**Java and Spring Framework notes**

**Day 1 : 11/11/2020**

Java : Java is a pure object and platform independent programming language.

Initial name of the Java **Oak.**

Games Gosling and Team.

Sun Microsystem it is part Oracle.

Nov 1995 rename to Java.

Java

JavaSE JavaEE JavaME

JavaStandard Java Java

Edition Enterprise Micro

Edition Edition

Syntax

class className {

fields;

methods;

}

class Demo {

public static void main(String args[]) {

}

}

Naming Rules :

Class always follow Pascal naming rules

If class contains one world first letter upper case,

If it contains more than one world each world first letter upper rules.

­­

Demo

Employee

EmployeeDetails

JDK Java Development Kit

JRE Java Run time environment

To compile the program

**javac className.java**

To run the program

**java className**

Demo.java

class Demo {

public static void main(String args[]) {

System.out.println("Welcome to Java.....");

}

}

**Data Types**

2 types

1. Primitive data type : it is use to hold only value
   1. byte
   2. short
   3. int
   4. long without decimal
   5. float
   6. double

with decimal

* 1. char single char
  2. boolean true or false.

2. Non primitive data type or reference data types : it is use to hold value as well as another data.

a. array

b. class

c. interface

d. enum

**Demo.java**

class Demo {

public static void main(String args[]) {

int a=10;

System.out.println(a);

System.out.println("The value of a "+a);

}

}

Operator:

1. Arithmetic operator : +, -, \*, /, %
2. Logical operator : &&, ||, !
3. Relational Operator : >, >=, <, <=, ==, !=
4. Assignment operator : =
5. Increment and decrement operator : ++, --

Increment and Decrement operator

class Demo {

public static void main(String args[]) {

int a=10;

int b=a;

System.out.println(b);

b=a++; // a= a+1 post increment

System.out.println(b);

b=++a; // pre increment

System.out.println(b);

}

}

If statement

1. Simple if

if(condition) {

}

1. If else

if(condition) {

}else {

}

1. Nested if

if(condition) {

if(condition) {

}else {

}

}else {

if(codition) {

}

}

1. If else if

if(condition) {

}else if(condition) {

}else if(condition) {

}else {

}

Switch statement

Syntax

switch(varibleName) {

case lable1: block1;

break;

case lable2: block1;

break;

case lable3: block1;

break;

default : wrong choice

break;

}

switch, case, break and default are keywords.

variableName : int family, char or String

Looping

while loop

do while loop

for loop

For each loop and enhanced loop

Syntax

Initialization

i=0

n=10

while(i<=n) {

body of loop

System.out.println(i);

i++; or n--;

}

Loop example

class Demo {

public static void main(String args[]) {

/\*int i=1;

int n=10;

System.out.println("Using while loop");

while(i<=n) {

System.out.println(i);

i++;

}\*/

/\*

int i=1;

int n=10;

do {

System.out.println(i);

i++;

}while(i<=n);\*/

/\*

for(int i=0;i<=10;i++) {

System.out.println(i);

}\*/

}

}

array : array is collection of same data type values.

Syntax

datatype arrayName[];

int abc[];

for each or enhanced loop

syntax

for(datatype variableName : arrayName) {

}

Array with for loop

class Demo {

public static void main(String args[]) {

int abc[];

int num[]={100,200,300,400,500,45,67,34,23,56,78,90};

System.out.println(num[0]);

System.out.println(num[1]);

System.out.println("Using for loop");

for(int i=4;i<num.length;i++) {

System.out.println(num[i]);

}

System.out.println("Using for each loop");

for(int n:num) {

System.out.println(n);

}

}

}

Memory creation for array

datatype arrayname[]=new datatype[size];

int num[]=new int[10];

class Demo {

public static void main(String args[]) {

int num[]=new int[10];

System.out.println(num[0]);

System.out.println(num[9]);

num[0]=100;

num[1]=110;

System.out.println(num[0]);

System.out.println(num[1]);

}

}

class Demo {

public static void main(String args[]) {

int num1[]={1,2,3,4,5};

int num[]=new int[10];

System.out.println(num[0]);

System.out.println(num[9]);

num[0]=100;

num[1]=110;

System.out.println(num[0]);

System.out.println(num[1]);

}

}

In Java we can take the value through keyboards 4 ways

1. Using Scanner class
2. BufferedReader
3. DataInputStream
4. Command line interface

Scanner : Scanner is pre-defined class part of util package. Package is a collection of classes and interfaces.

Syntax to create scanner class object.

Scanner obj = new Scanner(System.in);

import java.util.Scanner;

class Demo {

public static void main(String args[]) {

Scanner obj = new Scanner(System.in);

System.out.println("Enter the id");

int n = obj.nextInt(); //pre-defined methods

System.out.println(n);

System.out.println("Enter the name");

String name= obj.next();

System.out.println(name);

/\*

nextByte();

nextShort()

nextInt();

nextLong();

nextDouble()

nextFloat()

nextBooean()

but nextChar() method

next() for String value

\*/

}

}

Taking array value through keyborads

import java.util.Scanner;

class Demo {

public static void main(String args[]) {

Scanner obj = new Scanner(System.in);

System.out.println("How many number do you want to store?");

int n = obj.nextInt();

int num[]=new int[n];

System.out.println("Enter the number one by one");

for(int i=0;i<num.length;i++) {

num[i]=obj.nextInt();

}

System.out.println("Number are ");

for(int i=0;i<n;i++) {

System.out.println(num[i]);

}

}

}

1. Through keywords receive Employee Id, Name, Salary

Then using Salary find HRA, DA and PF

HRA 10%

DA 5%

PF 7 %

Display Id, Name, and Salary(GrossSalary)

For 1 Employee

1. More than one Employee using array concept.

Id,Name,Salary,Designation

HRA 10%

DA 5%

PF 7 %

If Designation is Manager + Bonus = 5000

If Designation is Programmer + Bonus = 2000

Else = 1000

**Day 2 : 13/11/2020**

object : object is any real world entity.

Properties(state)-🡪 have 🡪 variables/fields

Name, color, h, w 🡪int,float,char,double,string

Person

Behaviour --🡪do/does -🡪 functions/methods

Teaching(), talking(), sleeping(), going()

Place

Bank

Animal

Name,wheel, price etc

Car

Start(), appliedGear(), moving(), stop()

Etc

class : class is a blue print of object or template of objects.

Class is a user-defined data type which help to create the objects.

Syntax to create the object

**ClassName objectReference = new ClassName();**

class Car {

int wheel;

float price;

String color;

void start() {

System.out.println("Car Start");

}

void appliedGear() {

}

void moving() {

}

void stop() {

System.out.println("Car Stop");

}

}

class App {

public static void main(String args[]) {

System.out.println("Main method");

//start();

Car bmw = new Car();

bmw.start();

bmw.stop();

}

}

**Type of variables or fields**

3 types

1. Instance variable
   1. The variable which declare outside a method including main method is known as instance variable.
   2. Instance variable hold default value according to their data types

int family –0

float family -0.0

char space white

boolean –false

String –null

* 1. Instance variable we can access within same class method but method must be non-static.

1. Local variable
   1. The variable which declare inside a method including main method is known a local variable.
   2. Local variable doesn’t hold default value we have to initialize.
   3. The scope of variable within that block where it declare.
2. Static variable

class Car {

int wheel;

float price;

String color;

void start() {

String msg="Welcome";

System.out.println("Car Start");

System.out.println("Wheel "+wheel);

System.out.println("Price "+price);

System.out.println("color "+color);

//System.out.println(msg);

}

void stop() {

int n=10;

System.out.println("Car Stop");

System.out.println("Wheel "+wheel);

System.out.println("Price "+price);

System.out.println("color "+color);

System.out.println(n);

}

}

class App {

public static void main(String args[]) {

System.out.println("Main method");

//start();

Car bmw = new Car();

bmw.start();

bmw.stop();

}

}

**Assignment**

Create two classes

Employee

id,name,salary -🡪instance variable

Scanner object (outside methods)

read() receive id,name,salary

calSalary()

local variable hra,df,pf

hra = 10%

da = 5%

pf = 7%

Gross Salary

display()

id,name,salary (grossSalary)

EmployeeTest

Main method

Create the object

Call read method using object

Then we have to call calSalary method

You have to call display methods

**Constructor :** Constructor is a type of special method which help to create the object.

Pts

1. Constructor have same name as class itself.
2. Constructor doesn’t contains return type not even void also.
3. Constructor no need to call it will call automatically when we create the object.

class Car {

Car() {

System.out.println("Object created...");

}

void carInfo() {

System.out.println("Car Details");

}

}

class App {

public static void main(String args[]) {

//Car innova = new Car();

//innova.carInfo();

}

}

Parameterized constructor

class Abc {

int a,b,sum;

Abc() {

a=10;

b=20;

}

Abc(int x, int y) {

a=x;

b=y;

}

void setValue(int x, int y) {

a=x;

b=y;

}

void add() {

sum = a+b;

}

void display(){

System.out.println("Sum = "+sum);

}

}

class App {

public static void main(String args[]) {

Abc obj1 = new Abc();

obj1.add();

obj1.display();

Abc obj2 = new Abc();

obj2.add();

obj2.display();

Abc obj3 = new Abc(1,2);

obj3.add();

obj3.display();

Abc obj4 = new Abc();

obj4.setValue(100,200); obj4.setValue(101,201); obj4.setValue(102,202);

obj4.add();

obj4.display();

}

}

**Encapsulation :**Binding or wrapping data(variable) and code(function/methods) in a single unit is known as encapsulation.

class :

class Employee {

private String name;

private float salary;

void setValue(String name, float salary) {

this.name = name;

if(salary<0) {

this.salary = 8000;

}else {

this.salary = salary;

}

}

void display() {

System.out.println("Name is "+name);

System.out.println("Salary is "+salary);

}

}

class App {

public static void main(String args[]) {

Employee emp = new Employee();

//emp.name= "Ravi";

//emp.salary = -20000;

emp.setValue("Ravi",-20000);

emp.display();

}

}

**Inheritance : Inheritance is use to inherit or acquire properties and behaviour of old class to new class.**

**class OldClass { super class, base class parent class**

**Fields;**

**Methods;**

**}**

**class NewClass extends OldClass {**

**fields; //sub class, child class, derived**

**methods;**

**}**

**class A {**

**void dis1() {**

**System.out.println("A class method");**

**}**

**}**

**class B extends A{**

**void dis2() {**

**System.out.println("B class method");**

**}**

**}**

**class App {**

**public static void main(String args[]) {**

**A obj1 = new A();**

**B obj2 = new B();**

**obj1.dis1();**

**obj2.dis2();**

**obj2.dis1();**

**}**

**}**

**Types of Inheritance**

1. **Single Inheritance**

**One super class and one sub class**

**class A {}**

**class B extends A{}**

1. **Multilevel inheritance**

**One super class and n number of sub classes connected one by one**

**class A {}**

**class B extends A{}**

**class C extends B {}**

**class D extends C {}**

1. **Hierarchical Inheritance**

**One super class and n number of sub classes connected directly to super class.**

**class A {}**

**class B extends A{}**

**class C extends A{}**

1. **Multiple inheritance**

**More than one super class and one sub class**

**class A{}**

**class B {}**

**class C extends A,B {} Java doesn’t support.**

**In java we can achieve multiple inheritance using interface.**

**OOPs Relationship**

1. **Manager is a Employee**
2. **Employee/Programmer/Manager has a Address**

**class Employee{**

**id,name,salary**

**Address add = new Address();**

**}**

**class Manager extends Employee{**

**}**

**class Programmer extends Employee{}**

**class Address{**

**city,state**

**}**

Employee

id,name,salary -🡪instance variable

Scanner object (outside methods)

read() receive id,name,salary

calSalary()

local variable hra,df,pf

hra = 10%

da = 5%

pf = 7%

Gross Salary

display()

id,name,salary (grossSalary)

Manager extends Employee

numberOfEmp of type int

readMgr()

disMgr()

Programmer extends Employee

projectName:string

readPrg()

disPrg()

EmployeeTest

Main method

Create Manager class object

Call read(), readMgr()

calSalary()

display()

disMgr()

Scanner obj = new Scanner(System.in);

String name = obj.next(); Raj Deep

String fname = obj.nextLine(); Raj Deep Kumar

String[] name;

String [] name;

String []name;

String name[];

**Day 3 : 18/11/2020**

**Polymorphism :** One name many forms or many implementation.

2 types

1. Compile time or static binding or early binding.

Method overloading

1. Run time or dynamic binding or late binding.

Method overriding

**Method Overloading :** The method have same name but different parameter list (number of parameter list or type of parameter list must be different).

Example

class Operation {

void add(int x, int y) {

System.out.println(x+y);

}

void add(int x, int y, int z) {

System.out.println(x+y+z);

}

void add(float x, float y) {

System.out.println(x+y);

}

void add(String x, String y) {

System.out.println(x+y);

}

}

class Demo {

public static void main(String args[]) {

Operation op = new Operation();

op.add(10,20);

op.add(1,2,3);

op.add("10","20");

op.add(10.10f,20.20f);

}

}

**Find area of triangle, rectangle, circle etc using method overloading concept.**

**Method Overriding :** The method have same name and same method signature( number of parameter list, type of parameter list and return type must be same).

If you want to achieve method overriding the class must be in the inheritance concept.

class Bike {

void speed() {

System.out.println("60km/hr");

}

}

class Pulsar extends Bike {

void speed() {

System.out.println("90km/hr");

}

void color() {

System.out.println("White");

}

}

class Honda extends Bike {

void color() {

System.out.println("Red");

}

}

class Demo {

public static void main(String args[]) {

Pulsar pu = new Pulsar(); pu.color(); pu.speed();

Honda hh = new Honda(); hh.color(); hh.speed();

}

}

**Method overriding with super keyword for variable and methods**

class Bike {

int n=10;

void speed() {

System.out.println("60km/hr");

}

}

class Pulsar extends Bike {

void speed() { //overriding

System.out.println("90km/hr");

}

void color() {

System.out.println("White");

}

}

class Honda extends Bike {

void color() {

System.out.println("Red");

}

}

class Tvs extends Bike {

int n=20;

void color() {

System.out.println("Gray");

}

void speed() {

int n=30;

super.speed(); // merge the code , calling super class method

System.out.println("10km/hr");

System.out.println("n "+n);

System.out.println("n "+this.n);

System.out.println("n "+super.n);

}

}

class Demo {

public static void main(String args[]) {

Pulsar pu = new Pulsar(); pu.color(); pu.speed();

Honda hh = new Honda(); hh.color(); hh.speed();

Tvs tv = new Tvs(); tv.color(); tv.speed();

}

}

**abstract, static and final**

**abstract**

1. abstract is a keyword we can use with method and class but not with variable.
2. Abstract method : The method without body or without curly braces or incomplete method.

Syntax

abstract returnType methdoName(parameterList);

1. Abstract class : If class contains one or more abstract method then we have to declare the class as abstract class.

Syntax

abstract class className {

}

4 whichever class extends abstract class that class must be provide the body for all abstract method mandatory. Only that class can ignore if that class itself is a abstract class.

1. Abstract class we can’t create the object.
2. Abstract class can contains zero or 1 or many abstract methods.
3. Abstract class can contains default as well as paratermized constructor.

Abstract method code

abstract class Bike {

int n=10;

abstract void speed();

}

abstract class Pulsar extends Bike {

abstract void mailage();

void color() {

System.out.println("White");

}

}

class SuperPulsar extends Pulsar {

void speed(){

System.out.println("120km/hr");

}

void mailage(){

System.out.println("30/l");

}

}

class Demo {

public static void main(String args[]) {

//Pulsar pu = new Pulsar(); pu.color(); pu.speed();

SuperPulsar sp = new SuperPulsar();

sp.mailage();

sp.color();

sp.speed();

}

}

Final keyword

1. Final keyword we can use with variable, method and class
2. Final variable : to declare constant value in java we use final

Syntax

final int A=10;

1. Final method : if method is final we can’t override that method.
2. Final class : if class is final we can’t extends that class.

Final and abstract we can’t use together.

Final example

final class Bike {

int n=10;

final void speed() {

System.out.println("60km/hr");

}

}

/\*class Pulsar extends Bike {

void speed() {

System.out.println("90km/hr");

}

}

\*/

class Demo {

public static void main(String args[]) {

final int A=10;

System.out.println(A);

//A=20;

System.out.println(A);

//Pulsar pu = new Pulsar();

//pu.speed();

Bike bb = new Bike();

bb.speed();

}

}

static :

1. Static keyword we can use with variable and method but not with class(inner class or nested class if class is inner class or nested class then we can use static keywords).
2. Static method : If method is a static we can call that method with the help of className as well object of that class.
3. Static variable : If variable is a static we can assign the value for that variable with the help of className as well as object of that class.
4. Inside a non static method we can access static as well as non static variable directly of same class. But inside static method we can access only static variable directly.

class Abc {

int a;

static int b;

void dis1() {

System.out.println("non static method");

System.out.println("a "+a);

System.out.println("b "+b);

}

static void dis2() {

System.out.println("static method");

Abc obj = new Abc();

System.out.println("a "+obj.a);

System.out.println("b "+b);

}

}

class Demo {

public static void main(String args[]) {

Abc obj1 = new Abc();

obj1.dis1();

Abc.dis2();

obj1.dis2();

obj1.a=10;

Abc.b=20;

obj1.b=30;

}

}

class Abc {

int a;

static int b;

void dis1() {

System.out.println("non static method");

System.out.println("a "+a);

System.out.println("b "+b);

}

static void dis2() {

System.out.println("static method "+b);

}

}

class Demo {

public static void main(String args[]) {

//Abc.dis2();

Abc obj1 = new Abc();

Abc obj2 = new Abc();

obj1.a=10;

obj1.b=20;

Abc.b=30;

obj2.a=40;

obj2.b=50;

Abc.b=60;

obj1.dis1(); //a=10 , b=60

obj2.dis1(); //a= 40, b=60

}

}

**Day 4 : 25/11/2020**

**Interface :**

Interface is 100% pure abstract class. It is a type of reference data type.

Syntax

Interface interfaceName {

fields;

methods;

}

By default all fields in interface are public static and final.

By default all methods in interface are public and abstract.

interface Abc {

public static final int A=10;

public abstract void dis1();

}

interface Xyz {

int B=20;

void dis2();

}

interface Mno extends Abc,Xyz{

int C=30;

void dis3();

}

class Demo implements Abc, Xyz {

}

Class extends class : only one

Interface extends interface : more than one

Class implements interface : more than one

Interface doesn’t extends or implements to class

Method override with access specifiers

**Super class / interface Sub**

public public

protected public

protected

default public

protected

default(nothing)

private we can’t override

Interface example

interface Abc {

public static final int A=10;

public abstract void dis1();

}

interface Xyz {

int B=20;

void dis2();

}

interface Mno extends Abc,Xyz{

int C=30;

void dis3();

}

class Demo implements Abc, Xyz {

public void dis1() {

System.out.println("Abc interface method");

}

public void dis2() {

System.out.println("xyz interface method");

}

}

class InterfaceDemo {

public static void main(String args[]) {

Demo obj = new Demo();

obj.dis1();

obj.dis2();

}

}

**Exception Handling**

Exception is a object which occurs when unexpected or abnormal condition during the execution of a program.

Java

javac java

compiler interpreter

compile time error run time error

syntax error

run time error

Error Exception

Both are pre-defined classes part of lang package.

Error : Error is a type of error which generated at the run time which we can’t handle it. Ex : JVM crash.

Exception : Exception is a type of error which we can handle it. Ex : ArithmeticException divided by 0.

Exception

Checked exception unchecked exception

RuntimeException

ArithmeticException

ArrayIndexOutOfBoundsException

NullPointerException

Etc

SQLException

IOException

Etc

Java provide 5 keywords

try

catch

finally

throw

throws

try and catch block

try {

}catch(Exception e) {

}

Exception Example

class ExpDemo {

public static void main(String args[]) {

System.out.println("Welcome to Java");

int a=10;

int b=0;

try{

int res = a/b;

System.out.println("Result is "+res);

}catch(Exception e){

//System.out.println("I Take Care!");

//System.out.println(e.toString());

e.printStackTrace();

}

System.out.println("Bye...");

System.out.println("Bye...");

System.out.println("Bye...");

}

}

class ExpDemo {

public static void main(String args[]) {

System.out.println("Welcome to Java");

int a=10;

int b=1;

int abc[]={10,20,30};

try{

int res = a/b;

System.out.println("Result is "+res);

int res1 = 10/abc[5];

}catch(Exception e){

//System.out.println("I Take Care!");

//System.out.println(e.toString());

e.printStackTrace();

}

System.out.println("Bye...");

System.out.println("Bye...");

System.out.println("Bye...");

}

}

Try with multiple catch block

try{

}catch(ArithmeticException e) {

}catch(ArrayIndexOutOfBoundsException e) {

}

Try block : the code one line or multiple line which generate exception we have to write inside try block.

Catch block : it execute only if any exception generate.

finally block : this block will execute 100% sure if any exception generate or not.

File handling or database using JDBC

Open file

Read/write

Close file

Try{

Open connection

Do operation on database

}catch(Exception e) {

}finally {

Close connection

}

Finally block is use to close the resource

class ExpDemo {

public static void main(String args[]) {

try{

int res = 10/1;

System.out.println("No Exception");

}catch(Exception e){

System.out.println("Catch block");

}

finally {

System.out.println("finally block");

}

System.out.println("Normal Statement");

}

}

try – catch

try – catch –catch – catch

try – catch – finally

try – catch – catch – catch – finally

try – finally

class ExpDemo {

public static void main(String args[]) {

try{

int res = 10/0;

System.out.println("No Exception");

}

finally {

System.out.println("finally block");

}

System.out.println("Normal Statement");

}

}

**throw:** throw keyword is use to generate or raise pre-defined or user-defined (custom) exception depending upon the conditions.

Syntax

throw new Exception()

or

throw new ExceptionSubClass()

class AgeException extends Exception {

AgeException() {}

AgeException(String msg) {

super(msg);

}

}

class ExpDemo {

public static void main(String args[]) {

int age = 25;

try{

if(age<21) {

//throw new Exception();

//throw new ArithmeticException();

//throw new ArithmeticException("age is < 21");

//throw new AgeException();

throw new AgeException("age is < 21");

}else {

System.out.println("You Can Vote...");

}

}catch(Exception e) {

System.out.println(e.toString());

}

System.out.println("Normal Statement");

}

}

Throws : throws keyword is with method signature.

Syntax

returnType methodName() throws Exception, ExceptionSubClass {

}

class ExpDemo {

static void dis1() throws Exception{

//try{

int a=10/0;

//}catch(Exception e){}

System.out.println("dis1()");

}

static void dis2() throws Exception{

//try{

dis1();

//}catch(Exception e){}

System.out.println("dis2()");

}

public static void main(String args[]) throws Exception{

//try{

dis2();

//}catch(Exception e){}

System.out.println("main method");

}

}

Checked exception example

class ExpDemo {

public static void main(String args[]) {

System.out.println("Hello, Welcome to Java Training");

try{

Thread.sleep(5000);

}catch(Exception e){}

System.out.println("We will continue in next session...");

}

}

**Day 5 : 27/11/2020**

**Package : package is a collection of classes and interfaces.**

**2 types**

1. **User-defined packages**
2. **Pre-defined package.**

**Education**

**School college**

**Attendance Attendance**

**Date : util**

**Date : sql**

**Syntax to create the package**

**package com;**

**pre-defined package or built-in package**

**pre-defined packages**

**java javax : root package**

**lang swing**

**io sql**

**util net**

**awt servlet**

**net ejb**

**sql jms**

**etc etc**

**By default every java program import lang package.**

**Without import lang package we can use all classes and interfaces belong that package.**

**String and System : part of language**

**Exception handling as well as Multithreading Thread class are part of lang package.**

**By default every java program extends Object class. It is a part of lang package.**

**Object is super class for every java program.**

**SUPER API (Application Programming Interface).**

**Access specifiers : four types**

**private : instance variable, static variable, non static method, static method, constructor but we can’t use with local variable and class.**

**Scope : We can access within a class.**

**default (nothing): We can use with all.**

**Scope : within a same package.**

**protected : instance variable, static variable, non static method, static method, constructor but we can’t use with local variable and class.**

**Scope : within a same package other package if it is a sub class.**

**public : instance variable, static variable, non static method, static method, constructor, public but we can’t use with local variable.**

**(in one editor or notepad we can use only one class as public).**

**Every where. (same package as well as other package).**

**IDE : netbean, eclipse , my eclipse,**

**Download the Eclipse for Enterprise JEE**

**More than employee**

**int n = obj.nextInt();**

**int empId[]=new int[n];**

**String name[]=new String[n];**

**float salary[]=new float[n];**

**Structure :**

**class Employee {**

**id,name,salary**

**}**

**Employee emp = new Employee();**

**emp.id=100;**

**emp.name=”Ravi”;**

**emp.salary = 12000;**

**Array objects**

**Syntax**

**className refName[]=new className[size];**

**Employee emps[]=new Employee[100];**

**emps[0]=new Employee();**

**emps[0].id=100;**

**emps[0].name=”Ravi”;**

**emps[0].salary=24000;**

**Normal java class Vs JavaBean class**

1. **Class may be public or may not.**
2. **All property may be default or private not.**
3. **If property are private we have to provide setMethod to set the value. The method name may anything.**

**JavaBean class**

1. **Class must be public**
2. **All property must be private.**
3. **For every variable we have to provide setter and getter method.**
4. **The setter method name must be start with set followed by variableName. Which help to set the value.**
5. **The getter method name must be start with get followed by variableName. Which help to get the value.**
6. **Both method access specifiers are public.**

**JavaBean class is known as pure encapsulation class.**

**Annotation : it is meta-data. Data about data.**

**Java provided lot of pre-defined annotation and all annotation start with @ followed by name of the annotation.**

**@Override : This annotation we can write on method level if method override**

**Day 6 : 02/12/2020**

**Collection Framework (Like a Data Structure in C/C++).**

**int a;**

**array**

**int abc[];**

**Structure :**

**class Employee {**

**id,name,salary**

**}**

**Employee emp = new employee();**

**Array object**

**Employee emps[]=new Employee[100];**

**emps[0]=new Employee();**

**emps[99]=new Employee();**

**Collection framework contains set of classes and interfaces which help to store the collection of object or elements of any type (primitive (Wrapper) or user-defined objects).**

**Collection provide set of pre-defined methods so we can add, remove, search, iterate element or object very easily.**

**Collection Framework Hierarchy**

**Collection framework is part of util package.**

**Collection 🡪 interface**

**Extends extends extends but map doesn’t extends**

**Set List Queue Map -**🡪**interfaces**

**HashSet Stack PriorityQueue HashMap**

**LinkedHash ArrayList LinkedHashMap**

**TreeSet LinkedList TreeMap**

**Vector Hashtable**

**Set : In set we can hold collection of elements. Set doesn’t allow duplicate element. Some elements in Set order, Unorder or sorted.**

**List : It maintain the order using index position. List allow duplicate elements.**

**Queue : First In First Out.**

**Map : It is use to store key-value pairs. Where key is unique and value may be duplicate.**

**Primitive Wrapper classes**

**byte Byte**

**short Short**

**int Integer**

**long Long**

**float Float**

**double Double**

**char Character**

**boolean Boolean**

**Wrapper classes is use to convert primitive to object and vice-versa.**

**int a=10;**

**Integer b = new Integer(a);**

**int c = b.intValue();**

**float d = b.floatValue();**

Auto-boxing : Converting primitive to object.

All three classes doesn’t allow duplicate elements.

HashSet : display the elements unorder.

LinkedHashSet : This class internally extends HashSet. Maintain the order.

TreeSet : TreeSet internally implements SortedSet interface. So display the elements in asc order by default.

It provide extra methods like headset, tailset, subset()

List : It allow duplicate

Stack : First In Last Out

**ArrayList** :

Normal Array :

LinkedList :

Node

By default LinkedList class internally follow double linkedlist concept.

Null 🡨-- Ref ----10 ----🡪 Null

Null 🡨-- Ref ----10 <--🡪 Ref <---20--🡪Null

LinkedList is good if we do more Insertion or Delete operation

Arraylist is good if we retrieve elements again and again.

Vector : it is know as legacy class(old class). By default all methods in Vector are synchronized.

Queue : First In First Out

PriorityQueue : First In First Out base upon the priority (ie lesser number).

**Map :** key-value pairs . key is unique and value may be duplicate.

HashMap : display the elements unorder

LinkedHashMap : maintain the order (which order we inserted)

TreeMap : sorted by default as key in ascending order

Hashtable : it is legacy class (old class). By default all methods are synchronized.

Retrieve the elements from Collection

1. For each loop
2. Iterator
3. ListIterator
4. Enumberation : Legacy Iterator. With Vector.

**Day 7 : 04/12/2020**

Collection framework with generics.

CollectionClas<Type> obj =new CollectionClass<Type>();

Type may be Wrapper classes (Integer, Float), String class or user-defined class.

Collection Framework with Complex objects.

Product

ProductService

ProductMainClass

do {

1: Add , 2:Delete, 3, Update, 4, display

5: display by Id

switch() {

case 1 : Add Product, id must be unique

case 2 :Delete product using id

case 3 : update price using id

case 4 : displayAll product

case 5: display Product details using id

case 6: Display Price Asc

case 7: Display Price Desc

}

Do you want to continue

}while()

**Arrays and Collections**

Arrays and Collections are pre-defined class part of until package. Which contains set of static method which help to operation of primitive array and collection classes respectively

**Comparable and Comparator**

Both are interfaces.

Comparable is a part of lang

By default all wrapper classes implements Comparable interfaces.

**Comparator** is a part of util

Classes and interfaces details

javap java.packageName.className/interfaceName

**Comparator**

WE have to make separate class which implements comparator interface and override compare method which takes 2 object parameter.

And

In Collection.sort(listRef,classObjectWhichImplementsComaprator)

**Day 8 : 09/11/2020**

**Java 8 Features**

Collection Framework with Stream API

1. Interface can contains method with body but the method must be default or static.

**Default and static method**

interface A {

void dis1();

default void dis2() {

System.out.println("A interface default impl - dis2");

}

default void dis3() {

System.out.println("A interface default impl - dis3");

}

static void dis4() {

System.out.println("A interface Static method");

}

}

class B implements A {

public void dis1() {

System.out.println("dis1() method impl");

}

public void dis3() {

System.out.println("dis3() method impl");

}

}

class InterfaceDemo1 {

public static void main(String args[]) {

B obj1 = new B();

obj1.dis1();

obj1.dis2();

obj1.dis3();

//obj1.dis4();

A.dis4(); //static method we can't override and we have to call through interfaceName

}

}

**Functional interface**

1. The interface contains only one method ie abstract method. It can contains more than one default as well as static method but only one abstract method.

To verify that interface is functional interface or not Java8 provide @FunctionalInterface annotation.

@FunctionalInterface

interface A {

void dis1();

default void dis2() {

System.out.println("A interface default impl - dis2");

}

default void dis3() {

System.out.println("A interface default impl - dis3");

}

static void dis4() {

System.out.println("A interface Static method");

}

}

class InterfaceDemo1 {

public static void main(String args[]) {

}

}

**Inner classes**

Class within another class is known as Inner class.

1. Non static inner class
2. Static inner class
3. Anonymous inner class
4. Local class

Non Static inner class

class Outer {

int a;

void dis1() {

System.out.println("dis1() outer class method");

Inner in =new Inner();

in.dis2();

}

class Inner {

int b;

void dis2() {

System.out.println("dis2() inter class method");

}

}

}

class InnerClassDemo {

public static void main(String args[]) {

Outer out = new Outer();

out.dis1();

Outer.Inner in = out.new Inner();

in.dis2();

Outer.Inner in1 = new Outer().new Inner();

in1.dis2();

}

}

Static inner class

class Outer {

int a;

void dis1() {

System.out.println("dis1() outer class method");

}

static class Inner {

int b;

void dis2() {

System.out.println("dis2() inter class method");

}

}

}

class InnerClassDemo {

public static void main(String args[]) {

Outer.Inner in1 = new Outer.Inner(); //syntax to create static inner class object

in1.dis2();

}

}

AWT and Swing or Android

**Runtime polymorphism**

interface A {

void dis1();

}

class B implements A {

public void dis1() {

System.out.println("dis1() method override");

}

public void dis2() {

System.out.println("its own method");

}

}

class InnerClassDemo {

public static void main(String args[]) {

A obj1 = new B(); // creating the object of sub class and reference of super interface/class. Runtime polymorphism

obj1.dis1(); // with the help of A reference we can call only those method which belongs to

//obj1.dis2(); // A interface or overrided methods.

}

}

**Lambda Expression**

**Up Java7 Java is Procedure and Object Oriented Programming language.**

**But from Java8 onwards Java become functional programming language.**

**From Java8 onwards we can write nested method using Lambda expression like a JavaScript.**

**Lambda expression is anonymous function.**

**Syntax**

**If you want to use the lambda expression. The interface must be functional interface.**

**interfaceName referecName = ()-> statement.**

@FunctionalInterface

interface A {

void dis1();

}

class B implements A {

public void dis1() {

System.out.println("dis1() method override");

}

}

class InnerClassDemo {

public static void main(String args[]) {

A obj1 = new B();

obj1.dis1();

A obj2 = new A(){

public void dis1() {

System.out.println("A interface method override by anonymous class");

}

};

obj2.dis1();

A obj3 = ()->System.out.println("Provided body using Lambda Expression...");

obj3.dis1();

}

}

Stream API **: Lambda Expression and Collection Framework**

Date API

**Day 9 : 11/12/2020**

Stream API :

Collection Framework is like a Data Structure. A collection is an in-memory data structure to hold value(primitive or user-defined objects) and before we start using collections. All the values been populated.

Java Stream doesn’t store data. It operate on the source(collection) data structure and produce pipelined data that can be use and perform any specific operation on demand.

Stream : Flow of data. It abstraction between source and destination.

Array/Collection -🡪Source(Stream)----🡪 Op1-🡪Op2🡪Op3-🡪Opn---🡪 Destination (terminator operator)

Op 🡪 Intermediate operator it return stream reference.

Destination 🡪 It return non stream reference or any primitive value.

Top core functional interface.

java.util.function.\*;

4 interfaces

1. Predicate : test(T) takes T parameter and return Boolean value.
2. Function : apply(T) takes T parameter and return R.
3. Supplier : get() no parameter but return T value.
4. Consumer : accept(T) take T parameter but no return type.

**Comparator using Java8 Steam API with lambda Expression.**

**Date API in Java8**

**Before Java8 if we can to do any date operation**

**Date : util (Basic Methods).**

**Calendar class : util (more methods)**

**Convert custom date format**

**SimpleDateFormat : text package.**

**Date class is mutable class. (We can change the date).**

**Employee javaBean**

**Id,name,salary,dob, doj**

**Setter and getter methods.**

**Java 8**

**All date related classes are part of time package.**

**All those classes are immutable classes.**

**Day 10 : 14/12/2020**

**Multi threading :**

**Multi tasking .**

**Program : Set of instruction to perform a specific task.**

**Process : Time taken to execute the code.**

**Processor : Processor is responsible to execute the code.**

**Thread : Thread is small execution of a code within a process.**

**Thread also known as light weighted process. Process more resource of your machine. Thread take less resource of your machine. Inside a process always one or more than one thread will execute.**

**By default every java program depends upon the thread.**

**C and C++ are process based programming language.**

**Where is Java is thread base programming language.**

**All multithreading API are part of lang package.**

**If we can to check default thread which run inside a every java program main method.**

**currenThread() is a pre-defined method part of Thread class. Thread class is a part or lang package.**

**Thread.currentThread(); This method return type is Thread class reference.**

**Thread t = Thread.currentThread();**

**t 🡪 Thread[main,5,main]**

**main🡪 by default name of the thread is main.**

**5🡪 default priority of the thread is 5**

**main🡪 group of the thread is main**

MIN\_PRIORITY🡪1

MAX\_PRIORITY->10

NORM\_PRIORITY->5

In between 1 to 10

Default thread example

class Demo {

public static void main(String args[]) {

Thread t = Thread.currentThread();

System.out.println(t);

String name = t.getName();

int i = t.getPriority();

System.out.println(name);

System.out.println(i);

t.setName("My Thread");

System.out.println(t);

t.setPriority(2);

System.out.println(t);

t.setPriority(Thread.MAX\_PRIORITY);

System.out.println(t);

}

}

**Multitasking :**

Using process base

Using thread base

T1 t2 t3

Multitasking using process base is slower than multi tasking using thread base.

In Java we can create more than one thread using 2 ways

1. Extends Thread class
2. Implements Runnable interface

Both API part of lang package.

Extends Thread class

1. Create user-defined class and extends Thread class.
2. Create the reference of thread class.
3. With the help of that reference class start() method.
4. Start() method internally call run() method which is part of Thread class.
5. If you want any custom logic so we have to override run() method.

**Using Thread class**

class A extends Thread{

@Override

public void run() {

for(int i=0;i<10;i++) {

System.out.println("i="+i);

}

}

}

class B extends Thread{

@Override

public void run() {

for(int j=0;j<10;j++) {

System.out.println("j="+j);

}

}

}

class Demo {

public static void main(String args[]) {

A obj1 = new A();

B obj2 = new B(); // obj1 and obj2 are thread class reference.

obj1.start();

obj2.start(); // Runnable state : means ready to run.

}

}

**Using Runnable interface**

1. Create user-defined class and implements Runnable interface.
2. Runnable is a interface which contains one abstract method.

class A implements Runnable{

@Override

public void run() {

for(int i=0;i<10;i++) {

System.out.println("i="+i);

}

}

}

class B implements Runnable{

@Override

public void run() {

for(int j=0;j<10;j++) {

System.out.println("j="+j);

}

}

}

class Demo {

public static void main(String args[]) {

A obj1 = new A();

B obj2 = new B();

Thread t1 = new Thread(obj1); //Thread class take Runnable interface reference as a parameter.

Thread t2 = new Thread(obj2);

//t1 and t2 are thread class reference.

t1.start();

t2.start(); // Runnable state : means ready to run.

}

}

Thread life cycle

Create the Thread Runnable Running Destroy

obj1 --🡪 obj1.start() inside run() i=10,j=10

t1 --🡪 t1.start() inside run(),i=10,j=10

sleep()

isAlive()

wait()

notify()

notifyAll()

class A implements Runnable{

@Override

public void run() {

Thread t = Thread.currentThread();

String name = t.getName();

for(int i=0;i<10;i++) {

System.out.println(name+"="+i);

try{

Thread.sleep(1000);

}catch(Exception e){}

}

}

}

class B implements Runnable{

@Override

public void run() {

Thread t = Thread.currentThread();

String name = t.getName();

for(int j=0;j<10;j++) {

System.out.println(name+"="+j);

try{

Thread.sleep(500);

}catch(Exception e){}

}

}

}

class Demo {

public static void main(String args[]) {

A obj1 = new A();

B obj2 = new B();

Thread t1 = new Thread(obj1); //Thread class take Runnable interface reference as a parameter.

Thread t2 = new Thread(obj2);

t1.setName("1st Thread");

t2.setName("2nd Thread"); //t1 and t2 are thread class reference.

System.out.println("Thread1 "+t1.isAlive());

System.out.println("Thread2 "+t2.isAlive());

t1.start();

t2.start(); // Runnable state : means ready to run.

System.out.println("Thread1 "+t1.isAlive());

System.out.println("Thread2 "+t2.isAlive());

}

}

**Multithreading program with Wrong output**

class Booking implements Runnable{

int avl=1;

@Override

public void run() {

Thread t = Thread.currentThread();

String name = t.getName();

if(avl>0) {

System.out.println(name+" got the ticket");

avl=avl-1;

}else {

System.out.println(name+"Sorry, no ticket");

}

}

}

class Demo {

public static void main(String args[]) {

Booking b1 = new Booking(); //avl=1

//Booking b2 = new Booking(); //avl=1

//Booking b3 = new Booking(); //avl=1

Thread t1 = new Thread(b1);

Thread t2 = new Thread(b1);

Thread t3 = new Thread(b1);

t1.setName("Ravi");

t2.setName("Ajay");

t3.setName("Vijay");

t1.start();

t2.start();

t3.start();

}

}

Synchronization : It is use to block or lock the thread. Synchronization is a concept which help to use all resource for only one thread at time.

To achieve synchronization in java we have to use

synchronized keyword with method or block

class Booking implements Runnable{

int avl=1;

@Override

public synchronized void run() {

Thread t = Thread.currentThread();

String name = t.getName();

if(avl>0) {

System.out.println(name+" got the ticket");

avl=avl-1;

}else {

System.out.println(name+"Sorry, no ticket");

}

}

}

class Demo {

public static void main(String args[]) {

Booking b1 = new Booking(); //avl=1

//Booking b2 = new Booking(); //avl=1

//Booking b3 = new Booking(); //avl=1

Thread t1 = new Thread(b1);

Thread t2 = new Thread(b1);

Thread t3 = new Thread(b1);

t1.setName("Ravi");

t2.setName("Ajay");

t3.setName("Vijay");

t1.start();

t2.start();

t3.start();

}

}

Wait(), notify() and notifyAll()

Wait() : this method is use to make the thread to wait()

Notify() this method is use to notify() waited thread.

If more than one thread are waiting state. We call only thread is ready to run.

But if we want to start all thread then we have to call notifyAll().

Consumer and Producer :

Con proc (wait)

Do task

Wait(notify

To producer)

Points.

1. Wait(), notify() and notifyAll() all three method are part of Object class.
2. We have to create more than one thread in same memory.
3. The methods must in synchronized.

**Inter thread communication.**

class Abc implements Runnable{

@Override

public synchronized void run() {

Thread t = Thread.currentThread();

String name = t.getName();

for(int i=0;i<10;i++) {

try{

Thread.sleep(500);

if(name.equals("Ravi") && i==5) {

wait();

}

if(name.equals("Vijay") && i==6) {

wait();

notify();

}

System.out.println(name+" "+i);

}catch(Exception e){}

}

}

}

class Demo {

public static void main(String args[]) {

Abc b1 = new Abc();

Thread t1 = new Thread(b1);

Thread t2 = new Thread(b1);

Thread t3 = new Thread(b1);

t1.setName("Ravi");

t2.setName("Ajay");

t3.setName("Vijay");

t1.start();

t2.start();

t3.start();

}

}

Dead lock : One synchronized block or method trying to call another synchronized block or method and that block calling first synchronized block or methods. That time Dead lock occurs.

**Day 11 : 16/12/2020**

**JDBC :** JDBC is Java Database Connectivity or JDBC is API(Application Programming interfaces). Which provide set of classes and interfaces which help to connect the database (oracle, mysql, db2, sql server etc). With the help of JDBC we can do CRUD Operation through Java technologies. CRUD (Create, Read, Update and Delete).

**Oracle :**

Oracle : eXpress Edition

Enterprise Edition

MySQL or db2

**Create database mydb;**

**Use mydb;**

**Show tables**

**Show databases**

In Oracle database the login name itself is a database.

User :**scott**

Password : **tiger**

**Select \* from tab; :** It is a pre-defined table which help to display all user-defined as well as pre-defined table present in that account.

**Steps to connect the database through JDBC**

1. **Import the package.**

**sql**

**java and javax.**

1. **Write a method (main method or user-defined) with exception handling concept ie try-catch or throws.**
2. **Load the driver : Driver is a pre-defined class provided by vendor whose database going to connect through Java technologies.**

**There are totally 4 types**

* 1. **Type 1 : JDBC ODBC Bridge Driver : from java8 onward type1 is deprecated.**
  2. **Type 2 : JDBC Native API Driver**
  3. **Type 3 : JDBC net protocol driver**
  4. **Type 4 : JDBC pure or thing driver.**

Class.forName(“driverName”);

Class is pre-defined class. Name itself is a Class. Which contains forName() static method.

Type4 drivername for oracle database is

oracle.jdbc.driver.OracleDriver

**type 4 driver for oracle database**

**ojdbc6.jar**

1. **Establish the connection : getConnection() is a pre-defined method part of DriverManager class. Which takes three parameter first url, second one username, third one password. getConnection() method return type is Connection interface reference.**

**url :** jdbc:oracle:thin:@localhost:1521/orcl

1. **Create type of statement.** 
   1. **Statement : Statement stmt = con.createStatement();**
   2. **PreparedStatement**
   3. **CallableStatement**

**Statement provide set of method which help to do operation on any specific like insert, delete, update and retrieve.**

1. **Operation** 
   1. **DML : Insert/Delete/Update**

**int result = stmt.executeUpdate(“DML Query”);**

**for Insert return 1 or exception.**

**Delete or Update : zero :Condition doesn’t satisfy then more than one 1 successfully executed.**

* 1. **Select Query**

**ResultSet rs = stmt.executeQuery(“select clause”);**

**rs.next(); scan first record**

**int id = rs.getInt(1)**

**or**

**int id = rs.getInt(“id”)**

**or**

**if(rs.next() {**

**int id = rs.getInt(1);**

**}**

**Or**

**while(rs.next() {**

**int id = rs.getInt(1);**

**}**

1. Close all resource properly.

stmt.close();

con.close();

PreparedStatement : This interface support parameterized query concept. Which help to pass the value for any query at run time.

If we are executing same query again and again if we use statement reference query will compile on java side, send to database, execute in database and get the acknowledgement(success or failure) on java side. This steps repeat again and again.

If we are executing same query again and again if we use preparedstatement reference query will compile on java side only once, send to database, execute in database and get the acknowledgement(success or failure) on java side. This steps repeat again and again. So prepared Statement internally improve the performance.

Callable Statement is used to call the StoredProcedure or function of PL SQL.

Collection Framework

Using JDBC

EmployeeTest : main method

do {

1: add

2: delete

3: update

4: retrieve

5: retrieve by id

}while()

Employee : JavaBean

EmployeeDao : (Data Access Object )

insertRecord

deleteRecord

udpateRecord

retrieveAll

retrieveById

**Day 12 : 18/12/2020**

Design Pattern :Best practise.

DAO : Data Access Object : Inside this class we have to write pure JDBC code.

DTO : Data Transfer Object . This class also known as Java Bean or Entity class. Which help to pass the value or values from one class to another class.

Insert and Retrieve Using Design pattern.

Database Java side

Table JavaBean class

Entity class or DTO class

Table 🡪Class name

Column names 🡪 attribute name

Service Layer : Pure business logic.

Business logic and database logic in one class.

Resource layer : providing resource for our application.

Resource layer may using

Java class

Using XML file

Using properties file

Core Java : J2SE :

**Git :**

Git is a one type of Version Control System.

Version control system that records changes on files or files in a projects.

3 Version Control tool

1. Local Version Control : RCS : Revision Control System.
2. Centralized Version Control : Client and Service architecture. SVN is a type of Centralized version control.
3. Distributed Version Control : git

In Centralized version control there is no local repository concept.

But in Distributed Version Control it contains local repository as well as remote repository.

Git is a open source tool.

Git is distributed version control system keeps track of software version or files. And allow many developers to work on given project within a common network.

Git is base upon the Unix commands.

Git Vs Github

Git local Remote

It is command Web Base

As well as

GUI base

Local Repository Remote repository

Remote repository may be git hub, AWS, Azure etc.

git init: is command to make local repository

To check .git folder

You can write command as

ls -a

git status : This command is use to check the local repository status

Default branch name is main (master)

Local repository

Working Directory Staging Area git repository

OS file system local repo

To move untraced file to staging area

git add filename

**Staging area :** it is a simple generally present in git directory, that store information about what will go the next before commit.

Move the file from staging area to local repository.

Rollback from staging area to working directory

git restore –-staged filename

The difference between staged and unstaged

git diff

**Git branch**

By default main (master) created in git.

Branch is a pointer which will keep the track about your file changes.

Command to create the branch

**git branch branchName**

Move to user defined branch

git checkout branchName

display all the branch

git branch

Another command which help to create the branch as well as switch to that branch

git checkout –b branchName

Delete the local branch

git branch –D branchName

**git merge branchName**

This command is use to merge user-defined branch contents to current branch contents.

**Day 13 : 21/12/2020**

Remote repository

Git hub

AWZ : code commit

Azure :

Maven : I will start before Spring Framework.

**jUnit :**

**Testing :** Testing is use to find the error or defect or bugs in application.

Any Program

Input

Process

Output

Testing 2 types

Black box testing :

Input

Output

White box testing :

Input

Process

Output

Unit : unit means may be function, method, module, procedure or class.

Unit testing is a type of white box testing.

jUnit : jUnit is a small framework provided by third party vendor which help to do the unit testing on java classes.

jUnit is open source. jUnit provided set of jar files which help to do the testing on java programs.

**Day 14 : 23/12/2020**

Web Application

Core Java or JSE : Java standard edition

Basic Programming

OOPs

Exception Handling

Multi threading

Packages

lang, io,util, awt, swing, net,sql etc

awt

swing

GUI JDBC Oracle /MySQL

Standalone or Desktop Application

Limitation of Desktop Application

1. To run that application in every machine that software or runtime environment must be present.
2. This type of application is known as single user application.
3. If you want to do any changes every machine we have to update.

Web Application :J2EE or JEE

Java Enterprise Edition.

<https://www.google.com> URL

req(http/https)-🡪

Client Server

🡨---res(http/https)

HTML

HTML : Hyper text Markup language. HTML 1 to 5.

CSS

Cascading Style sheet : it is use to apply formatting style to web page.

JavaScript

JavaScript was help to do validation on client side.

Validation

HTML5 Features

Using JavaScript

View technologies

HTML

CSS

JavaScript

jQuery

Angular JS 1.x : HTML:/CSS/JavaScript

Angular 2 to 11 : HTML/CSS/JavaScript/TypeScript

React JS

Vue JS

JEE

Asp.net

Php

CGI

Python

Node (Using JavaScript)

JEE : Servlet /JSP/EJB

JSP : Java Server pages

EJB : Enterprise Java Bean

Server : Run time environment for Servlet /JSP and EJB. There is no main in Servlet, JSP and EJB.

2 types

Web Server

Application Server

Container : It is a runtime environment or engine. It is a part of Server. It is responsible to execute Servlet, JSP and EJB Application. It load the class, create the object, call the life cycle methods and destroy the object.

If Server is a type of Web Server it contains only one container ie Web Container. Web container can execute only servlet and jsp. Example of Web Server is tomcat.

It Server is a type of application server. It contains two type of container ie Web Container and ejb Container. Web Container is responsible to execute servlet and jsp and ejb Container is responsible to execute the ejb application.

Example : Web Logic, JBoss, WebSphere or GlassFish.

Application Server provide extra services like Connection pooling, thread management, resource management, security etc.

Application server is heavy server.

Servlet : Servlet is a normal java program which help to create the dynamic web page on server side.

**Servlet API**

**servlet :** servlet is a package which contains set of classes and interfaces.

**Servlet:** Servlet is a interface which contains 5 methods. This interface is a part of servlet package.

**init()**

**service()**

**destroy() Life cycle methods.**

getServletInfo()

getServletConfig()

1st way

class Demo implements Servlet {

we have to override all 5 methods.

}

**import javax.servlet.Servlet;**

**GenericServlet :** It is a type of abstract class which internally implements Servlet interface and provided body for all methods except **service** methods.

2nd way

class Demo extends GenericServlet {

So we have to override only service method

}

**HttpServlet :** It is a type of Abstract class which internally extends GenericServlet. This class provided body for service() methods as well as provided extra methods in the form of doXXX()

Like

goGet(), doPost(), doPut(), doDelete() etc

doXXX() are not a life cycle methods they wrap the service methods.

3rd way

class Demo extends HttpServlet {

service() or doGet() or doPost()

}

Servlet

Up to Servlet 2.5

We were using dd file (deployment descriptor file

web.xml file)

This file contains deployment descriptor details.

Deploy this application on server.

Client

<http://localhost:8080/ProjectName/URLPattern>

URL

**Day 15 : 25/12/2020**

**RequestDispatcher** : It is a interface which provide set of methods which help to navigate from one page to another page.

RequestDispatcher rd1 = request.getRequestDispatcher(“path”);

Target page

1. Servlet : URL pattern of that Servlet Program.
2. HTML/JSP : PageName.html/pageName.jsp

rd1.include(request,response);

Source Page + Target Page combine as a output.

or

rd1.forward(request,response);

Target Page output

**JSP : Java Server Pages :**

JSP is a scripting language which help to create dynamic web page on server side.

Limitation of Servlet

1. Servlet is normal java program if we do any changes in servlet we have to re-compile and re-deploy that application once again in server.
2. Servlet is complex. To display simple message through servlet we have create normal java class extends or implements type of servlet then override life cycle method or doXXX methods, then create the PrintWriter class object give the configuration details using web.xml or using annotation.
3. If we want to write any html code(Presentation Logic) it must be inside a pw.println(“”);

JSP tags

1. Scriptlet

Syntax

<%

Java coding (The code which we write inside a methods).

%>

out : It is a PrintWriter class reference.

1. Declarative tag

<%!

Variable declaration

%>

1. Expression tag

<%=

%>

**Day 16 : 28/12/2020**

**Action tags**

Which help to redirect from one jsp page to another jsp/servlet/html page.

**Limitation of JSP**

1. JSP is not secure.
2. We can’t do reusability of the JSP code.
3. Performance wise jsp is slower than Servlet.

Page Translation (Converting JSP to Servlet).

**JSP Model 1 Architecture**

Login.jsp Login.java

User userName

Password Password

Setter and getter methods

LoginService.java

Business login

**JSP Model 2 (MVC Model View Controller)**

View -🡪 Login.jsp, Success.jsp, Failure.jsp

Controller 🡪 LoginController.java (Servlet)

Model Layer : Business Logic and Database Logic

JavaBean

Service

Dao

Resource

**Limitation of MVC Project**

**View Layer :**

**Controller Layer**

**Model Layer : Issue**

To Improve the model layer EJB came in picture.

EJB is use to provide distributed application.

**Model Layer : EJB Developer**

**Types of EJB**

**Session Bean Session Bean**

**Entity Bean JPA**

**Message Driven Bean Message Driven Bean**

**Framework :** It container lot of pre-defined classes and interfaces which internally connected to each other to perform a specific task.

Framework is a template or protocol.

Framework is not a final product.

The implementation of all design pattern is provided by framework.

60% to 70% task is taken care by framework.

**Struts** : Struts is a opens source framework provided by Apache. It is a web framework. Internally follow MVC and provide FrontController design pattern.

Struts is Controller Centric Framework.

**JSF :** Java Server Faces : It is open source framework part of Oracle. It is a web framework. Internally follow MVC and provide FrontController design pattern.

JSF is View Centric Framework.

**JSF** Vs HTML5/CSS3/Angular/React/Vue JS

**Hibernate as well as JPA**

Improve the DAO Layer

**Spring :** spring is a open source framework. It is also known as onion architecture framework or layered architecture framework. It provided lot of layer or module to improve all type of application.

Spring Modules

1. Spring core
2. Spring context
   1. Spring MVC : Spring MVC is use to create the MVC Project. It is Model Centric Framework.

Spring MVC Vs EJB

1. Spring Rest
2. Spring DAO
3. Spring ORM
4. Spring Security
5. Spring boot
6. Spring cloud
7. Spring micro service

**Day 17 : 30/12/2020**

**Spring Framework :**

Spring Core :

IOC : Inversion of Control

DI : Dependency Injection

**IOC :** IOC is a design pattern or programming design pattern. IOC is concept. In place creating or maintaining the life of any resource manually . Allow to create those resources or object to container. Try to pull those resources or object from a container whenever you required. Then use it and leave to container to maintain the life of those resources.

Spring framework creating the object of POJO class. **POJO means Plain Old Java Object.** Not to extends or implements any pre-defined or user-defined class.

Servlet

JSP

EJB

Struts

JSF Web Container or EJB Container

Part of Server.

In Java JavaBean

In Spring Framework POJO

In ORM Framework (Hibernate ) Entity class

Employee emp = new Employee()

We push the object in heap memory. Rather than creating the memory explicitly allow to create the object to container and pull from a container whenever required.

DI : Dependency Injection

It is a implementation of IOC.

In Spring Core or Context spring container is a part of jar files. This container is light weighted.

To achieve IOC we have to configure using XML or annotation.

Types of DI

1. Constructor base DI
2. Setter base DI
3. Interface base DI

Spring framework support only Constructor and setter base DI.

scanf(“%d”,&n);

**Spring Constructor Base DI Using XML file**

**STS :**

**Day 18 : 04/01/2021**

**Spring Framework support DI for Collection framework Set, List, Queue and Map.**

**<bean class=”com.Employee” id=”emp1”>**

**@Component(“empid”)**

**class Employee {**

**}**

**By default className itself is id consider using camel Naming rules.**

**@Component**

**@Autowired**

**@Configuration**

**@ComponentScan**

**@Value**

**SpringDataSource**

**This project to improve the Resource Layer**

**JNDI Lookup (Application Server)**

**@Repository (DAO Layer specific annotation)**

**@Bean**

**Day 19 : 06/01/2021**

**Common Problems without build tools (Maven or Gradle)**

1. **Adding required jar files for our projects. Like odbc6.jar, jUnit.jar, spring jar, Struts, Hibernate or JPA etc.**
2. **We have to provide the dependencies and version of the jar files.**
3. **Every IDE Like Eclipse, MyEclipse, netbean, manually creating the project structure are different.**
4. **­Build the application ( compile, run, packing the application ie jar, war, ear file, creating documentation etc)**

**Build tools : Build tools is use to compile the program, run the application, testing the application, creating jar, war or ear files.**

**Maven is the most popular build and management tools for Java projects.**

**Before Maven we were using ANT**

**Maven is based on the concept of POM (Project Object Model). It is a type of XML file. Which help to automatically manage project’s build phase, documentation and reporting from the central piece of information.**

**Benefits of the Maven tool**

1. **We can develop the Java application very easily.**
2. **Easily add all jar files and their dependencies.**
3. **Access project information such as log documentation, unit testing, and dependencies list.**

**CI/CD**

**First downloads the Maven latest version**

**Set for Java Home path**

**In System variable**

**JAVA\_HOME**

**variableName : JAVA\_HOME**

**variableValue : C:\Program Files\Java\jdk1.8.0\_271**

**MAVEN\_HOME**

**variableName : M3\_HOME**

**variableValue : C:\Program Files\apache-maven-3.6.3**

**in User Variable**

**%JAVA\_HOME%\bin**

**%M3\_HOME%\bin**

**Maven Build Life cycle**

**The maven build follow a specific life cycle to deploy the application on a target project.**

**3 life cycle**

1. **Default : it is responsible to project development**
2. **Clean : it is responsible to clean the previous build files or code.**
3. **Site : it is responsible to create the documentation for the project.**

**Each life cycle contains set of phases. Phase is use to execute the specific task.**

1. **Default life cycle contains : 23 phase**
2. **Clean life cycle contains : 3 phase**
3. **Site life cycle contains : 4 phase**

**Few important phase**

1. **validate**
2. **compile**
3. **test-compile**
4. **test**
5. **package**
6. **integration-test**
7. **install**
8. **deploy**

**mvn validate**

**mvn clean**

**mvn compile**

**mvn exec:java -Dexec.mainClass=com.Demo**

**Day 20 : 08/01/2021**

**Spring core**

**Spring Context**

**Spring JDBC (DataSource)**

**Using Maven**

**Spring MVC**

**Maven Web Projects**

**Spring MVC :**

**Spring MVC internally follow MVC Architecture.**

**It provide FrontController design pattern.**

**Spring MVC Internally provide DispatcherServlet pre-defined class as a FrontController.**

**ActionServlet 🡪 Struts**

**FacesServlet 🡪 JSF**

**First Module**

**Login Module View Pages HTML/JSP**

**LoginController (Servlet)**

**Model 🡪 Login, LoginService and**

**LoginDao**

**Second Module**

**Customer Module**

**Third Module**

**Account Module**

**In Web projects we have to configure the DispatcherServlet**

1. **In XML file (web.xml file)**
2. **Using User-defined classes**

**DispatcherSerlvet receive the request base upon the URL and load the spring configuration file (name must be servletname-servlet.xml)**

**Day 21 : 11/01/2021**

**Library and Framework :**

**jQuery is known as library**

**Angular is known as Framework**

**Library contains set of functions or modules which internally connected to each others. Library doesn’t follow standards.**

**JavaScript:**

**DOM : Document Object Model : read, write or update.**

**Framework : Framework provide lot classes, modules. Framework is a protocol or template but not final product. 70% to 80% task taken care by framework. Framework internally follow standards. Implementation of all design pattern is provided by framework.**

