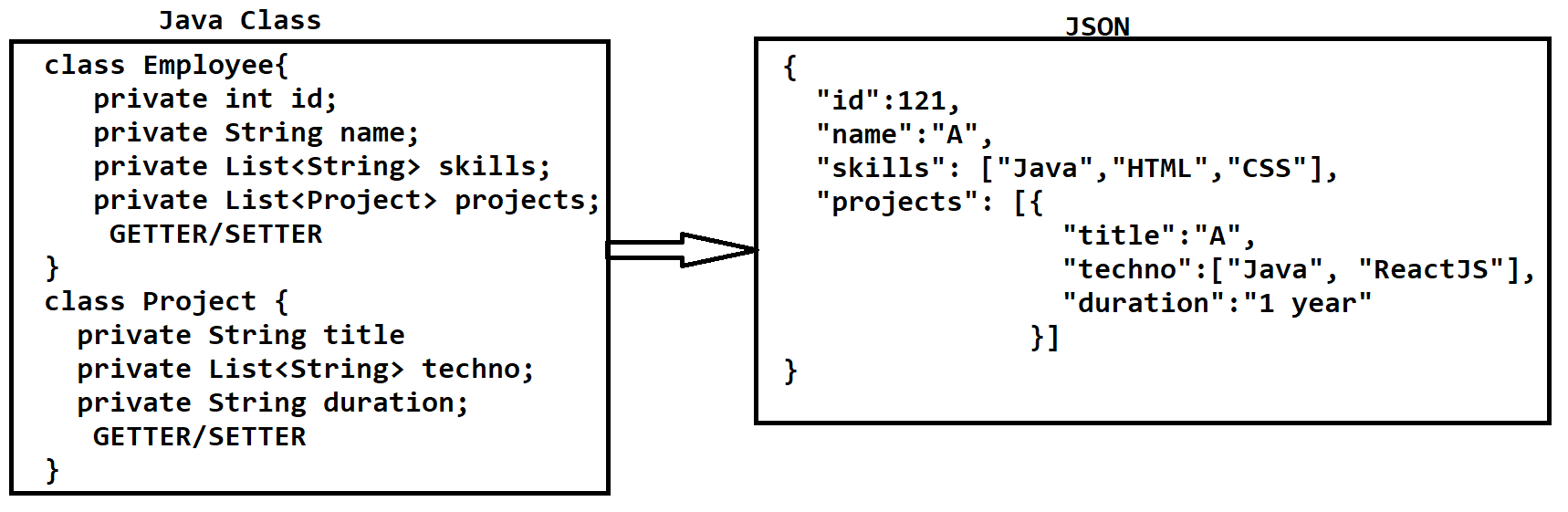
1. Request JSON has to convert into java Object. (JSON 🡪 Java Object)
2. To return the response Java Object has to convert into json. (Java Object 🡪 JSON)
3. To do this conversion you can use GSON or Jackson libraries.
4. Spring boot internally use Jackson library for this conversion.

**JSON To Java Object**





Java Class to JSON



**Steps to create REST API in Spring Boot**

1. Create a java class
2. Annotated the java class with @RestController annotation.
3. Create a methods with input parameter and return type as per you REST API requirement.
4. Annotate the method using @GetMapping, @PostMapping, @PutMapping or @DeleteMapping for GET, POST, PUT or DELETE method of HTTP respectively.
5. Provide the URL for the REST API.

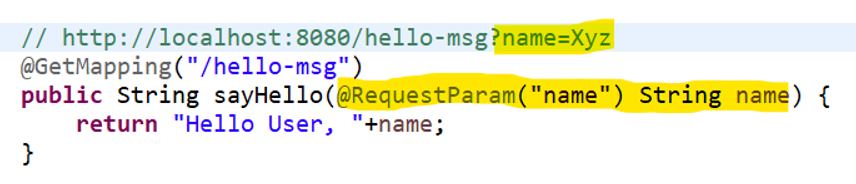
**Postman**

1. Postman is a tool using which you can test the REST APIs.
2. You have to install the Postman tool on your local

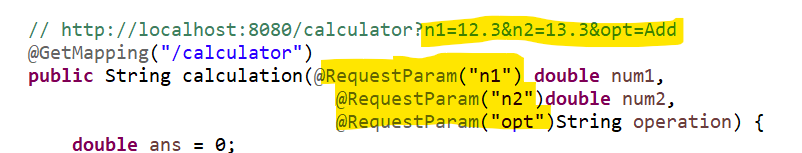
<https://www.postman.com/downloads/>

**Accept the Data from the request using REST API**

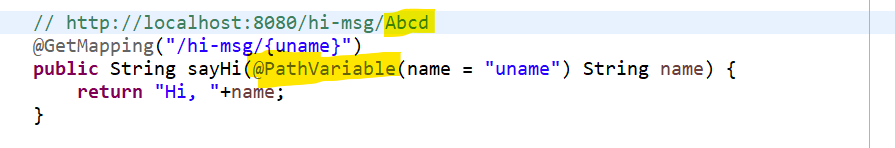
1. You can accept the use data in REST API using 3 approaches.
2. **Using Request Parameter**
   1. In the request parameter you can pass the data in the form of parameters in the URL.
   2. In Spring You can receive the request parameter values as a input parameter of the method
   3. The Input parameter has annotated by @ReuqestParam annotation.
   4. Example1:

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* 1. Example2:

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1. **Using Request Path Variable**
   1. You can accept the user info as a part of url itself instead of creating parameter.
   2. This will be a dynamic part of the URL.
   3. To receive such type of values in the application you have to use @PathVariable annotation for the input parameter.
   4. There can be a multiple path variable in a URL.
   5. Example:

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1. **Using Request Body in from of JSON**
   1. The data can be accept as a JSON from the REST API.
   2. This JSON data gets converted into Java Object automatically by Spring.
   3. To Set the data into Java Object you have to make sure that the Key of the JSON element has to match with the variable of java class.
   4. To receive the JSON data in form of Java Object you have to create a reference of java class as a input parameter and use @RequestBody annotation for the input parameter.
   5. Example:

