**Java Full Stack Training Notes**

**Day 1**

**11/01/2020**

**Database :**

Program :

Input : Data

Process : Business rules

Output :Data

1 File based system

2 Database System

Limitation of File base system

1. Data Redundancy (Storing same records or duplicate records)
2. Data inconsistency (format of the file)
3. Data Security (read or write mode)

.txt

Employee.txt

Id,name,Salary

1,Ravi,12000

2,Ramesh,1400

Employee.txt

Id name Salary

1 Ravi 12000

2 Ramesh 1400

.doc

.pdf

**Database :**

Data : row fact

Information : Processed data or meaningful data.

Database : Storing data and information in proper format like table.

DBMS :Database Management System. It is a software which help to store the data in a table format.

Excel sheet is a small DBMS.

Employee – Table

Columns

Id Name Salary Row

1 Ravi 12000

2 Ramesh 14000

Database Model

Hierarchical Model

Network Model

RDBMS

Relational model

TrainerStudentRecords

TId TName Tech Sid SName Age

1 Raj Java 100 Seeta 21

1 Raj Java 101 Meeta 22

1 Raj Java 102 Leeta 23

2 Ravi Python 103 Keeta 24

2 Ravi Python 104 Veeta 25

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

103 Leeta 24 null

104 Teeta 25 3 Error

RDBMS : Table is known as Relation

Column is known as Attribute

Row is known as Tuple or records

1970

Dr EF Codd’s Rules

12 Rules start from 0 to 11

RDBMS

RDBMS Company

Oracle Oracle

MySQL Sun Microsystem (Oracle)

SQL Server

2020/19 Microsoft

Db2 IBM

SQL : Structure Query Language

5 types

1. DRL or DQL (Data Query Language or Data Retrieval Language)
   1. Select Clause
2. DDL : Data Definition Language
   1. Create, Drop, Alter , Truncate , rename
3. DML : Data Manipulation Language
   1. Insert , Delete and Update
4. TCL : Transaction Control Language
   1. Commit, rollback and savepoint
5. DCL : Data Control Language
   1. Grant and revoke

Oracle :

MySQL :

90% SQL Query

**Oracle :**

In Oracle Database Login itself is database.

**scott : username**

**By default oracle database username is scott/admin/oracle etc**

**Scott username**

**Tiger password**

**select \* from tab;** tab is pre-defined table provided by oracle database to check all pre-defined as well as user-defined tables.

MySQL/db2/sql server

**create database databaseName;**

**show databases;**

**use databaseName;**

**show tables;**

**DRL or DQL**

**use test**

**show tables**

**select \* from tableName;**

select \* from employees;

select \* from departments;

select \* from locations;

to check the table structure

**desc tableName;**

desc employees;

display specific columns

select columnname,columname from tableName;

**columnName alias**

select employee\_id as emp\_id, first\_name as f\_name, last\_name as l\_name from employees;

select first\_name,last\_name,concat(first\_name,last\_name) as Full\_name ,salary,salary+1000 as GrossSalary from employees;

Employee\_Id, FullName, Basic\_Salary, HRA, DA, PF, GrossSalary

**1st Assignment**

Full\_name --- First\_name and Last\_name

Salary --- Basic\_Salary

HRA –10%

DA – 5%

PF – 7%

GrossSalary – Salary +HRA + DA – PF

**Filter the Data**

Where clause

Select \* from tableName;

Select columnName,columName from tableName 🡪 filter the columns

1. Relational Operators

Select \* from tableName where columnName RO Value

>

>=

<

<=

= (is a equal Operator in SQL)

!= or <>

select \* from employees where salary > 10000;

select \* from employees where salary <> 17000;

1. Between operator (range of records)

Select \* from tableName where columnName between min and max

Select first\_name from employees where salary between 5000 and 10000

MySQL default date format is yyyy-mm-dd

Oracle default date format is dd-mon-yy

Display all employee first\_name and salary where hire date between 1990 to 1995.

1. In operator (specific more than one values)

Select \* from tableName where columName in (v1,v2,v3);

select first\_name,salary,hire\_date from employees where job\_id in('IT\_PROG','ST\_MAN');

select first\_name,salary,hire\_date from employees where employee\_id in(100,120,10000);

1. Like operator

Select \* from employees where first\_name like ‘Steven’;

Select \* from employees where first\_name = ‘Steven’;

Start with **S** Character ‘

Select \* from employees where first\_name like ‘S%’;

End with **a** character

Select \* from employees where first\_name like ‘%a’;

Contains **e** character

Select \* from employees where first\_name like ‘%e%’;

% zero or infinity

\_ any single character

Start with **L** as first character, second may be anything and third character must be **u**

select first\_name from employees where first\_name like 'L\_u%';

1. is null

select first\_name,salary,commission\_pct from employees where commission\_pct is null;

select first\_name,salary,commission\_pct from employees where commission\_pct is not null;

**Logical operators**

1. and
2. or
3. not

**Not**

select \* from employee where salary between 10000 and 20000

select \* from employee where salary not between 10000 and 20000

select \* from employee where job\_id in(‘IT\_PROG’,’ST\_MAN’)

select \* from employee where job\_id not in(‘IT\_PROG’,’ST\_MAN’)

select \* from employee where first\_name like ‘Steven’;

select \* from employee where first\_name not like ‘Steven’;

**and**

select first\_name from employees where salary > 12000 and department\_id=90;

**or**

select first\_name from employees where salary > 12000 or department\_id=90;

**Order by clause**

This clause mainly use to sort the records ascending or descending order.

Select \* from tableName order by columnName asc/desc

By default asc consider

select first\_name,salary from employees order by salary;

select first\_name,salary from employees order by salary asc;

select first\_name,salary from employees order by salary desc;

select first\_name,salary from employees where employee\_id between 110 and 150 order by salary desc;

Multi sort

select first\_name,department\_id,salary from employees order by department\_id desc,salary asc;

**Joins :** Joining is use to retrieve more than one columns from more than one table with or without conditions.

Create table table1(srno int, name varchar(10), salary float);

Insert into table1 values(1,’Ravi’,12000);

Insert into table1 values(2,’Ram’,14000);

Create table table2(accno int, name varchar(10), amount float);

Insert into table2 values(100,’Ravi’,500);

Insert into table2 values(101,’Ramesh’,1000);

1. **Cartesian product :**

Select columnname1,columnname2…… from table1, table2…. Tablen

M\*N

select srno,salary,accno,amount from table1,table2;

**Table Name with common columns**

select table1.srno,table1.salary,table1.name,table2.accno,table2.amount from table1,table2;

**Table alias**

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1,table2 t2;

**Equi Join using where clause**

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1,table2 t2 where t1.name = t2.name;

Common records

Left Outer Join : Left table remaining records + common records

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1,table2 t2 where t1.name = (+)t2.name; **In oracle database**

Right Outer Join : right Table remaining records + common records

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1,table2 t2 where t1.name(+) = t2.name; **In oracle database**

**Inner Join using on clause**

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1 inner join table2 t2 on t1.name = t2.name;

**Left Outer join**

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1 left outer join table2 t2 on t1.name = t2.name;

**Right Outer join**

select t1.srno,t1.salary,t1.name,t2.accno,t2.amount from table1 t1 right outer join table2 t2 on t1.name = t2.name;

**FK = PK**

**De-Normalization**

Employee

Id Name

10

Project 5 employee – 5 project

Pid ProjectName

10

**Normalization**

First\_name,Salary,Department\_name

select emp.employee\_id,emp.first\_name,emp.salary,dept.department\_name from employees emp, departments dept where emp.department\_id = dept.department\_id;

First\_name, Department\_name, City

Where clause

On clause

**Self Join** : Joining the same table itself is known as Self join

select emp1.employee\_id,emp1.first\_name,emp1.job\_id,emp2.first\_name,emp2.job\_id from employees emp1, employees emp2 where emp1.manager\_id = emp2.employee\_id;

**MySQL functions**

Function : It contains set of instruction to perform a specific task.

Database Function : Function take one or more parameter and return output or results.

2 types of

1. Pre-defined function
2. User-defined function (PL SQL).

Pre-defined functions

1. Single row function : The output or result apply for every records independently.
2. **String functions**

select **upper**(first\_name),**lower**(first\_name),**concat**(first\_name,' ',last\_name),**length**(first\_name) from employees;

nested function

select **length(concat**(first\_name,' ',last\_name)) from employees;

select **substring**(first\_name,2,2) from employees;

1. **Date functions**

select upper('raj deep'),curdate(),sysdate();

select datediff('2021-01-11','2021-01-05');

select datediff(curdate(),'2021-01-05');

select date\_format(curdate(),'%d-%m-%y');

1. **Maths functions**

select ceil(10.1),ceil(10.9),floor(10.1),floor(10.9);

select round(2356.4578,2);

select truncate(2356.4578,2)

1. Multi row function : The output or result apply for all records depending upon the group.

**Aggregate Functions**

sum(), count(), max(), min(), avg() etc

select sum(salary) as TotalSalary from employees;

select avg(salary) as AvgSalary,max(salary) as MaxSalary,min(salary) as MinSalary from employees;

select count(commission\_pct),count(manager\_id),count(employee\_id) from employees;

select count(\*), count(employee\_id) from employees;

**group by clause**

select aggregatefunction from tableName group by columnName(FK)

select sum(salary) from employees group by department\_id;

select department\_id,sum(salary) from employees group by department\_id;

**Where clause**

It is before group by

Condition apply for every individual records

Where clause we can use without group by

**Having clause**

After group by clause

Conditions apply for group by records.

But having clause we have to use with group by clause

select department\_id,sum(salary) from employees where department\_id is not null group by department\_id having sum(salary) > 50000 order by department\_id desc;

**Git : Sub Version Control System**

**Centralized repository**

Github :

Code commit : AWS

Azure

Google cloud

Oracle Cloud

DevOps tools

**Day 2**

**12/01/2020**

**DDL :**

**Create table**

**Syntax**

**Create table tableName(columnName dataType1,**

**columnName dataType2,**

**columnName datatTypen)**

**Emp**

**Id Name Salary**

**int varchar(10) float**

**Oracle : number(10), number(10,2)**

**create table emp(id int,name varchar(10), salary float);**

**DML :**

Insert into tableName(columnName1,columnName2,columnName3) values(v1,v2,v3);

insert into emp(id,name,salary) values(1,'Ravi',12000);

insert into emp values(2,'Ramesh',14000);

insert into emp(id,name) values(3,'Raju');

insert into emp values(4,'Ajay',null);

insert into emp(id) values(5);

insert into emp values(6,null,null);

insert into emp(name,id,salary) values('Dinesh',7,22000);

**Delete Query**

delete from tableName; : all records

**delete from emp;**

Delete with where clause

Delete from tableName where clause

**delete from emp where id=1;**

**delete from emp where name like ‘Ravi’;**

**delete from emp where salary between 2000 and 5000;**

**update Query**

syntax

update tableName set columnName = value;

update emp set salary = 20000; update salary for all employee

update with where clause

update tableName set columnName = value where clause

update emp set salary = 20000 where id=2;

update emp set name=’Ravi Kumar’ where name like ‘Ravi’;

update emp set salary = 22000 where salary = 18000;

DDL

Create

Drop

Drop table tableName ;

drop table sample;

**drop table sample;**

it will remove all records as well as table structure.

Truncate

Truncate table tableName;

It remove all records from table but maintains the table structure.

**truncate table sample**

delete

1. It is a part of DML
2. Using delete we can use where clause
3. Without where clause delete all records but maintains table structure.
4. We can use TCL commands.

truncate

1. It is part of DDL
2. We can’t use where clause
3. Delete all records but maintains table structure.
4. We can’t use TCL commands.

drop

1. It is part of DDL
2. Remove all records as well as table structure.

Alter command

1. Add column

alter table emp add desg varchar(2);

1. Modify column

alter table emp modify desg varchar(10);

1. Rename the column

alter table emp rename column desg to designation;

1. Change the tableName

alter table emp rename to empdetails;

1. Drop column

alter table empdetails drop column designation;

DDL

DML

Online shopping

Online Examination

custId,custName,age,phnumber,accnumber,typeofaccount,amount,pid,productName,price,mgrId,managerName,phnumber etc

**Single table**

**Super keys**

**Any one**

custId PK

accNumber, unique

phNumber, unique

mgrid unique

pid unique Candidate keys

CustId,CustName : super key but not candidate key

CustName not super key not a candidate key

CustId : is super key as well as candidate key

cusId,mgrId,

custId,Pid

custId,Pdi,mgrId

custId,phNumber

custid,phNumber,pid,

etc

**Candidate keys**

custid,phNumber,pid

phNumber,Pid

Pid CK

PhNumber CK

CustId,CustName :Super key

CustName :not CK

CustId :CK

MySQL

auto\_increment : generate the numbers one by one

Oracle

sequence: using this they generate auto increment number.

**🡨-PK-🡪(ProductId,customerId):**

**ProductId, CustomerId Price**

A X 10

A Y 20

B X 20

B Y 40

A X 50 Error

Composite primary key

**Constraints :** It is use to restrict the user to insert the invalid data in table.

1. Not null
2. Unique
3. Default
4. enum
5. Primary key
6. Foreign key
7. Check constraints : it doesn’t support.

EmpDetails

PK not null male/female unique IBM

EmpId FName Age gender phnumber Company

create table empdetails(

empid int primary key,

fname varchar(10) not null,

age int,

gender enum('male','female'),

phnumber int unique,

company varchar(10) default 'IBM');

**Relationship : Using Primary key and foreign key**

4 types

One means primary key and many foreign key

1. **One – to – many : Trainer -- Student**
2. **Many – to – one : Employee -- Project**
3. One – to one : Person -- Passport
4. Many – to – Many : Students -- Technologies

ER Diagram : Entity Relationship Diagram

One – to – Many

Trainer

PK

TId TName Tech

Column Level

**create table trainer(tid int primary key,tname varchar(10) not null,tech varchar(10) not null);**

Table Level

**create table trainer(tid int, tname varchar(10) not null, tech varchar(10) not null, constraint t\_pk primary key(tid));**

Student

PK FK

Sid SName Age TSId

**create table student(sid int primary key,sname varchar(10) not null,age int,tsid int references trainer(tid)); Not consider as FK in mysql but consider as In Oracle.**

Table Level

**create table student(sid int,**

**sname varchar(10) not null,**

**age int, tsid int,**

**constraint s\_pk primary key(sid),**

**constraint ts\_fk foreign key(tsid) references trainer(tid));**

**create table trainer(tid int,**

**tname varchar(10) not null,**

**tech varchar(10) not null,**

**constraint t\_pk primary key(tid));**

**Drop Foreign key**

alter table student drop foreign key ts\_fk;

**Add foreign key on student table after table created with records**

alter table student add constraint ts\_fk foreign key(tsid) references trainer(tid);

**Drop the primary key**

alter table student drop primary key;

**Add the primary key after table created with records (records must be unique)**

alter table student add constraint s\_pk primary key(sid);

**Keys**

Constraints

**One to One**

Person

create table person(pid int, pname varchar(10), primary key(pid));

1 Raj

Passport

1

create table passport(ppid int, typeof varchar(10),primary key(ppid),foreign key(ppid) references person(pid));

One – to – One (primary key and foreign key)

Many to – Many

Students SkillSets

Sid PK SSId PK

SName SkillName

create table students(sid int,sname varchar(10), primary key(sid));

create table skillset(ssid int,skillname varchar(10), primary key(ssid));

One – to – many bidirectional is known as many – to – many relationship.

Third table

Maintain the relationship

create table students(sid int,sname varchar(10), primary key(sid));

1. Ravi
2. Ramesh

create table skillset(ssid int,skillname varchar(10), primary key(ssid));

100 Java

101 Python

102 Angular

create table students\_skillset(

sss\_id int primary key auto\_increment, 1,2,3,4,

s\_ss\_id int, FK

ss\_s\_id int, FK

foreign key(s\_ss\_id) references skillset(ssid),

foreign key(ss\_s\_id) references students(sid));

1, 100, 1

2,101, 1

3, 102, 1

4, 100, 2

5,101, 2

**On delete cascade**

alter table student add constraint ts\_fk foreign key(tsid) references trainer(tid) on delete cascade;

**On Update cascade**

alter table student add constraint ts\_fk foreign key(tsid) references trainer(tid) on update cascade;

**On delete set null**

**On update set null**

Check constraints syntax

**create table sample(id int primary key,amount float check(amount>500));**

**Sub Query :**

Query within another query is known as sub query

Syntax

Outer query (Inner Query)

Outer Query (Inner Query (Inner Inner Query))

Sub Query must be return only columns

1. Single row sub query
2. Multi row sub query

Single row sub query

Select \* from tableName where columName RO (select columnName from tableName);

>, >=, <, <=, =, !=

Multi row sub query

Select \* from tableName where columnName in | RO any | RO all (select columnName from tableName)

Find the person name whose salary is greater than average salary of all employee working in a department 60 or Finance.

**Without sub query**

select avg(salary),count(\*) from employees where department\_id=60;

select first\_name from employees where salary > 5760;

**With sub query**

select first\_name from employees where salary > (select avg(salary) from employees where department\_id=60);

Multi row sub query

In

RO any

RO all

Find person name and job\_id whose min salary must be > 2000 and max salary must be < 10000.

select first\_name from employees where job\_id in (select job\_id from jobs where min\_salary > 2000 and max\_salary <10000);

In with Join

Display FirstName, Job\_Title whose salary between 5000 and 10000

RO any

RO all

Select salary from employees where department\_id=30;

Min 🡪 2500

Max🡪11000

>any ( > min salary of inner query)

select first\_name,salary from employees where salary >any (select salary from employees where department\_id=30);

select first\_name,salary from employees where salary > (select min(salary) from employees where department\_id=30);

>all (> max salary of inner query)

select first\_name,salary from employees where salary >all (select salary from employees where department\_id=30);

select first\_name,salary from employees where salary > (select max(salary) from employees where department\_id=30);

**exists**

select first\_name from employees where exists (select \* from employees where department\_id=100);

**not exists**

select first\_name from employees where not exists (select \* from employees where department\_id=100);

Regular Expression : search the contains base upon the pattern.

Start with S character

select first\_name from employees where first\_name regexp '^S';

End with a character

select first\_name from employees where first\_name regexp 'a$';

Range

Start with any character

select first\_name from employees where first\_name regexp '^[A-D]'

\* 1 to many

+ 0 to many

? optional (0 to 1)

git add .

git commit –m “Message”

git status

git pull

Project

Pid PName

create table project(pid int, pname varchar(10) not null);

Primary key

**alter table project add constraint p\_pk primary key(pid);**

Employee

Empid EmpName ProjectId;

create table employee(empid int, empname varchar(10), pid int);

**alter table employee add constraint emp\_pk primary key(empid);**

**alter table employee add constraint emp\_proj\_fk foreign key(pid) references project(pid);**

SQL

NoSQL

MongoDB

JSON

Document

Id,name,age

Id,phnumber

Id,image

Info

**Day 3**

**13/01/2020**

**Java : Java is pure object oriented and platform independent programming language**

**Till Java 7**

**Java is combination on procedure and object oriented programming language**

**From Java 8**

**Java is combination of procedure, object, and functional programming language(Lambda).**

**1991 Oak. Initial Name of java is Oak. In Nov 1995 rename to Java.**

**It was part of sun microsystem**

**It is a part of Oracle.**

**James Gosling and Team**

**Version 1.0 7, 8, 9, 14 version.**

**Java 7.**

**Java 8.**

**Features**

1. **Simple : C/C++. Pointer, Memory Management, Operator Overloading, Friend, Virtual keyword, delete etc.**
2. **Pure object oriented programming language.**
3. **Platform independent programming language : Write only run anywhere.**
4. **Compiler and interpreter :**
5. **Portable :**

**Portable : machine must be different.**

**Platform Independent : OS must different**

1. **Exception Handling**
2. **Multi threading**
3. **Distributed application : RMI**

**Basic Programming :**

**class**

**syntax**

**class className {**

**fields/variable**

**function /methods;**

**}**

**className follow pascal naming rules**

1. **If class contains one word first letter must be upper case.**
2. **If class contains more than one word each word first letter upper case.**

**Demo**

**Employee**

**EmployeeDetails**

**ManagerInfo**

**etc**

**open command prompt**

**java –version**

**javac**

**java**

**Simple Java program**

class Demo {

public static void main(String args[]) {

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

}

}

To compile

javac Demo.java

To run

java Demo

**Another Example**

class Demo {

public static void main(String args[]) {

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

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

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

}

}

**Data Types :** It is a type of data which tell what type of data it can hold.

Data types

2 types

1. Primitive data type : It is use to store only value.
   1. byte 1 byte
   2. short 2
   3. int 4
   4. long 8 Number without decimal point
   5. float 4
   6. double 8 with decimal
   7. char 2 any single character
   8. boolean 1 bit true or false.
2. Non primitive data type or reference data type : it is use to store value as well as reference of another data type.

**Data Types example**

class Demo {

public static void main(String args[]) {

int a=10;

double b = 10.20;

char c ='%';

boolean res = true;

System.out.println(a);

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

System.out.println(b);

System.out.println(c);

System.out.println(res);

}

}

**Type casting :** Converting from one data type to another data type is known as type casting.

2 types

1. Implicit type casting : By default internally taken care by JVM
2. Explicit type casting : We have to convert.

int family

-----------------------------🡪 Implicit --------------------------🡪

byte short int long

🡨------------------------Explicit ----------------------------------------

**Type casting example**

class Demo {

public static void main(String args[]) {

byte a=10; // byte range -128 to 127

short b=a; //implicit

System.out.println(a);

System.out.println(b);

short c = 129;

byte d = (byte)c; //Explicit (type)variableName;

System.out.println(c);

System.out.println(d);

}

}

Byte class

byte : primitive

int :primitive

Integer : class

int to float

----🡪 implicit ---------------🡪

int float

🡨-------explicit -----------------------

**Example**

class Demo {

public static void main(String args[]) {

int a=10;

float b=a; //Implicit

System.out.println(a);

System.out.println(b);

//float c = 10.0f;

float c = (float)10.10;

int d = (int)c;

System.out.println(c);

System.out.println(d);

}

}

**Operators**

1. Arithmetic Operator : +, -, \*, /, % (remainder):
2. Logical Operator : &&, ||, !
3. Conditional Operator : >, >=, <, <=, ==, !=
4. Assignment operator : =
5. Increment and decrement : ++, -- increment means increment the value by one. Decrement means decrement the value by 1
6. Ternary operator
7. instanceOf

+ve or –ver number is known as true

Zero known as false

class Demo {

public static void main(String args[]) {

int a=10;

System.out.println(a); //10

++a; // pre-incremenet

System.out.println(a); //11

a++; //post increment

System.out.println(a); //12

}

}

Another example

class Demo {

public static void main(String args[]) {

int a=10;

int b;

b =a;

System.out.println(b); //10

b = a++; // pre-incremenet increment and assign

System.out.println(b); //10

b = ++a; //post increment assign and increment

System.out.println(b); //12

}

}

**Ternary operator**

class Demo {

public static void main(String args[]) {

int a=10;

int b=50;

int res = a>b?a:b;

System.out.println(res);

}

}

**Another Ternary Operator**

class Demo {

public static void main(String args[]) {

int a=10;

int b=20;

int c=30;

int d =50;

int e = 60;

int f = 70;

int res = a>b?( c>d?c:d ): (e>f?e:f);

System.out.println(res);

}

}

**If statement**

1. simple if

if(condition) {

}

1. if else

if(condition){

}else {

}

1. nested if : if within another if

if(condition) {

if(condition) {

}else {

}

} else {

if(condition) {

}

}

Example

class Demo {

public static void main(String args[]) {

// largest of three number

int a=3;

int b=1;

int c=2;

if(a>b) {

if(a>c) {

System.out.println("a is largest");

}else {

System.out.println("c is largest");

}

}else {

if(b>c) {

System.out.println("b is largest");

}else {

System.out.println("c is largest");

}

}

}

}

1. if ladder or if else if

if(condition) {

}else if(condition) {

}else if(condition) {

}else {

}

**switch statement**

**syntax**

switch(variableName) {

case value: block1;

break;

case value: block2;

break;

case value :block3;

break;

default : wrongblock

break;

}

switch, case, break and default are keywords.

variablename must be type of int, char or String.

**Looping :** it use to execute set of statement again and again till the condition become false.

1. While loop
2. Do while loop
3. For loop
4. For each loop or enhanced loop

While loop

Initialization : start end

while(condition) {

body of the loop

increment or decrement

}

While loop example : Entry loop

class Demo {

public static void main(String args[]) {

int i=1;

int n=10;

while(i<=n) {

System.out.println(i);

i++;

}

System.out.println("Finish");

}

}

Do while loop example : Exit loop

class Demo {

public static void main(String args[]) {

int i=1;

int n=10;

do {

System.out.println(i);

i++;

}while(i<=n);

System.out.println("Finish");

}

}

**For loop**

class Demo {

public static void main(String args[]) {

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

System.out.println(i);

}

System.out.println("Finish");

}

}

class Demo {

public static void main(String args[]) {

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

System.out.println(i +", "+j);

}

System.out.println("Finish");

}

}

**Taking the value through keywords**

1. Using Scanner class
2. Using DataInputStream
3. Using BufferedReader
4. Using command line arguments

**Scanner :** Scanner is a pre-defined class part of util package. Which provide set of methods which help to scan the value through keyboards.

Syntax to create the object of Scanner

**Scanner obj = new Scanner(System.in);**

**obj.nextByte();**

**obj.nextShort();**

**obj.nextInt();**

**obj.nextLong();**

**obj.nextFoat();**

**obj.nextDouble();**

**obj.nextBoolean()**

**obj.nextChar() no methods**

**String name = obj.next(); one more than one character.**

**char name[]=name.toChar();**

**char val = name[0];**

**obj.next(); terminator is space**

**Raj Deep**

**obj.nextLine() terminator is enter key**

**Taking employee details through keyboards**

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 id = obj.nextInt(); //scan int value

obj.nextLine(); // hold the enter key

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

String name = obj.nextLine();

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

float salary = obj.nextFloat();

System.out.println("The id is "+id);

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

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

}

}

**Assignment 1**

do{

Online Examination

1:English , 2 : Math 3 : GK

switch() {

case 1

3 Q

case 2

3 Q

case 3

3 Q

}

Do want to continue ?

}while();

**Result g\_total > 70**

**Result + 10**

**Result>=90 selected else try next time.**

System.out.prinntln();

**array :** array is user defined data type which is use to store same type of values.

Syntax

datatype arrayName[];

int abc[]; //Java

int abc[10]; //C or C++

**for each loop**

for(datatype variableName: arrayName) {

}

**Array with for and for each loop**

class Demo {

public static void main(String args[]) {

int []abc={10};

int []xyz={10,20,30,40,50,60,150,12,34,56,34,32,45,67,78,99};

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

System.out.println(xyz[5]);

System.out.println("Size of array is "+xyz.length);

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

for(int i=2;i<8;i=i+2) {

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

}

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

for(int n : abc) {

System.out.println(n);

}

}

}

**Syntax to create the memory size for the array**

datatype arrayName[] =new datatype[size];

int []abc = new int[10];

String []names=new String[10];

char name[]=new char[20];

**Assignment 2**

Take n number records through keyboards as Id,Name,Salary,Desg

(array id,name,salary,Desg).

Salary = salary + hra + da – pf;

Hra is 10% salary

Da is 7 % salary

Pf 5 % salary

If desg is manager desg.equals(“Developer”)

15% bonus

If developer 10% bonus

Else

5 % bonus

Id, name, salary( grossSalary +bonus ) and desg

**OOPs**

**object :**

**object is any real world entity**

**state or properties –have --- fields/variable**

**Person**

**Behaviour---do/does --- function / methods**

**Bank**

**Animal**

**Car**

**Object is a concept.**

**class : Blue print of object**

**Template of object**

**In java method as well as variable must follow camel Naming rules**

1. **One word first then it must be lower case**
2. **More than one word from second word onward each word first letter upper case.**

**Syntax**

**ClassName objectRefereName = new ClassName();**

**class and object example**

class Car {

int wheel;

String color;

float price;

void start() {

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

}

void appliedGear() {

System.out.println("Gear Applied successfully ");

}

void moving() {

System.out.println("Car is moving");

}

void stop() {

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

}

}

class App {

public static void main(String args[]) {

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

Car innova = new Car(); //heap memory

innova.start();

innova.appliedGear();

innova.moving();

innova.stop();

Car santro = new Car();

santro.start();

santro.appliedGear();

santro.moving();

santro.stop();

}

}

**Type of fields / variables**

3 types

1. Instance variable
   1. The variable which declare inside a class but outside a method including main method is known as instance variable.
   2. Instance variable hold default value according to their data types like int family 0, float family 0.0, char space, boolean false and String null.
   3. Instance variable we can use directly inside a method but the method must be part of same class as well as it must non static method.
2. Local variable
   1. The variable which declare inside a method including main method is known as local variable.
   2. Local variable doesn’t hold default value we have to initialize.
   3. Scope of local variable within that block where it declare.
3. Static variable or class variable

**Example of instance variable and local variable**

class Car {

int wheel;

String color;

float price;

void carInfo(String name) {

String msg=name+", Car Details ";

System.out.println(msg);

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

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

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

}

}

class App {

public static void main(String args[]) {

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

Car innova = new Car(); //heap memory

Car santro = new Car(); //heap memory

innova.wheel =4;

innova.color="Gray";

innova.price = 1400000;

santro.wheel = 4;

santro.price = 850000;

santro.color = "Black";

innova.carInfo("Innova");

santro.carInfo("Santro");

}

}

**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 explicitly it will call automatically when you create the object.

Simple constructor example

class Car {

Car() {

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

}

void carInfo() {

System.out.println("Car Info Method");

}

}

class App {

public static void main(String args[]) {

Car obj1 = new Car();

obj1.carInfo();

}

}

**Difference between constructor Vs Methods**

In the life of the object if we want to perform any task only one time. That type of task we have to write inside a constructor (empty or parametrized).

In the life the object if we want to execute any task more than one time that type of task we have to write inside a methods.

Constructor and Method example

class Cal {

int a,b,sum;

Cal() {

a=1;

b=2;

}

Cal(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[]) {

Cal c1 = new Cal(); c1.add(); c1.display();

Cal c2 = new Cal(); c2.add(); c2.display();

Cal c3 = new Cal(); c3.display();

Cal c4 = new Cal(100,200); c4.add(); c4.display();

Cal c5 = new Cal(10,20); c5.add(); c5.display();

Cal c6 = new Cal(); c6.setValue(11,22); c6.setValue(111,222); c6.add(); c6.setValue(1111,2222); c6.display();

}

}

**Assignment 3**

Create EmployeeDetails class with 4 instance array variables.

EmployeeDetails() : memory size for array id,name,salary, desg must assign in constructor at run time.

read()

read all employee id,name,salary,desg

calSalary()

hra, da, pf local variables.

calculate salary

bonus()

apply bonus

display()

display details

EmployeeTest :

Main methods

Object creation

And calling all methods

Take n number records through keyboards as Id,Name,Salary,Desg

(array id,name,salary,Desg).

Salary = salary + hra + da – pf;

Hra is 10% salary

Da is 7 % salary

Pf 5 % salary

If desg is manager

15% bonus

If developer 10% bonus

Else

5 % bonus

Id, name, salary( grossSalary +bonus ) and desg

**Create the Folder**

**Then create simple text file with message.**

**Right click in folder and click on git bash (terminal open for you)**

**git init**

**git status**

**git add filename.txt**

**or**

**git add .**

**git status**

**git commit –m “File added”**

**git status**

git config [user.email akash3000383@gmail.com](mailto:user.email%20akash3000383@gmail.com)

git config [user.name Akash](mailto:user.email=akash3000383@gmail.com)

git remote add origin https://github.com/Kaleakash/fullstackassignment.git

git push -u origin main

git push –u origin master

First time

Create folder

add file or assignment file

open git bash terminal

git init (first time)

git add filename

git add .

git commit –m “First time added file”

git remote add origin https://github.com/Kaleakash/fullstackassignment.git

git push –u origin main/master

again and again whenever you add new file

open git bash terminal

git status --🡪 red

**git add . (add all file in staging area)**

**or**

**git add filename.txt (specific file)**

**git status**

**git commit –m “1st day assignment done”**

**git push –u origin master/main**

[**akash300383@gmail.com**](mailto:akash300383@gmail.com)

**share you gitURL**

**Day 4**

**15/01/2020**

**this :** this is a keyword which refer to current object.

1. When local variable or parameter variable and instance variable have same name. The local variable or parameter variable hide the visibility of instance variable.

this.variableName = variableName; it may be in constructor or methods.

**Example of this keywords**

class Employee {

int id;

String name;

float salary;

Employee() {

id =123;

name = "Unknown";

salary = 8000;

}

Employee(int id, String name, float salary) {

this.id = id; //local = local

this.name = name;

this.salary = salary;

}

void setValue(int id, String name, float salary) {

this.id = id;

this.name = name;

this.salary = salary;

}

void display() {

System.out.println("Id is "+id);

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

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

}

}

class Demo {

public static void main(String args[]) {

Employee emp1 = new Employee(); emp1.display();

Employee emp2 = new Employee(); emp2.display();

Employee emp3 = new Employee(100,"Ravi",12000); emp3.display();

}

}

**Encapsulation :** Binding or Wrapper data(variables/fields) and code(methods/functions) in a single unit is known as Encapsulation.