**Store Employee details using Spring MVC**

**Spring Forms tags**

**Improve Database Layer**

1. **DataSource**
2. **Spring JDBC**
3. **Spring ORM Using Hibernate or JPA**
4. **Spring Data**

**Spring AOP**

**Spring Boot**

**mvn install:install-file -Dfile=path/to/your/ojdbc6.jar -DgroupId=com.oracle -DartifactId=ojdbc6 -Dversion=11.2.0.4 -Dpackaging=jar**

**mvn install:install-file -Dfile=C:\\ojdbc6.jar -DgroupId=com.oracle -DartifactId=ojdbc6 -Dversion=11.2.0.4 -Dpackaging=jar**

**mvn install:install-file -Dfile=C:\\ojdbc6.jar -DgroupId=com.oracle -DartifactId=ojdbc6 -Dversion=11.2.0.7 -Dpackaging=jar**

**@Component : Generic**

**@Controller : Servlet Specific**

**@Service : Service layer specific**

**@Repository : Dao layer specific**

**Day 22 : 13/01/2021**

**ORM : Object Relation Mapping**

**Limitation of JDBC**

1. **Using JDBC we can’t store object as well as we can’t retrieve from a database.**
2. **JDBC use SQL and SQL is database dependent language.**
3. **JDBC throw checked exception. Those all SQLException hierarchy are vendor or database dependent.**
4. **JDBC doesn’t OOPs relationship**
5. **JDBC doesn’t support collection.**

**ORM is tools or it is a concept.**

**Object Relation**

**Programming language Mapping Database**

**@Entity**

**@Table**

**class Employee{ Employee table**

**@Id**

**@Column**

**id ID,NAME,SALARY**

**name**

**salary**

**}**

**Mapping file**

**XML file**

**Employee --- EMPLOYEE**

**id ---- ID**

**name --- NAME**

**salary ---SALARY**

**id ---ID PK**

**Configuration**

**XML file**

**DriverName**

**URL**

**Username**

**Password**

**Dialects this class is responsible to convert Java object to SQL query.**

**JPA : Java Persistence API**

**JPA is a type of EJB. EJB is a technologies.**

**Hibernate : Framework part of jboss**

**iBaties**

**JDO**

**JPA is a specification and Hibernate is a implementation of JPA.**

**JPA is a technologies or type of EJB. Where hibernate is framework part of jboss.**

**Spring with ORM**

**Spring MVC with Hibernate**

**Spring MVC with JPA**

**Spring boot 1.x and 2.x**

**Spring boot 1.x with Hibernate or JPA**

**Spring 2.x with JPA**

**Spring data**

**Spring 2.x with Spring Data.**

**Mapping**

1. **Using XML**
2. **Using Annotation**

**Configuration**

1. **Using XML**
2. **Using properties**
3. **Using Pure Java.**

**SQL**

**Select \* from employee -- employee is table**

**Select \* from employee where salary > 12000**

**HQL**

**Select e from Employee e ---- here Employee is JavaBean**

**Select e from employee e where e.salary > 12000**

**Day 23 : 18/01/2021**

**Hibernate Relationship**

JDBC doesn’t support relationship

1. **Is a relationship : Inheritance.**
2. Has a relationship : Inside one class creating another class object (complex).

**Hibernate Inheritance**

1. Table-per –class hierarchy
2. Table – per subclass (join)
3. Table – per – concrete sub class

mvn install:install-file -Dfile=C:\\ojdbc6.jar -DgroupId=com.oracle -DartifactId=ojdbc6 -Dversion=11.2.0.4 -Dpackaging=jar

Table-per –class hierarchy

Manager Details

Id, Name,Salary,numberOfEmp,ProjectName

In JDBC first we have to create the table base upon the table we have to create the Java classes.

class Employee {

id,name,salary

}

class Manager extends Employee {

numberOfEmp;

}

class Programmer extends Employee {

projectName;

}

**Has a relationship**

4 types

1. One – to – One : Person – Passport

One – to – Many : Trainer – Student

1. Many – to – One : Employee – Project
2. Many – to – Many - Employees – SkillSet

Trainer

PK

TId TName tech

1 Raj Java

2 Ravi Python

Student

PK FK

Sid SName Age TSId

100 Seeta 21 1

101 Meeta 22 1

102 Veeta 23 2

JPA : JPA is a technologies. JPA is a type of EJB.

JPA is a specification as well as implementation.

EJB + JPA

Hibernate : Hibernate is a framework.

Hibernate implementation of JPA.

Spring + JPA

Spring + Hibernate

Spring Data

Spring MVC or Rest with Hibernate

No XML file

Spring boot 1.x to 2.x

Spring boot 1.56 it support Hibernate

Spring boot 2.x Hibernate deprecated.

Spring boot 2.x with JPA

Spring boot 2.x with Spring data.

Spring Rest

Spring Rest with Hibernate

**Web Service :**

Giving the Service for web application when both application running using different technologies.

Req(Java)

HDFC Common language HSBC

XML /JSON

Res(.net)

Java Technologies Asp .net

Servlet/JSP

Spring Framework

Java is pure object and platform independent programming language but language dependent.

2 types

1. SOAP Base Web Service or Big Web Service.

Simple Object Access Protocol.

SOAP Web Service base upon SOA (Service Oriented Architecture).

We can consume or produce data in the form of only XML.

JSX\_RPC : Java API for XML Remote Process Call

JAX\_WS : Java API for XML Web Service.

Axis tool

Metro tool

These tool provide the implementation of JAX\_WS

1. Rest Full Web Service

It expose the Data in any format like XML or JSON or html or text or plain text etc.

RESTFull Web service is style.

Concept

The implementation of Rest Web Service in java

JAX\_RS

Java API for XML RestFull Service

Jersey without Spring framework.

Spring MVC or Spring boot

Jersey and Spring MVC Provide the Implementation of JAX\_RS.

Product or Employee or Customer

JSON

**Get :** Get the Resources

Get All Employee or Product or Customer

Get Employee by Id

Query Param using key=value?key=value&

Path Param value1/value2/value3

**Post :** Store or create the Resource

Store Employee or Product or Customer

**put :** Update the Resources

Update Employee salary using id

Update customer age using custId

**delete :** Delete Resource

delete customer details using id

delete transaction details using from and to date.

Spring REST with Hibernate

**Day 24 : 22/01/2021**

Query Param

Append one data through URL

URL?key=value

Append two data through URL

URL?key=value&key=value

Path Param

URL/Ravi

URL/Ravi/Kumar

To call post method (Data format is may json or XML).

Post method we can’t call through browser.

HTML form we have option is method =”post”

**Rest Client**

AJAX Program

Another Java program

Asp.net

Python .net

Angular

React

Using browser plugin we can check

Post, put and delete

Postman client

Client 🡪 RestClient

Ajax

Angular

React

RestController 🡪

Get

Post

Put

Get

RestController 🡪 Service Layer 🡪Dao layer

* JDBC / Hibernate / JPA/ Spring Data

WADL : REST

WSDL : SOAP

**Day 25 : 25/01/2021**

**Spring Boot :** Spring boot combination of two words

Spring Framework and bootstrap for all spring modules Like spring core, spring application context, spring MVC, spring jdbc, spring orm etc.

Spring boot itself is a normal java program or standalone application which help to develop web application or any other application.

Spring boot main class. Main class help to develop the application in development mode.

Spring boot = Spring Framework + web server tomcat / jetty – XML file + few annotation.

Spring framework we can develop using different type of build too maven or gradle

Spring boot we can develop using maven or gradel

Pom.xml file

Before Spring boot framework

1. We have to configure all configuration depending upon the project using xml file or annotation.
2. In Spring MVC in web.xml file we have to configure the DispatcherServer using xml file or java class.
3. We have to enable all annotation @Component, @Controller, @Restcontroller, @Service, @Repository, @Autowired using xml file or using java classes.
4. DataSource features as well as Dependency injection of SessionFactory, EntityManagerFactory or more we have to configure in spring configuration.

Spring boot version

Spring 1.x

Spring 2.x

Spring boot mainly divided into 4 component

**Spring starter**

Spring starter combine all common dependencies in main jar files to do specific type of modules.

Spring web starter

Spring testing starter

Spring jdbc starter

Spring jpa starter

Before build tool may maven or gradle

Spring core spring4.2.x

Spring context spring3.6.x

Spring MVC jar

Using maven we have download specific jar.

Spring Database Features

Database

Spring jdbc

Spring orm

Spring transaction

**Spring autoConfiguration**

Most of the Spring modules Spring mvc, spring jdbc, spring orm we have to configure using XML or more annotation.

Spring Autoconfiguration remove completely all xml file and provide few annotation to achieve the task very easily.

This module help to reduce the configuration task.

**Spring CLI (Command line interface):** We can run the spring boot application using any IDE as well as using command.

**Spring Actuator :** Spring boot actuator which hep to check the health of the application.

Tomcat server or jetty server

Port number

Up or down

Etc

**Spring DI and IOC using spring boot**

@SpringBootApplication = @Configuration +@ComponentScan +@EnableAutoConfiguration

Spring boot resource file

Using two ways

1. Using properties : application.properties
2. Using YML : application.yml

**Day 27 : 25/01/2021**

**Spring Framework with ORM**

**Spring boot with ORM JPA**

**Spring boot with Spring Data**

**JPA : Java Persistence API**

**JPA is ORM Concept.**

JPA Configuration file

**persistence.xml :** Database Details

DriverName,URL,username,password, and Entity Mapping class details.

**EntityManagerFactory (SessionFactory)**

**EntityManager (Session)**

**EntityTransaction (Transaction)**

**persistce save**

**remove delete**

**merge update**

**JPQL HQL**

**Java Persistence Query Language**

**Select e from Employee e;**

**Hibernate Query Language**

**Select e from Employee e**

**From Employee e**

**Spring boot rest with Spring Data**

Spring Data is base upon the JPA.

Spring Data provide internally all DAO implementation for generic query.

Spring Data provided JpaRepository interface that interface internally provide the implementation of all methods.

Create user defined interface and implements the JpaRepository interface.

**Day 28 : 29/01/2021**

**Spring AOP :**

AOP means Aspect Oriented Programming.

Procedure Language

Procedure language we have more focus on functionality rather than property(data).

OOPs :

In OOPs we are focus more property(data) rather than coding or functionality.

AOP : Aspect Oriented programming language.

