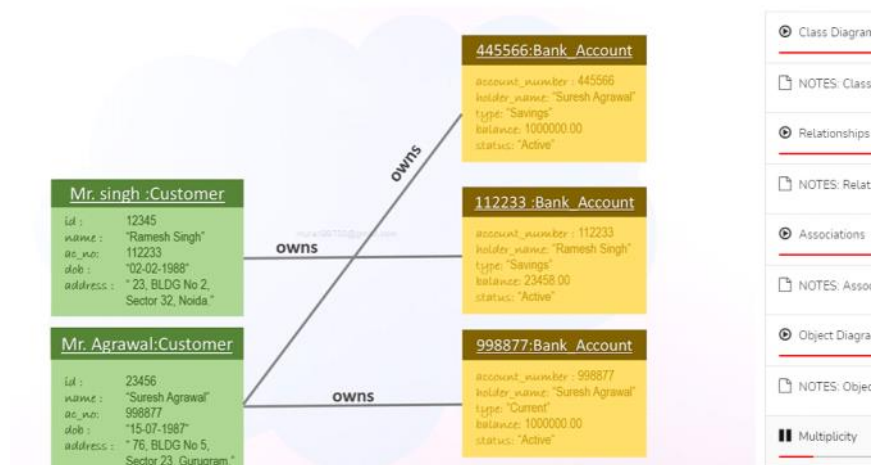
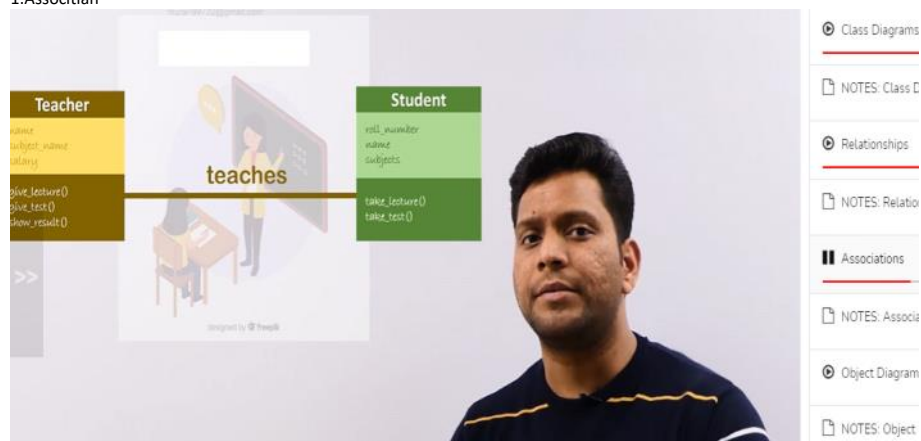


Low Level design

1.Association

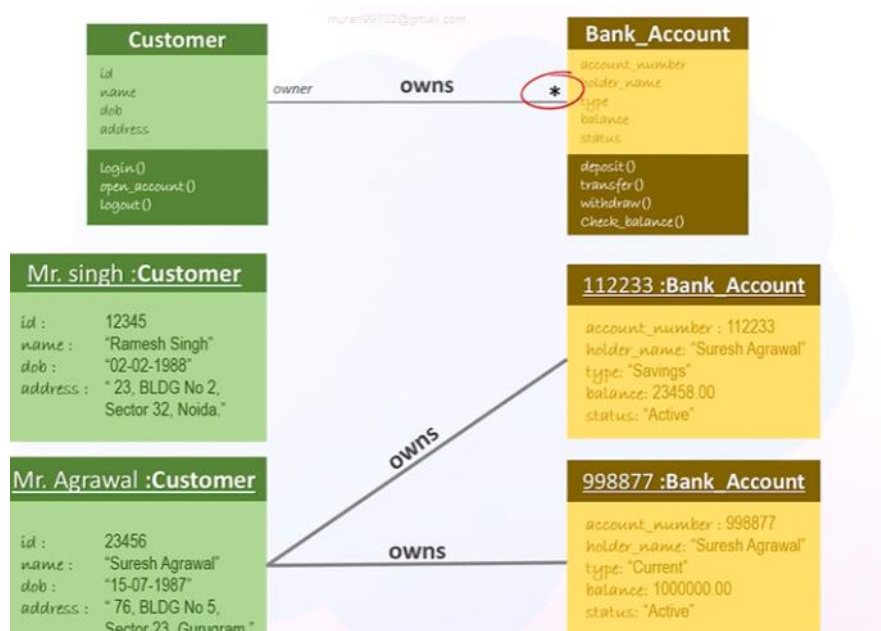


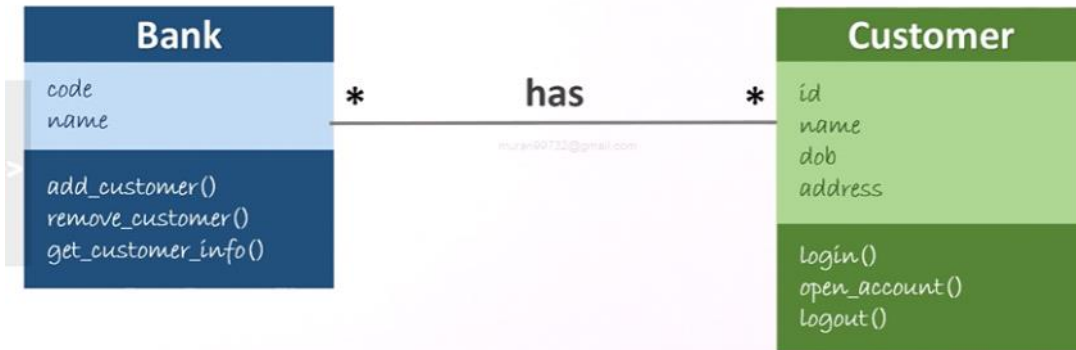
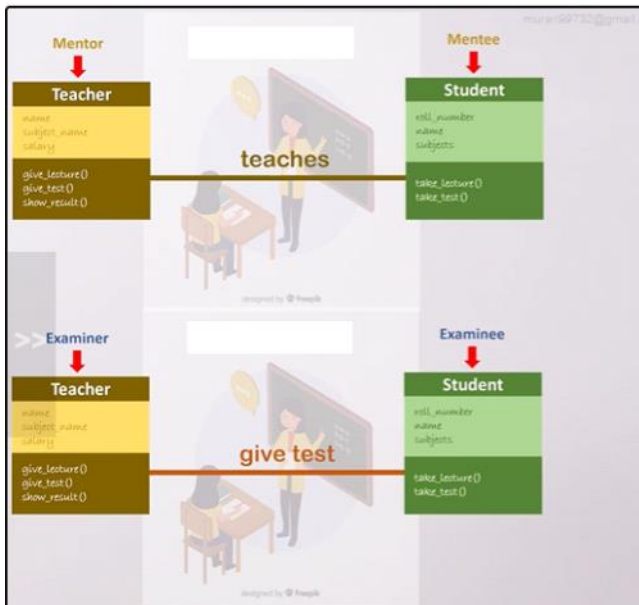


Association Name: a **Verb** or verb phrase, placed **at Middle** of the association.

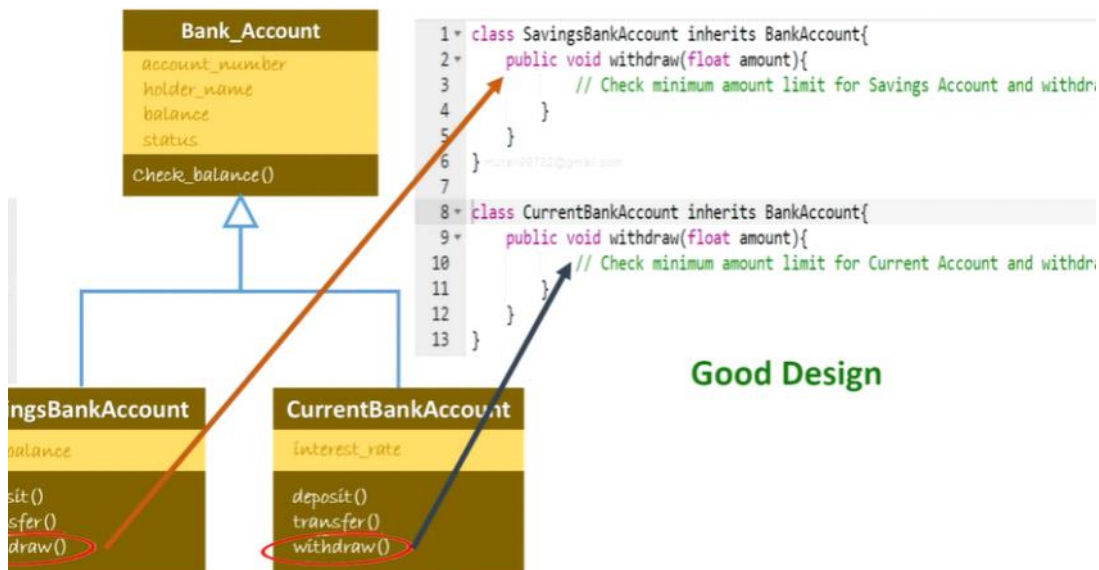
Multiplicity

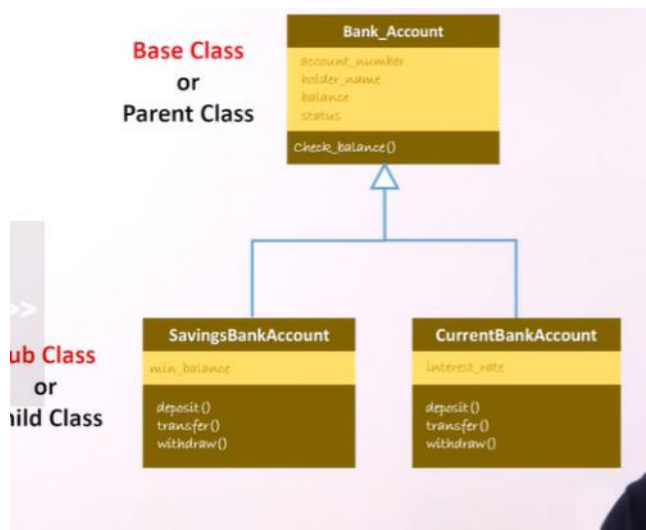
Multiplicity: How many objects of each class take part in the relationships?





Generalization



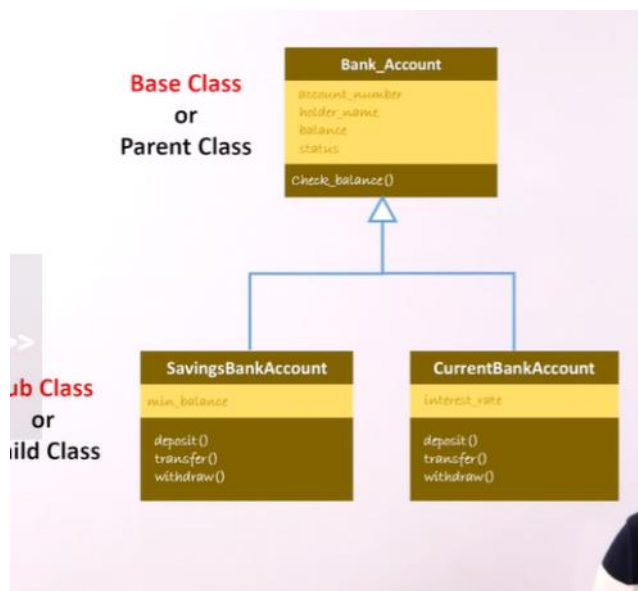


Aggregation



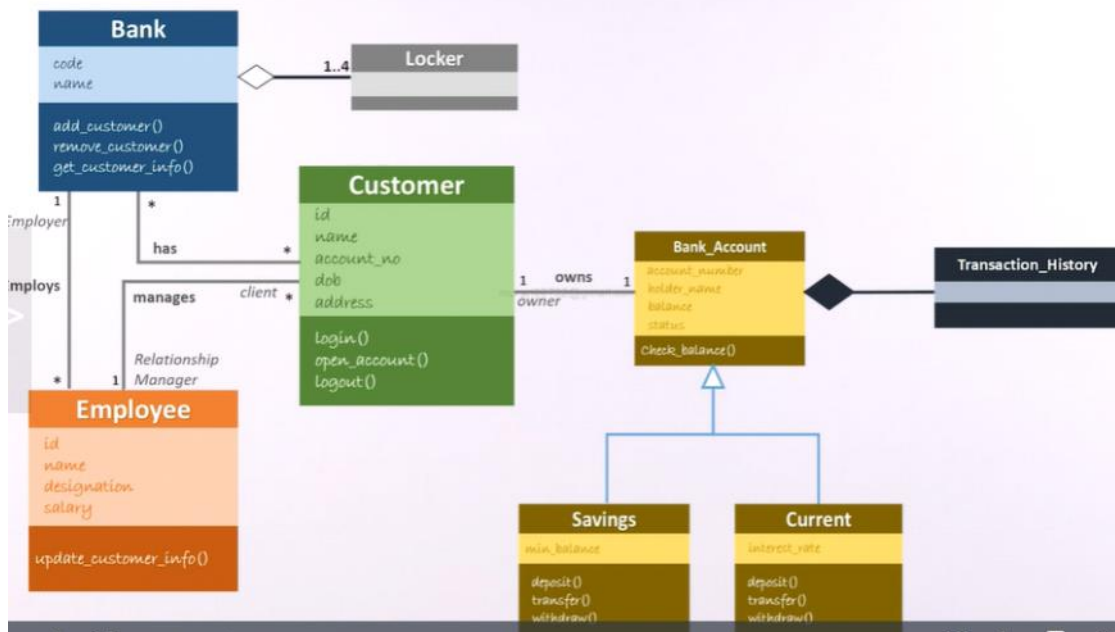
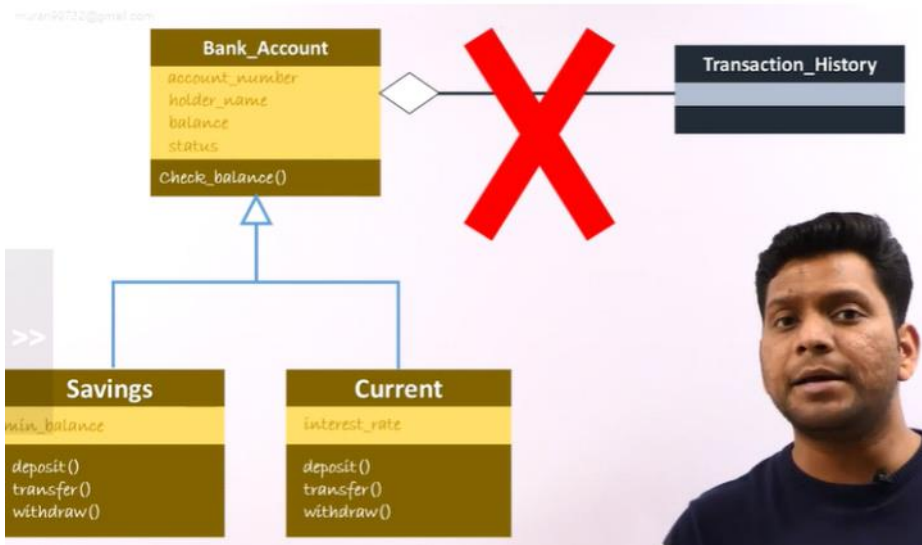
Locker can exist alone example cars and wheel

Library has books



Generalization

Composition



Memory
Interning - what? why?
new
Immutability
Performance
Equal & ==

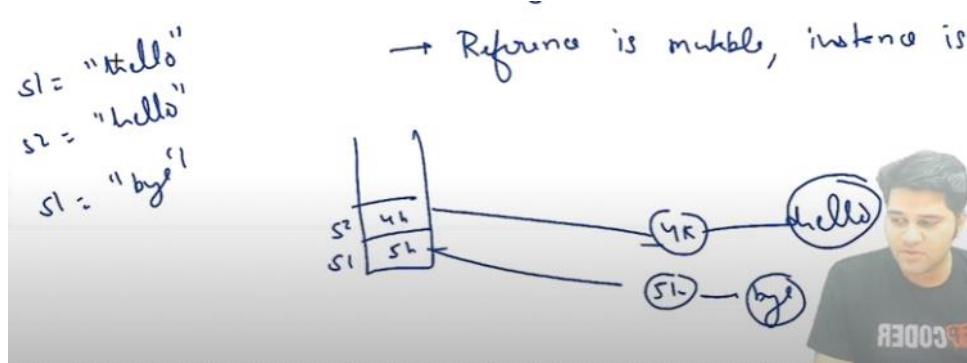
String s1 = "hello" ✓
" s2 = "hello" ✓
" s3 = new String("hello")

Interning is done to save the space

To avoid interning we use new

S1 equals s2 first check the address then it checks the character by character if address is same then direct true other wise check one by one character

Immutable we cannot change the string due to interning
 Refrence is mutable instance is not mutable