Security

class :

**Example**

class Employee {

private int id;

private String name;

private float salary;

void setValue(int id, String name, float salary) { //helper methods

this.id = id;

this.name = name;

//this.salary = salary;

if(salary<0) {

this.salary = 8000;

}else {

this.salary = salary;

}

}

void display() {

System.out.println("Id is "+id);

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

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

}

}

class Demo {

public static void main(String args[]) {

Employee emp = new Employee();

//emp.id = 123;

//emp.name="Ravi";

//emp.salary = -12000;

emp.setValue(123,"Ravi",-12000);

emp.display();

}

}

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

class OldClass { super class, base class or parent class.

properties

behaviour

}

class NewClass extends OldClass{ sub class, derived class, child class.

properties

behaviour

}

**Simple Inheritance example**

class A {

void dis1() {

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

}

}

class B extends A {

void dis2() {

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

}

}

class Demo {

public static void main(String args[]) {

A obj1 = new A();

obj1.dis1();

B obj2 = new B();

obj2.dis2();

obj2.dis1();

}

}

**Type 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 class extends 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 extends directly to super class.

class A {}

class B extends A {}

class C extends A {}

class D extends A {}

1. Multiple Inheritance

More than one super class and one sub class

class A {}

class B {}

class C extends A,B {} But Java Doesn’t support. This type of inheritance java support indirectly using interface but not through class.

**OOPs Relationship**

1. Is a relationship
2. Has a relationship

**Assignment 4**

Manager / Programmer is a Employee

Employee has a Address

class Employee { super class must be generic

id,name,salary

Scanner obj = new Scanner(System.in);

Address add = new Address();

methods

read() id,name,salary

, calSalary() : hra, da and pf

dislay()

}

class Manager extends Employee { sub must be specific

numberOfEmp : numbers

readMgr() numberOfEmp

add.readAdd();

disMgr();

numberOfEmp

add.disAdd();

}

class Programmer extends Employee{ sub must be specific

projectName: string

readPrg()

projectName

add.readAdd();

disPrg();

}

class Address {

city, state, pinCode

Scanner obj = new Scanner();

readAdd()

read city,state and pincode

disAdd();

city, state and pincode

}

EmployeeTest

Main Don’t create the Employee class object.

S.O.P(ManagerDetails);

Manager mgr

mgr.read() 3 details

mgr.readMgr() 1 own details, 3 address details

S.O.P(ProgramerDetails)

Programmer prg

prg.read()

prg.readPrg()

mgr.calSalary();

prg.calSalary()

Display Manager and Programmer details.

**Polymorphism:**

One name many forms or many implementation

2 types

**Compile time polymorphism Run time polymorphism**

Static binding Dynamic binding

Early binding Late binding

Example Example

Method Overloading Method Overriding

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

Example

class Abc {

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[]) {

Abc obj1 = new Abc();

obj1.add(1,2); //compile time binding

obj1.add("1","2");

obj1.add(10.10f,20.20f);

obj1.add(1,2,3);

}

}

**JDBC**

URL,

URL,UserName

URL,username,password

DriverManager.getConnection(url);

DriverManager.getConnection(url,username);

DriverManager.getConnection(url,username,password);

**Runtime Polymorphism :** Method Overriding :

The method have same name and same method signature (number of parameter list, type of parameter list as well as return type must be same).

To achieve the method overriding the class must in Inheritance.

Super class and sub class.

**Method Overriding Example**

class Bike {

void speed() {

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

}

}

class Pulsar extends Bike {

void color() {

System.out.println("Black");

}

void speed() {

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

}

}

class Honda extends Bike {

void color() {

System.out.println("Gray");

}

}

class Demo {

public static void main(String args[]) {

Pulsar pu = new Pulsar();

pu.color(); pu.speed();

Honda hh = new Honda();

hh.color(); hh.speed();

}

}

**Annotation :** Annotation is meta-data. Meta-data means data about data.

int a;

Java provide lot of pre-defined annotation as well as we can create user defined annotation. Some annotation we can use on class level or methods level or constructor level or property level (primitive or complex property).

All annotation start with @ followed by annotation name.

**@Override :** it is pre-defined annotation we can use on method level on sub class method if sub class method overriding super class method then we will not get any error else it will through error at the compile time.

**Method overriding, reusability, merge method example**

class Bike {

void speed() {

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

}

}

class Pulsar extends Bike {

void color() {

System.out.println("Black");

}

@Override

void speed() {

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

}

}

class Honda extends Bike {

void color() {

System.out.println("Gray");

}

}

class Tvs extends Bike {

void color() {

System.out.println("White");

}

@Override

void speed() {

super.speed(); //callng super class speed meth

System.out.println("20km/hr");

}

}

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**

abstract is a keyword or non access specifiers. Which we can use with method and class but not with variable.

1. abstract method: the method without body or without curly braces or incomplete method is known as abstract methods.

Syntax

abstract returnType methodName(parameterList);

1. abstract class : if class contains abstract method then we have to declare the class as abstract class.

Syntax

abstract class className {

}

1. which ever class extends abstract class that class must be provide the body for all abstract methods mandatory. That class can ignore only if that class itself is a abstract class.
2. Abstract class we can’t create the object.
3. Abstract class can contains normal methods as well as abstract methods.

It can contains zero or 1 or all abstract methods.

1. Some time class is abstract but no abstract method. (If we don’t want to create the object of that class directly then we can declare the class as abstract class without abstract methods).

If we want to give instruction to not allow to create the object of that class.

1. Abstract class can contains default constructor we well as parameterized constructor because abstract class contains instance variable (inside constructor only default initialization happen).

A abstract 1 or more

B extends A abstract 1 or more :

C extends B normal must be provide body for A and B class methods.

**Abstract class example**

abstract class Bike {

int wheel;

Bike() {

wheel = 4;

}

abstract void speed();

}

class Pulsar extends Bike {

void color() {

System.out.println("Black");

}

void speed() {

int abc=20;

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

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

}

}

class Demo {

public static void main(String args[]) {

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

}

}

**Final keyword :** Final is a keyword or non access specifiers we can use with variable, method and class.

1. Final variable : To declare constant variable in java we use final keyword with variable

final int A=10; : we have to initializes and we can’t change the value final variable. Final variable must be upper case.

1. Final method: if the method final we can’t override that method but we can call or use that method.
2. Final class : if class is final we can’t inherits or extends final class.

**Final example**

final class A {

final void dis1() {

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

}

}

class B extends A {

/\*void dis1() {

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

}\*/

}

class Demo {

public static void main(String args[]) {

final int A=10;

System.out.println(A);

//A=20;

System.out.println(A);

B obj1 = new B();

obj1.dis1();

}

}

**static :** static is a keyword or non access specifiers we can use with variable and method but not with class (Inner class. If class is inner we can use static keyword but not for outer class).

1. If variable is static we can assign the value for that variable using class name.

className.staticVariablename = value;

1. If method is static we can call that method with the help of className.

className.staticmethodName();

1. Even though we can assign the value for static variable with the help of object also as well as we can call static method with help of object also.
2. Inside a non static method we can access non static as well as static variable directly of same class.
3. Inside static method we can access only static variable directly. Non static we can’t access directly.

**Static example**

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();

obj1.a=100;

Abc.b=200;

obj1.dis1();

Abc.dis2();

obj1.b=300;

obj1.dis2();

}

}

Every class contains only one static memory. Every class contains n number of heap memory or instance number base upon the number of object created.



**Static and heap memory example**

class Abc {

int a;

static int b;

void dis1() {

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

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

}

/\*static void dis2() {

System.out.println("Static Method");

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

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

}\*/

}

class Demo {

public static void main(String args[]) {

//Abc.dis2();

Abc obj1 = new Abc(); //heap memory

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

}

}

**Initialization and static block:**

Example

class A {

A() {

System.out.println("A class constructor");

}

void dis1() {

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

}

{

System.out.println("Initialization block 1");

}

static {

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

}

{

System.out.println("Initialization block 2");

}

}

class Demo {

public static void main(String args[]) {

A obj1 =new A();

obj1.dis1();

obj1.dis1();

A obj2 = new A();

obj2.dis1();

obj2.dis1();

}

}

**Day 5**

**16/01/2020**

By default git consider as master as a default branch.

Master branch is replace by main branch

**Branch : It is like a pointer which hold more than one commit details.**

My Remote repository default branch is : main / master

My Local repository default branch is : main / master

Two options to create local repository

1. **git init** : The folder become local repository with empty files.
2. **git clone** :

**Day 6**

**18/01/2020**

**Interface :** Interface is a type of reference data type or also known as 100% pure abstract class (till Java 7 Version).

Syntax

interface interfaceName {

fields;

methods;

}

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

By default all methods are public and abstract.

interface Abc {

public static final int A=10;

static final int B=20;

final int C=30;

int D=40;

public abstract void dis1();

abstract void dis2();

public void dis3();

void dis4();

}

interface Abc {

int A=10;

void dis1();

}

interface Mno {

int B=20;

void dis2();

}

interface Xyz extends Abc,Mno {

int C=30;

void dis3();

}

class Sample implements Abc,Mno {

}

Like a class interface can extends another interface. Interface can extends more than one interface.

Class always implements interface. Class can implement more than one interface.

Which ever class implements interface that class must be provide the body for all abstract method belong to that interface. That class can ignore only if that class is a type of abstract class.

**Access specifiers for method overriding**

Super (class/interface) Sub class

public public

protected public

protected

default public

protected

default

private We can’t override

Interface Example

interface Abc {

int A=10;

void dis1();

}

interface Mno {

int B=20;

void dis2();

}

interface Xyz extends Abc,Mno {

int C=30;

void dis3();

}

class Sample implements Abc,Mno {

public void dis1() {

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

}

public void dis2() {

System.out.println("Mno interface Method");

}

}

class Demo {

public static void main(String args[]) {

Sample s = new Sample();

s.dis1();

s.dis2();

}

}

Points

1. class extends class (only one )
2. interface extends interface (more than one)
3. class implements interface (more than one)
4. interface doesn’t extends or implements to class.

**Array object :**

Syntax

class Employee{

id,name,salary

}

Employee emp = new Employee();

className refereceName[]=new className[size];

Employee employees[]=new Employee[100];

int abc[]=new int[10];

employees :

0

1

100

99

**Assignment 5:**

Create Student class which contains sId,SName,Age,Marks[](PCMB) ,Grade(char)

Scanner obj

read()

take

id, name,age

for(i=0;iM<marks.length;i++) {

marks[i]=obj.next()

}

calculateGrade()

local variable total,avg;

avg > 90 A+ avg >80 A

avg >70 B avg >55 C

else

D

display

id,name,age,Grade

StudentTest

Create Student array object

How many student details do you want to store.

Student std[]=new Students[n];

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

std[i]=new Student();

std[i].read();

}

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

std[i].calculateGrade();

}

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

std[i].display();

}

Difference between Abstract class and interface.

Interface

1. Interface contains only final variable.
2. Interface contains only abstract method.
3. Interfaces doesn’t contains default constructor as well as we can’t write parameterized constructor.
4. Normal or abstract class can implements more than one interface.
5. Using interface we can achieve full abstraction.

Abstract class

1. Abstract class contains final as well as normal variables.
2. Abstract class contain normal as well as abstract methods.
3. Abstract class can contains default constructor as well as we can write parameterized constructor.
4. Abstract class or normal class can extends only one abstract class.
5. Using abstract class we can achieve partial abstraction.

Common we can’t create the object of interface as well abstract class.

Whichever class extends or implements abstract class or interface that class must be provide the body for all abstract method belong to that class or interface.

**Assignment 6:**

**Assignment 6: Update the Code**

**First Change**

**Create user-defined exception**

1. **MinimumAccountBalance**
2. **InValidAccountNumber (Transfer, Withdraw, deposit)**

**Second Changes : you have to use package concept.**

Account 🡪 bean package

AccountInitialization, 🡪 service package

Bank 🡪 service package

MyBank 🡪 service package

BankTest 🡪 main / test package

**Small Mini Projects**

**Menu Driven Application**

Banking Application

1. Create Account
   1. Default Details : 1010,1011,1012 Unknown, 500
   2. Name and Amount : 1013,Raj, 600 amount >= 500
2. Check Account Balance
3. Withdraw the amount
4. Deposit
5. Transfer

abstract class AccountInitialization {

static int accountCount=0;

Account accounts[]=new Account[10];

Start with 1010 (account number )

void accountCreate() {

account Number must be unique

name =”Unknown”

amount =500;

Account ac = new Account(accno,Unknown,500);

accounts[acountCount]

accountCount++;

}

void accountCreate(name,amount) {

accno must be unique

amount > 500 then crate account

assign name and amount

Account acc = new Account(uniqueNumber);

Call helper to set name and amount;

accounts[acountCount]

accountCount++;

}

abstract void transfer(fromaccNo,toAccNo,amount);

}

interface Bank

void withdraw : accno, amount

void deposit : accno, amount

void checkBalance : accno

all abstract methods

class Account

private Accno

private Name

private Amount it must be private

write constructor empty or parameterized.

helper method set the value.

setAccno,setName,setAmount

getAccno, getName,getAmount

class MyBank extends AccountInitialization implements Bank {

void transfer(fromaccNo,toAccNo,amount) {

fromAccNum : 1010

toAccoNumber : 1011

amount must be +ve

fromAccoNumber may not present

toAccoNumber may not present

Amount is not available

Maintain min 500 in fromAccount Number

}

Withdraw {

Accno

AccountNumber may be not present

Amount

Amount is not available

Maintain min 500 in fromAccount Number

}

Deposit {

Accno

AccountNumber may be not present

Amount

Amount is not available

Can’t deposit more than 50,000/-

}

Checkbalance {

Using account Number

}

BankTest App

Main method

Do {

Switch() {

1. Create Account
   1. Default details
   2. Name and Amount pass;
2. Check Account Balance
3. Withdraw the amount
4. Deposit
5. Transfer
6. Exit the Application

}

Do want to continue.

}while(condition)

Welcome, thank

**this, this(), super, super()**

this is use to refer the current object.

When local variable or parameter variable and instance variable have same name then local variable hide the visibility of instance variable. To refer the instance variable we use

this.variableName = variableName;

When super class variable and sub class variable have same name sub class variable hide the visibility of super class variable. To super superclass variable we use

super.variableName;

**this and super keywords example**

class A {

int a=10;

}

class B extends A {

int a=20;

void dis() {

int a=30;

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

System.out.println("a - instance variable "+this.a);

System.out.println("a - super class variable "+super.a);

}

}

class Demo {

public static void main(String args[]) {

B obj = new B();

obj.dis();

}

}

this(): It is use to invoke more than one constructor of same class or also known as constructor chaining of same class without creating fresh memory.

this() or this(parameter) it must be inside a constructor and it must be first statement inside a constructor.

**this() example**

class Employee {

Employee() {

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

}

Employee(int id) {

this(); //calling constructor

System.out.println("Employee(int)");

}

}

class Demo {

public static void main(String args[]) {

//Employee emp1 = new Employee();

Employee emp2 = new Employee(10);

}

}

**super()**

In Inheritance sub class can inherits only instance variable and non static method. It can’t inherits constructor as well as static property/methods.

By default every sub class constructor **super()** is available. It help to invoke sub class constructor to super class constructor (constructor chaining from sub to super class).

It must be first statement inside a constructor.

class Employee {

Employee() {

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

}

Employee(int id) {

System.out.println("Employee(int)");

}

}

class Manager extends Employee {

Manager() {

super(100); //by defaut

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

}

}

class Demo {

public static void main(String args[]) {

Manager mgr = new Manager();

}

}

/\*

Manager()

Manager(), Employee()

Employee(), Manager()

Employee();

\*/

**this() and super() example**

class Employee {

private int id;

private String name;

private float salary;

Employee() {

this.id = 123;

this.name = "Unknown";

this.salary = 8000;

}

Employee(int id) {

this();

this.id = id;

}

Employee(int id, String name) {

//this.id = id;

this(id);

this.name = name;

}

Employee(int id, String name, float salary) {

//this.id = id;

//this.name = name;

this(id,name);

this.salary = salary;

}

void disEmp() {

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

System.out.println("Number of rec "+Employee.rec);

}

static int rec;

void setRecordsDetails(int rec) {

Employee.rec = rec;

}

}

class Manager extends Employee {

int numberOfEmp;

Manager(int id, String name, float salary, int numberOfEmp) {

super(id,name,salary);

this.numberOfEmp = numberOfEmp;

}

void disMgr() {

System.out.println("Number of emp is "+numberOfEmp);

}

}

class Demo {

public static void main(String args[]) {

int record=10;

Manager mgr = new Manager(1,"Ravi",45000,5);

mgr.setRecordsDetails(record);

mgr.disEmp();

mgr.disMgr();

}

}

**Run time polymorphism using object creation**

class A {

void dis1() {

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

}

}

class B extends A {

void dis1() {

System.out.println("A class dis() method override by B class");

}

void dis2() {

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

}

}

class Demo {

public static void main(String args[]) {

A obj1 = new A(); //1 Creating super class object.

obj1.dis1();

B obj2 = new B(); //2 Creating sub class object

obj2.dis1(); obj2.dis2();

//B obj3 = new A(); //3 Super class object and Sub class reference not possible

A obj4 = new B(); //4 Sub class object and super class reference with help of super class references we can

// call only those methods which is a part of super class and overrided methods. This is also known as

//Run time polymorphism.

obj4.dis1(); //5

//obj4.dis2(); //6

B obj5 = (B)obj4; //down level type casting..

obj5.dis1();

obj5.dis2();

}

}

/\*

Valid Object creation in Java.