According AOP we have to again focus on functionality rather than property (data).

**Functionality**

Coding

**Method or function**

2 types of coding inside a method

1. Actual coding or Primary logic
2. Supporting logic to achieve actual code or secondary logic.

Secondary logic Security, Logging, Logger, database resources.

AOP will take care secondary logic.

It allow the separation of the **cross cutting concern**.

These cross cutting concern are different from the main business logic.

**AOP Terminology**

**Aspect :** An aspect is a module that encapsulated advice and point cut and provide cross cutting concern (secondary functionality).

**PointCut :** A point cut is an expression that selects one or more join joints where advice is executed. We can define point cut using expression language.

**Joint point :** A joint point is a point in the application where we can apply an AOP concept.

**Adivce** The advice is a an action that we take either before or after business logic.

5 types

1. Before
2. After
3. Around
4. AfterThrow
5. AFterReturing

**Target Object :** An object on which advice are applied is called Target object.

**Spring Cloud and Micro Service**

Spring cloud : It help in providing the tools to quickly build the distributed with common design pattern.

1. Service Discovery
2. Discovery Client
3. Circuit Breaker
4. Load Balancer
5. Feign Client

**Monolithic service and Micro Service**

SOAP and Rest Full Web Service

Customer

Store, delete, update, retrieve 8080

Spring boot

Account

Store, delete, update and retrieve

Spring boot 8181

Bank

Node JS 9090

Manager

Features of Micro Service

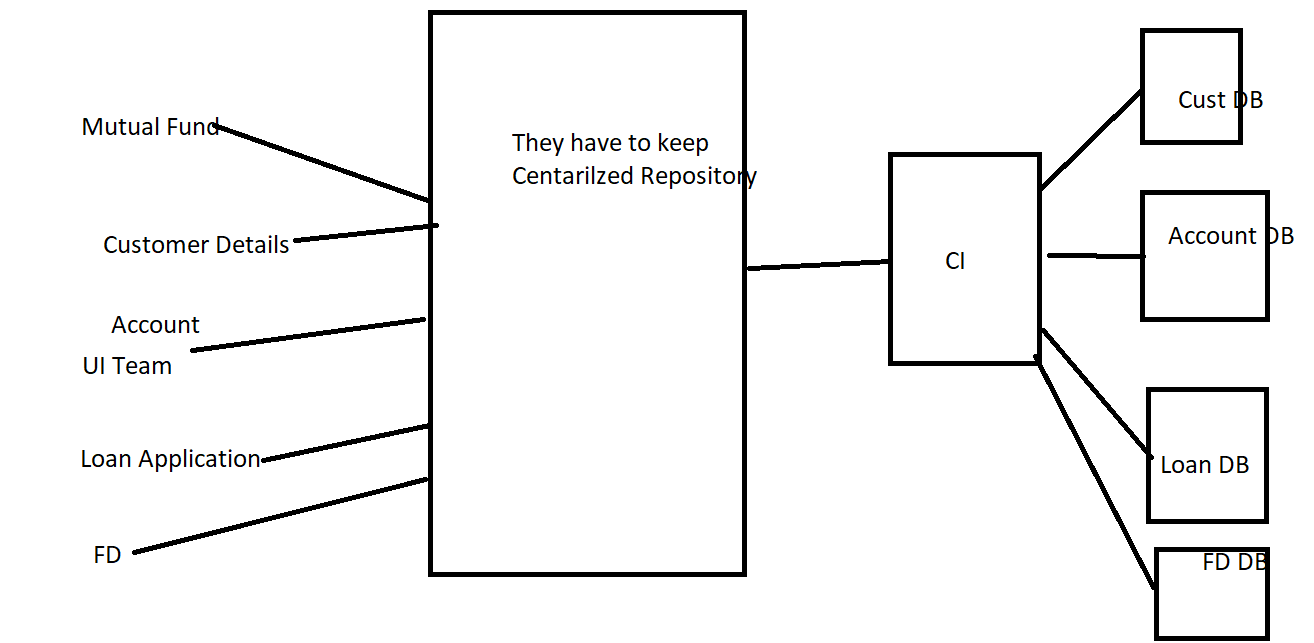
1. They are easily scalable
2. They don’t effect other service if any service go down.
3. Each service has different setup. (server, language, port number, etc)
4. If any service go down we no need to check whole application. Only we have to check service
5. These all service can call using Rest call.

**Eureka Server :** This server provided by Spring boot which help to deploy all micro service in centralized place.

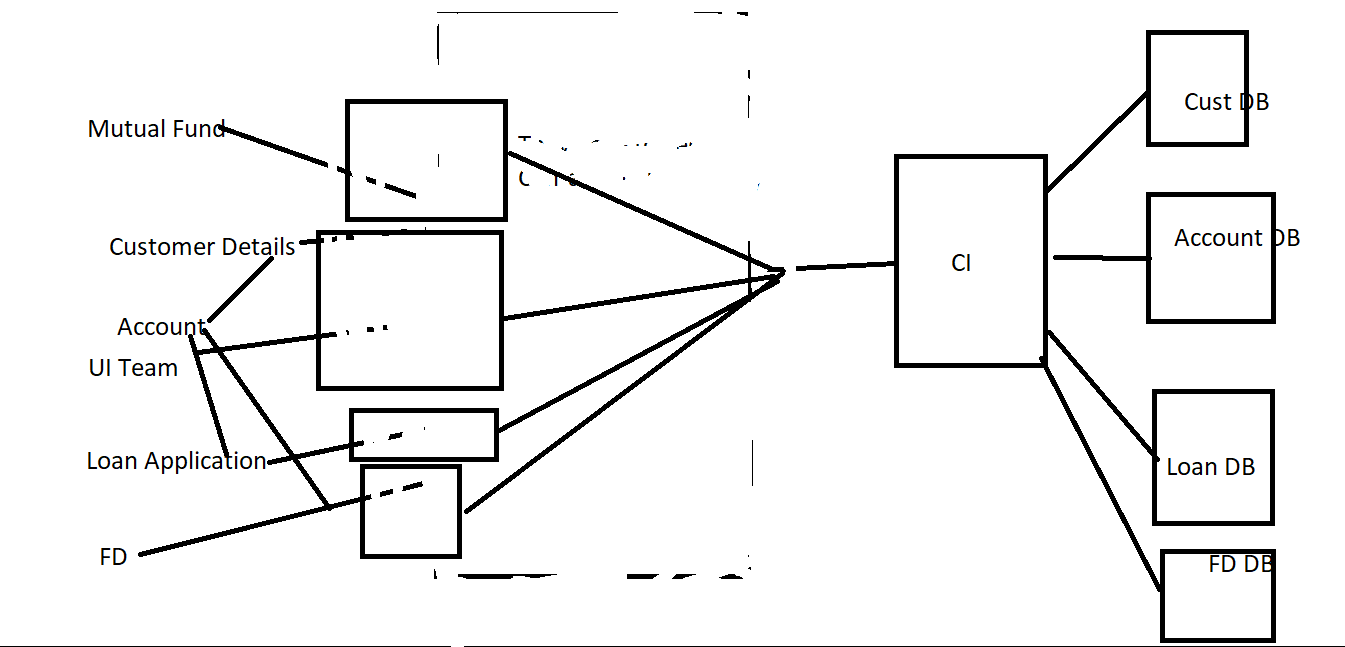
**Day 29 : 01/02/2021**

**Micro Service :** Micro Services are loosely coupled services that are independent from other services of same or different language or platform.

**Monolithic Services Architecture**



Micro Service Architecture



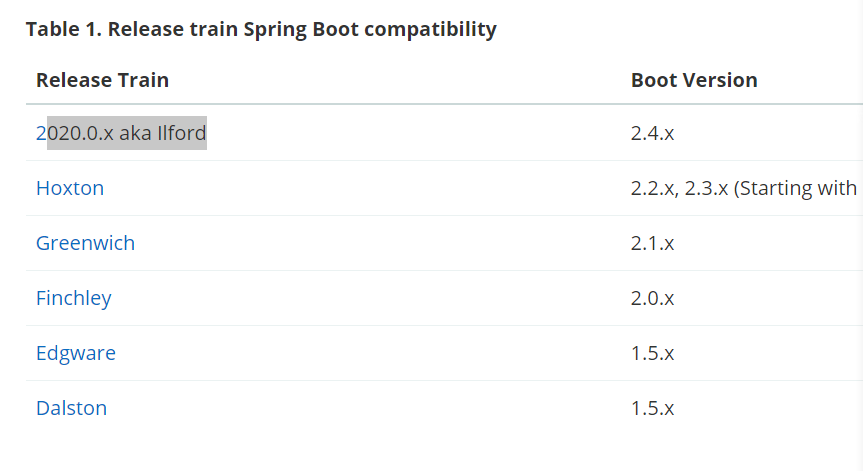
Account – Service HDFC

Wallet Service (PayTM, PhonePay, GooglePay)

To Achieve Micro Service Using Spring Framework

1. Spring boot
2. Spring Cloud

Spring Cloud stable version with Spring boot



**Spring Eureka Server :** It is Server provided by Spring boot which help to deploy all micro services created using Spring Framework. It is centralized place where we can keep the track about all services.

**Spring Initializr:** It is website provided by Spring people which help to create the Micro Services projects early easily.

**03-02-2020**

Yml : Yet Another Mark up Language

Ain’t Mark up language

**Micro service communication**

Account – service : oracle db : CRUD Operation

Customer Service : oracle db : CRUD Operation

Manager Service : mysql db : CURD Operation

PayTM Wallet Service :

**RestTemplate and FeignClient**

Which help to call other micro services running using same technologies and different technologies.

@LoaBalanced :

It is a Ribbon that equally distributed the load on the multiple or single instance of same service if exits.

**Feign Client**

Feign client is a discovery – aware Spring RestTemplate using interfaces to communicate with endpoint or micro services.

Feign client allow you to abstract the mechanism of calling REST services. Once you configure and annotate the Feign interface, you can call a REST service just a like Simple java method invocation.

ResTemplate call

<http://localhost:9393/paytm/wallet/123/5000>

Feign Client call

<http://localhost:9494/paytmfeign/wallet/123/4000>

**Spring Cloud Config Server**

Spring Cloud config Server provide an externalization configuration support for Client and server side distributed system. You can create a configuration file which is globally or distributed all micro service or rest client application.