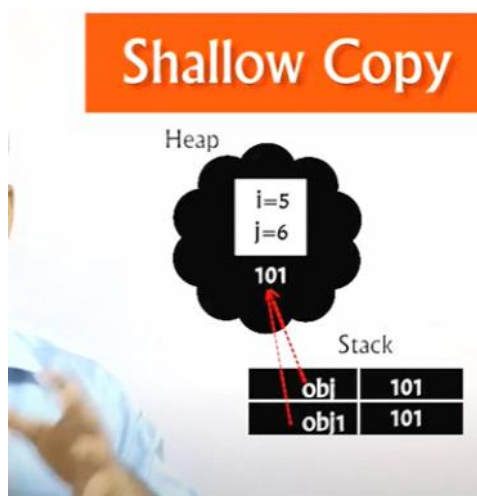
We cannot change the hello but we can change the pointing or refrence

Steps to achieve encapsulation

1. Declare the variables of a class as private.
2. Provide public setter and getter methods to modify and view the variables values.

Shallow Copy

Both are referring to same stack



Abstract class means partially implemented
 Hiding internal implementation

Encapsulation -> Grouping data members and method in single unit

```
class A
{
    int i;
    int j;
}

A obj = new A();
obj.i = 5;
obj.j = 6;
A obj1 = obj;
```

---> i=5
 ---> j=6
 ---> i=5
 ---> j=6

Fail fast -> ArrayList or any iterator count size if size increase by adding or removing value throw concurrent hashmap error

Fail safe -> CopyArray by cloning the array

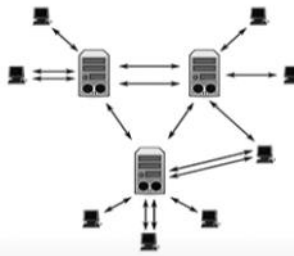
What is a web service? (1/2)

- Piece of software that makes itself available over the internet
- A collection of protocols and standards used for exchanging data between applications or systems
- The exchange of data is preferably in standard formats like JSON or XML
- The important aspect of web service is to provide a service not necessarily an UI for humans
- The web services are meant mostly for other applications or systems

What is a web service? (2/2)



Websites allow humans to communicate and collaborate



Web services allow systems to communicate and collaborate

SOAP (1/2)

- Simple Object Access Protocol
- Protocol
- Can work on almost any internet protocol
- Permits only XML
- SOAP support SSL and WS-Security
- Envelope
- Requires more bandwidth



- Representational State Transfer
- Architecture
- Works mostly HTTP
- REST uses HTTP for all 4 CRUD operations - HTTP Methods
 - Create (POST)
 - Read (GET)
 - Update (PUT)
 - Delete (DELETE)
- Postcard
- Requires less bandwidth
- REST permits not only XML and file types like JSON can be used

URI exposes the business logic

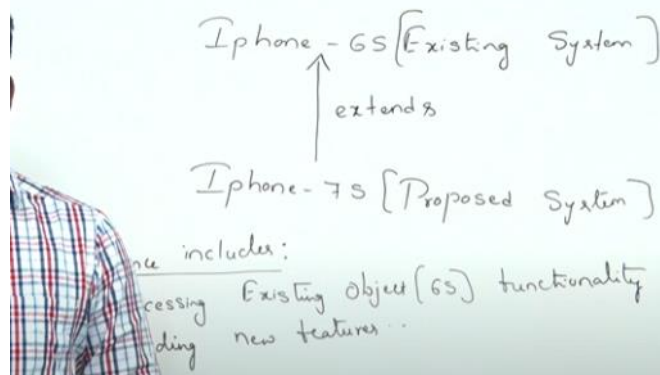
	SOAP	REST
Language independent	Yes	Yes
HTTP status codes	User defined	Uses HTTP status codes
Security	Very secure - used in banking as the whole envelop can be encrypted	Secure as well as HTTPS is used
Overhead	More as the whole envelope needs to be sent	Less
Strict Standards	Yes	No

Static means common-?

If one functionality is common to all better declare static.

If we are not implementing in parent then it is not common for all

What is Inheritance?



Non-static → Specific to only 1 object [accno]

Static → Common to more than 1 object

IFSC → Common [few]

Bank Name → Common [All]

Overloading and overriding->

Class Test -> Both had same name but different type of arguments

```

{
Public void m1(int i)

```



```

{
}
Public void m1(long i)
{
}
}

```

Overriding-> Sometime may satisfied with implementation or not.
By extends all the methods comes to child. Redefining the method.