A. line 5 error

B line 6 error

C no error

D line 5 and 6 error

A. all four

B. 1,2,3

C. 1,2,4

D,1,2

\*/

Another Example using Abstract class

abstract class A {

abstract void dis1();

}

class B extends A {

void dis1() {

System.out.println("A class dis() method override by B class");

}

void dis2() {

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

}

}

class Demo {

public static void main(String args[]) {

A obj4 = new B(); // sub class object and super class reference may super class normal class or abstract class.

obj4.dis1();

}

}

Interface reference

interface A {

void dis1();

}

class B implements A {

public void dis1() {

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

}

void dis2() {

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

}

}

class Demo {

public static void main(String args[]) {

A obj4 = new B(); // sub class object and interface reference. Very Imp

obj4.dis1();

}

}

**Abstraction** : Hiding the internal implementation without knowing background details.

**100% pure abstraction example**

interface A {

int add(int x, int y);

}

interface B {

int sub(int x, int y);

}

class Server implements A,B{

public int add(int x, int y) {

return x+y;

}

public int sub(int x, int y) {

return x-y;

}

public void ownMethod() {

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

}

}

class Demo {

public static void main(String args[]) {

Server s = new Server();

System.out.println(s.add(10,20));

System.out.println(s.sub(10,20));

s.ownMethod();

A obj1 = new Server(); Run time polymorphism

System.out.println(obj1.add(10,20));

//System.out.println(obj1.sub(10,20));

B obj2 = new Server(); Run time polymorphism

//System.out.println(obj2.add(10,20));

System.out.println(obj2.sub(10,20));

}

}

**packages :**

package is a collection of classes and interfaces.

2 types

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

Education

School College Pg

Attendance Attendance Attendance

Package is like a directory or folder which more than one class/interface have same but different purpose.

Syntax

package packgename;

package com;

class Demo {

public static void main(String args[]) {

System.out.println("Welcome to User defined package");

}

}

javac Demo.java

create directory with packageName and paste .class file

and run the command as

java com.Demo

or

javac –d . Demo.java

java com.Demo

IDE :

Netbean

Eclipse

MyEclipse

RAD

Etc

**Eclipse for JEE**

**Access Specifiers :** It use to give the visibility or accessibility of class, variable, method etc.

**private :**

**Using with :**

Instance variable, static variable, non static method, static method, constructor but not with local variable and class.

**Scope :**

Within a same class. (other class we can’t access directly as well as through object).

**default (nothing):**

**Using with :**

We can use with all.

**Scope :**

With a same package. May be non class is non sub class or sub class we can access through object.

**protected :**

**Using with :**

Instance variable, static variable, non static method, static method, constructor but not with local variable and class.

**Scope :**

Within a same package. May be non sub class or sub class other package if it is sub class.

**public :**

**Using with :**

Instance variable, static variable, non static method, static method, constructor, class but not with local variable.

**Scope :**

Within a same package as well as other package.

**Pre-defined package or built in package**

java javax-🡪 root package

lang sql

io swing

util net

sql rmi

net servlet

awt ejb

rmi jms

etc etc

Every package contains lot of classes, interface as well as other sub package.

By default every java program import lang package.

By default every java program extends Object class.

Class part of lang ( Name of the class itself is **Class)**

**class Class {**

**}**

This class is also part of lang package.

**Exception Handling**

**Exception** : Exception is object (memory) which occurs when unexpected or abnormal condition during the execution of a program.

**Java Program**

javac command java run

compile time error run time error

syntax error Error Exception

or

typo error

**Command Line Arguments**

class ExpDemo {

public static void main(String args[]) {

System.out.println("Hi");

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

for(String str:args) {

System.out.println(str);

}

}

public static void main(int args[]) {

System.out.println("Hello");

}

}

Run time error

Error Exception

**Error** : it is a type of error which generate at the run time which we can’t handle it. Ex : JVM Crash, Software issue or hardware issue, Out of memory.

**Exception :** it is a type of error which generated at the run time which we can handle it. Ex : divided zero, array index, null pointer etc

Error and Exception both are pre-defined classes part of lang package.

Object

Throwable

**Error** **Exception**

**Exception**

Group Group

**Checked Exception Unchecked Exception**

**RuntimeException** : pre-defined class

SQLException ArithmeticException

IOException ArrayIndexOutOfBoundsException

InterruptedException NumberFormatException

FileNotFoundException ClassNotFoundException

NullPointerException

InputMismatchException

Etc etc

All checked exception directly or indirectly connected / extends to **Exception** class.

All unchecked exception directly or indirectly connected / extends to Exception class through **RuntimeException**

All unchecked exception sub class RuntimeException class.

To handle both the type of exception java provide five keywords.

1. try
2. catch
3. finally
4. throw
5. throws

try catch block

try {

The code generate exception 1 or more than one line

}catch(Exception e) {

}

try {

1

2

3

4

5

6

7

8

9

10

}catch(Exception e) {

}

try {

1

2

3

4

5

}catch(Exception e) {

}

try {

5

6

7

8

9

10

}catch(Exception e) {

}

Try with single catch : Generic exception and generic solution.

**try {**

**}catch(Exception e){**

**}**

Try with multiple catch block : Specific exception specific treatment.

**try {**

**}catch(ArithmeticExeption e) {**

**}catch(ArrayIndexOutOfBoundsException e) {**

**}catch(NumberFormatException e){**

**}**

**Day 7**

**19/01/2020**

**Finally block :** This block will execute 100% sure if any exception generate or not.

try {

}catch(Exception e){

}finally {

}

Finally block example

class ExpDemo {

public static void main(String args[]) {

System.out.println("Hi");

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 and finally

1. try – catch
2. try – catch –catch –catch
3. try – catch – finally
4. try – catch – catch – catch – finally
5. try – finally

**Finally example**

class ExpDemo {

public static void main(String args[]) {

System.out.println("Hi");

try {

int res = 10/0;

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

}finally {

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

}

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

}

}

try {

open file / open database connection

read or write or store or retrieve

}catch(Exception e){

}finally {

close file or close database connection to close resources

}

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

Syntax

**throw new Exception();**

or

**throw new ExceptionSubClass();**

throw Example

class MyException extends Exception {

MyException() {

super();

}

MyException(String msg) {

super(msg);

//System.out.println("Pameterized constructor");

}

}

class ExpDemo {

public static void main(String args[]) {

int a=10;

int b=5;

try {

//int res = 10/0;

if(a>b) {

//throw new Exception(); // generating exception;

//throw new ArithmeticException();

//throw new ArithmeticException("a>b");

//throw new MyException();

throw new MyException("a is > than b ");

}else {

}

}catch(Exception e) {

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

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

}

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

}

}

**throws :** throws keyword is use to throw exception to caller methods.

Syntax

returnType methodName(parameterList) throws Exception {

}

void dis() throws Exception,ExceptionSubClass {

}

**throws Exception example**

class ExpDemo {

static void dis1() throws ArithmeticException {

try{

int a=10/0;

}catch(ArrayIndexOutOfBoundsException e){}

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

}

static void dis2() throws Exception{

//try{

dis1();

//}catch(Exception e){}

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

}

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

//try{

dis2();

//}catch(Exception e){}

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

}

}

**Checked Exception**

InterruptedException it is type of checked exception we have handle it or throw it using try catch or throws.

Checked exception check twice compile time or run time.

class ExpDemo {

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

System.out.println("Hi");

//try{

Thread.sleep(3000);

//}catch(Exception e){}

System.out.println("Take Tea Break..");

}

}

**Lang package**

By default every java program import lang package.

By default every java class extends Object class.

Imp class and interfaces from lang package

1. String
2. StringBuffer
3. StringBuilder
4. Math
   1. Exception and Type of Exception classes
5. Object
6. Thread
7. Runnable interface
8. Cloneable interface.
9. Wrapper classes

String : In Java String is a reference data type or pre-defined class part of lang package.

In Java every string not end with null character (\n).

Syntax

String str1 = “Welcome to Java Training”; // using string literal

String str2 = new String(“Welcome to Java Training”); //using new keyword.

Assignment 7 : Take n number of names through keywords and display those names in ascending or descending order. (Ignore case sensitive).

String names[]={“Raj”,”ravi”,”Akash”,”ajay”};

Akash, ajay, Raj, ravi 🡪Asc

ravi, Raj, ajay, Akash 🡪Desc

Hint : compareTo() methods or any other ways.

String class Example

**package** com;

**public** **class** StringDemo {

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

String str1 = "Welcome to Java Training";

String str2 = **new** String("Welcome to Java Training");

System.***out***.println(str1);

System.***out***.println(str2);

System.***out***.println(str1.charAt(1));

System.***out***.println(str1.toLowerCase());

System.***out***.println(str1.toUpperCase());

System.***out***.println(str1.length());

System.***out***.println(str1.substring(5));

System.***out***.println(str1.substring(5, 10)); //start 0 index, end 1 position,

System.***out***.println(str1.compareTo(str2));

}

}

compareTo() : This method check both string ASCI code.