Overloading:

- What ever methods parent has by default available to the child through inheritance. some times child may not satisfy with parent method implementation. Then child is allow to redefine that method based on its requirement. this process is called overriding.
- The parent class method which is overridden is called overridden method.
- The child class method which is overriding is called overriding method.

```

class P {
    public void property() {
        System.out.println("cash+Land+Gold");
    }
}

```

Thread-> How many way-> We can define thread by extending thread class by implementing runnable interface
Implementing is best.

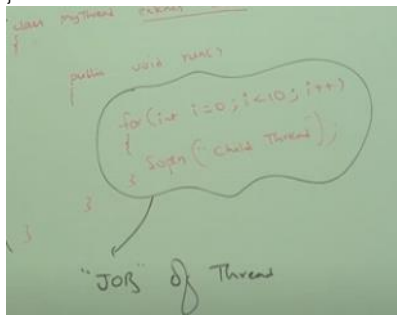
Thread is flow execution.

Class Mythread extends thread

```

{
@Override
Public void run()
{
For(int i=0;i<10;i++)
{
soplIn("CHILD THREAD");
}
}
}

```



1. How to start thread
2. Main()

```

{
Only one flow main thread. JVM will start main thread.
Mythread t = new MyThread();
t.start();-> After this two thread are there. Two execution
}

```

We cannot gurantee the output

Thread scheduler. Which responsible for our thread. It is part of jvm.
Multiple thread are there.
Some scheduler follow fcfs sjf.

If we have independent jobs.

- **wait()** method releases the acquired lock when the thread is waiting till some other thread calls **notify()** while Thread. **sleep(sleepTime)** method keeps the lock even if thread is waiting.

yield(): indicates that the thread is not doing anything particularly important and if any other threads or processes need to be run, they can. Otherwise, the **current thread will continue to run**.

sleep(): causes the thread to definitely stop executing for a given amount of time; if no other thread or process needs to be run, **the CPU will be idle** (and probably enter a power saving mode).

From <<https://www.geeksforgeeks.org/java-concurrency-yield-sleep-and-join-methods/>>

Next → ← Prev

Spring vs. Spring Boot vs. Spring MVC

Spring vs. Spring Boot

Spring: Spring Framework is the most popular application development framework of Java. The main feature of the Spring Framework is **dependency Injection** or **Inversion of Control** (IoC). With the help of Spring Framework, we can develop a **loosely** coupled application. It is better to use if application type or characteristics are purely defined.

Spring Boot: Spring Boot is a module of Spring Framework. It allows us to build a stand-alone application with minimal or zero configurations. It is better to use if we want to develop a simple Spring-based application or RESTful services.

The Primary comparison between Spring and Spring Boot are discussed below:

Spring	Spring Boot
Spring Framework is a widely used Java EE	Spring Boot Framework is widely used to develop REST APIs .

framework for building applications.	
It aims to simplify Java EE development that makes developers more productive.	It aims to shorten the code length and provide the easiest way to develop Web Applications .
The primary feature of the Spring Framework is dependency injection .	The primary feature of Spring Boot is Autoconfiguration . It automatically configures the classes based on the requirement.
It helps to make things simpler by allowing us to develop loosely coupled applications.	It helps to create a stand-alone application with less configuration.
The developer writes a lot of code (boilerplate code) to do the minimal task.	It reduces boilerplate code.
To test the Spring project, we need to set up the sever explicitly.	Spring Boot offers embedded server such as Jetty and Tomcat , etc.
It does not provide support for an in-memory database.	It offers several plugins for working with an embedded and in-memory database such as H2 .
Developers manually define dependencies for the Spring project in pom.xml .	Spring Boot comes with the concept of starter in pom.xml file that internally takes care of downloading the dependencies JARs based on Spring Boot Requirement.

From <<https://www.javatpoint.com/spring-vs-spring-boot-vs-spring-mvc>>

Maven is build tool project management
Maven is repository or library.

Java with jdbc then we need mysql connector.
Spring we will require 10 jar.

If we want to download all these thing then it is not good thing.
If we want to update. Download dependency match with otyher depencdeis.

To solve this problem there is maven dependencies

We can compile using maven.
Packaging-> war jar
Project->Pom.xml
Artificat id-> Project name
Group id-> If I am building 5 project make sure unique from world. Com.telusko
Package name->

Mvn reposiotry--> We have to connected from internet

Local repository-> If it is not there then it will be go to remote

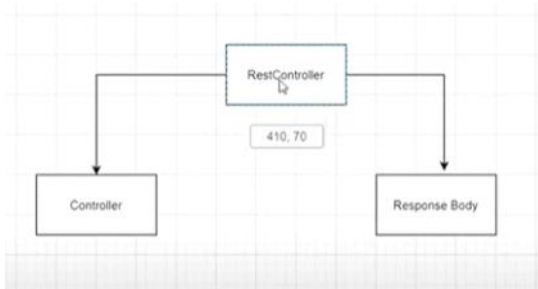
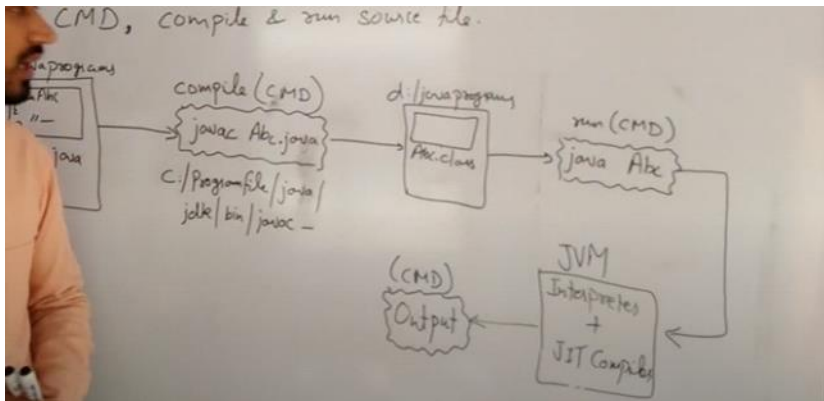
Maven manage project

- Source code
- Test code
- Project structure (directories, assets, resources)
- Libraries / dependencies
- Configuration
- Task runner - build, test, run

Run build test->10 classes or 50 classes. Run these single task.

Reporting -? How project doing. How many test cases passes

Create jar file



9) Explain @RestController annotation in Spring

Root?

- @RestController is a convenience annotation for creating Restful controllers. It is a specialization of @Component and is autodetected through classpath scanning. It adds the @Controller and @ResponseBody annotations. It converts the response to JSON or XML.
- which eliminates the need to annotate every request handling method of the controller class with the @ResponseBody annotation. It is typically used in combination with annotated handler methods based on the @RequestMapping annotation.
- indicates that the data returned by each method will be written straight into the response body instead of rendering a template.

To answer this we first understand the difference between a **web application** and a **REST API**.

It's that the response from a web application is generally view (HTML + CSS + JavaScript) because they are intended for human viewers while REST API just returns data in form of JSON or XML because most of the REST clients are programs.

Same goes with @RestController and @Controller annotation

@Controller Map of the model object to view or template and makes it human readable but @RestController simply returns the object and object data is directly written into HTTP response as JSON or XML.

```

try
{
    System.exit(1);
}
catch(Exception e)
{
}
finally{
    System.out.println("hey");
}
  
```

Runtime gc and system gc sweep and mine

Equals and Hashcode Contract in Java [Important Java Interview Question]

From <<https://www.youtube.com/watch?v=4X5Kgi2VtI4>>

```

MainClass.java 11 Employee.java
5= public static void main(String[] args) {
6     Employee e1 = new Employee();
7
8     e1.setId(1);
9     e1.setName("John");
10
11     Employee e2 = new Employee();
12
13     e2.setId(1);
14     e2.setName("John");
15
16     System.out.println("Shallow compare " + (e1 == e2));
17
18     System.out.println("deep compare " + (e1.equals(e2)));
19 }
20
Problems Javadoc Declaration Console
terminated> MainClass [Java Application] C:\Program Files\Java\jre1.8.0_181\bin\javaw.exe (19-Apr-2020, 5:53:41 am)
allow compare false
ep compare false

```

```

public boolean equals(Object o) {
    if(o == null || getClass() != o.getClass())
    {
        return false;
    }

    if(o == this)
    {
        return true;
    }
}

```

```
Employee e = (Employee)o;
```

```

MainClass.java 11 Employee.java
5= public static void main(String[] args) {
6     Employee e1 = new Employee();
7
8     e1.setId(1);
9     e1.setName("John");
10
11     Employee e2 = new Employee();
12
13     e2.setId(1);
14     e2.setName("John");
15
16     System.out.println("Shallow compare " + (e1 == e2));
17
18     System.out.println("deep compare " + (e1.equals(e2)));
19 }
20
Problems Javadoc Declaration Console
terminated> MainClass [Java Application] C:\Program Files\Java\jre1.8.0_181\bin\javaw.exe (19-Apr-2020, 5:53:41 am)
allow compare false
allow compare false
deep compare true

```

It says that :

If two Objects are equal according to the **Equals(Object o)** method then the hash code for both the object must be the same(integer value).

Its **not necessary** that if you have same hash code for 2 object means those two object are equal. This is collision. Better hash function prevents this.

Whenever it is invoked on the same object more than once during an execution of a Java application, the hashCode method must consistently return the same integer.

Activate Windows
Go to Settings to activate Windows

```

public static void main(String[] args) {

    Employee emp1 = new Employee(1);
    Employee emp2 = new Employee(1);

    Map<Employee, String> map = new HashMap<Employee, String>();
    map.put(emp1, "Jack");
    map.put(emp2, "Jack");

    System.out.println(map.size()); // guess it 2 ->1

    //clue
    Integer i = new Integer(1);
    Integer i1 = new Integer(1);

    Map<Integer, String> map1 = new HashMap<Integer, String>();
    map1.put(i, "one");
    map1.put(i1, "one");

    System.out.println(map1.size()); //guess it 1

}

```

Why the hell we need it?

- ▶ If I don't want the behavior and properties of my class to be changed at the runtime.
- ▶ They are thread safe and don't have any synchronization issues.
- ▶ Very safe to be used as the keys of the hashmap.

▶ 1:55 / 9:21

Interview Question : Immutable Classes

WS • Oct 2, 2017

7

How To make a class immutable ?

- ▶ Make the class final so that class cannot be extended and its behavior cannot be overridden.
- ▶ Make all the properties of the class final and private.
- ▶ Set the values of the properties using constructor only.
- ▶ Don't provide any setters of these properties.
- ▶ If the class contains the references of the mutable objects .Don't provide the reference of the objects. Provide the copy of the reference.

Equals and hash

Hash can be different when equals is true

Present in different physical location but it is same value inside.

Hash may be equal or not

Difference between cookies, session and tokens

From <https://www.youtube.com/watch?v=44c1t_cKyo>

Authentication

- **authentication:** verifying identity (401 Unauthorized)
- **authorization:** verifying permissions (403 Forbidden)

Username/password scheme

- **stateful** (i.e. session using a cookie)
- **stateless** (i.e. token using JWT / OAuth / other)

Sessions

Actually we have exchanged our username and password against the cookies containing the session id



If we logout cookies will be deleted from database as well from browser cookies

We will be using cookies till the server we are working after sometime when there is inactivity then again we have to provide username and password

Browser will send cookies id on every request

We don't store cookies on server side because it cannot be trusted by user or client

Http is protocol which used to take request of user and bring back user response

Http protocol is stateless protocol. It will send new request

How facebook will know that which user has gone to home page who has requested new thing.. There is million user.

HTTP protocol to stateful protocol we can use session and cookies.

So we don't want as new request. Server should know that this user is already logged in.

Session-> Session data is stored on server side. Facebook login. Session is assigned and unique id created.

Cookies-> Cookies data is stored on client side. Client also get stored as in the form of cookies same session id which is created

So now if we do something then session id is compared with cookies id. If they both id match then user logged in.

Cookies always stored they are not temporary.

Session are temporary.

To maintain state.

So when we are using online shop so it is getting stored with cookies.

Rollno	name	Course
101	Modi	CN OS
102	Sonia	DBMS CO

101	Modi	CN
101	Modi	OS
102	Sonia	DBMS
102	Sonia	CO

2NF:-

$R(\overline{AB}, \overline{C}, \overline{D})$ $(AB)^+ = ABCD$
 $\overline{AB} \leftarrow CK$

$A, B \in$ prime attribute
 $C, D \in$ non prime attribute

$B \rightarrow C$ ← partial dependency

$R(\overline{A}, \overline{B}, \overline{C}, \overline{D})$ $(AB)^+ = ABCD$
 $\overline{AB} \leftarrow CK$

1) $AB \rightarrow C$
 2) $C \rightarrow D$

$A, B \in P$
 $C, D \in NP$