== : It always check value as well as reference code of that memory.

equals() : it is use to check the value of two reference. It doesn’t matter same memory or different memory.

String class equals methods example

**package** com;

**public** **class** StringEquals {

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

// **TODO** Auto-generated method stub

String str1 = "Raj"; // string literal

String str2 = "Raj"; // refer to same memory.

String str3 = **new** String("Raj"); // new memory

String str4 = **new** String("Raj"); //new memory

**if**(str3.equals(str4)) {

System.***out***.println("Equal");

}**else** {

System.***out***.println("Not Equal");

}

}

}

String class is known as immutable class. Immutable means can’t change.

String class is immutable string class.

We can create the object of string using string literal or using new keyword.

StringBuffer is mutable string class.

Using new keyword.

**StringBuffer Example**

**package** com;

**public** **class** StringImmutable {

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

String name="Ravi";

System.***out***.println(name); //Ravi

name = name+" Kumar";

System.***out***.println(name); //Ravi or Ravi Kumar

System.***out***.println(name.toUpperCase());

System.***out***.println(name);

System.***out***.println("Using String Buffer");

StringBuffer sb = **new** StringBuffer("Ravi");

System.***out***.println(sb);

System.***out***.println(sb.append(" Kumar"));

sb.insert(4, " Patil");

sb.delete(2, 4);

sb.reverse();

System.***out***.println(sb);

}

}

StringBuilder : It is a type of String mutable class.

StringBuffer class maximum methods are synchronized they are thread safe but slow is performance. StringBuilder methods are not synchronized they are not thread safe but very fast.

**Math:** Math class also known as static class. (When all variable and methods are static that type of class is know static class).

This class use to do some mathematical operation.

**Math.PI**

**Math.sqrt(9);**

**Object class Example**

By default every class extends Object class.

This command is to display all method part of that specific class or interface.

javap java.packageName.className/interfaceName

getClass(); : The return type of methods method is Class class reference.

hashCode();

equals(); Collection Framework

clone();

toString();

wait();

notify();

notifyAll() : Multithreading

finalize()

**JavaBean :**

1. Class must be public
2. Variable must be private.
3. For each variable we have to provide setter and getter methods.
4. Setter method to set the value and getter method to get the value.
5. Insider a setter method we can set the value with terms and conditions.

class Employee {

private int id;

private String name;

private float salary;

public void setId(int id) {

this.id = id;

}

public int getId() {

return id;

}

}

**Normal class :**

1. Class may be public or may not.
2. Instance variable may be private or may not.
3. If variable are private then we have to provide helper method to set the value. The methods name may be anything.

toString() : When we display any user defined class reference in println it internally call toString() method of Object class. That class toString() method return object in String format.

finalize() : This method get call automatically before GC. (Pre-Destructor methods).

**package** com;

**public** **class** Manager {

**void** dis() {

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

}

@Override

**protected** **void** finalize() **throws** Throwable {

// **TODO** Auto-generated method stub

System.out.println("Before GC");

}

}

In main method

Manager mgr = **new** Manager();

mgr.dis();

mgr = **null**; //GC

System.*gc*(); // WE can request to JVM for GC

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

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

**clone :** This method is use to create the clone of the object or duplicate object.

If we are planning to create the clone.

We have to make that class must be implements Cloneable interface part of lang package.

Cloneable is a marker interface.

Marker interfaces doesn’t contains any methods or Zero methods.

clone() : this method is part of object class which help to create to clean. Cloneable interface which support to create the clone.

**Day 8**

**20/01/2020**

**Util Package**

Utility :

Collection Framework (Data Structure) :

int a=10;

array

int abc[];

class Employee {

id,name,salary

}

Employee emp =new Employee();

Array object

Employee emps[]=new Employee[100];

Array memory size fixed.

Emps array can hold only same type of objects.

Primitive array or array object doesn’t provide any pre-defined methods which help to add, remove, search, iterate etc

Collection Framework : It contains set of classes and interfaces which provides set methods with help of those methods we can add any objects or elements (any primitive type (Wrapper classes)) as well as user-defined objects. We can add, remove, search, iterated etc. Memory size no issue.

Collection Framework Hierarchy

javap java.util.List

Iterable -🡪 lang package

extends

Collection -🡪 interface -🡪 util package

extends extends extends doesn’t

List Set Queue Map 🡪 interfaces

Hold collection Collection Collection Key-value pairs

Of elements of elements of where key is Unique

It can allow It doesn’t elements value may be duplicate.

Duplicate elements allow duplicate. FIFO.

Maintain order Some API

Using index position maintains

Order, UnOrder

Sorted.

Deque (interface)

ArrayList HashSet PriorityQueue HashMap

LinkedList LinkedHashSet LinkedHashMap

Vector TreeSet TreeMap

Stack Hashtable

ArrayList :

Normal array :

Normal array is use to store same type of value.

Fixed memory size.

Adding and removing element from array complexity.

ArrayList :

By default ArrayList help use to store same as well as different type of values.

Memory size get increase dynamically.

We can add or remove elements very easily.

**ArrayList Example**

import java.util.\*;

class A {}

class B {}

public class CollectionExpDemo {

public static void main(String args[]) {

ArrayList al = new ArrayList();

al.add(10);

al.add(10.10);

al.add("Ravi");

al.add(true);

A obj1 = new A();

al.add(obj1);

B obj2 = new B();

al.add(obj2);

System.out.println(al);

}

}

Collection of classes is use to store collection of element or objects.

Primitive Data types Wrapper classes

byte Byte

short Short

int Integer

long Long

float Float

double Double

char Character

boolean Boolean

Wrappers classes is use to do type casting.

With help of wrapper classes we can convert primitive to object and vice-versa.

Wrapper class Example

**int a=10;**

**Integer b = new Integer(a); // converting primitive to objects.**

**System.out.println(a);**

**System.out.println(b);**

**int c = b.intValue(); //type casting**

**float d = b.floatValue(); //type casting**

**Float e = b.floatVallue(); // auto-boxing**

**System.out.println(c);**

**System.out.println(d);**

**Auto – boxing**

import java.util.\*;

class A {}

class B {}

public class CollectionExpDemo {

public static void main(String args[]) {

ArrayList al = new ArrayList();

int a=10;

Integer b = new Integer(a);

al.add(b);

al.add(new Integer(100));

al.add(20); // auto-boxing : converting primitive to objects.

al.add(10.20); // auto-boxing : converting primitive to objects.

Integer c =30; //auto-boxing : converting primitive to Integer

System.out.println(c);

}

}

**Primitive Data types**

int a=10;

add, sub, mul, div, mod, >, <.

a is primitive

Wrapper classes

Integer b = new Integer(a);

b is a Integer object

**ArrayList methods**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

ArrayList al = new ArrayList();

al.add(100);

al.add(200);

al.add(300);

al.add(400);

al.add(500);

System.out.println(al);

System.out.println("First value "+al.get(0));

System.out.println("Second value "+al.get(1));

al.add(1,10);

System.out.println(al);

System.out.println("First value "+al.get(0));

System.out.println("Second value "+al.get(1));

al.remove(1); // remove using index position

al.remove(new Integer(400)); // remove using value.

System.out.println(al);

al.set(2,30);

System.out.println(al);

}

}

**LinkedList :** It is a type of List and Queue implementation class. In Java LinkedList Internally provide double linked list features.

Node ---🡪

Ref value

Ref value

Previous value Next

Single Linked List

Double Linked List

Circular Linked list

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

LinkedList al = new LinkedList();

al.add(10);

al.add(20);

al.add(30);

al.addFirst(100);

al.addLast(200);

al.add(1,123);

System.out.println(al);

System.out.println("Get "+al.get(0));

}

}

**Vector :** By default all methods in Vector are synchronized.

Synchronized : Slow in performance and single threaded (thread safe).

Work is safe.

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

Vector vv = new Vector();

vv.add(10);

vv.addElement(20);

System.out.println(vv);

}

}

**Stack :** Stack First In Last Out

Push() : add on top

Pop : retrieve top element

Search() : present or not

Peek() : top select check.

**Stack Example**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

Stack ss = new Stack();

ss.push(100);

ss.push(200);

ss.push(300);

ss.push(400);

System.out.println("Size "+ss.size());

System.out.println(ss);

System.out.println("Pop "+ss.pop());

System.out.println(ss);

System.out.println("Search "+ss.search(300));

System.out.println("Search "+ss.search(3000));

System.out.println("Peek "+ss.peek());

System.out.println(ss);

}

}

**Set :** It doesn’t allow duplicate.

HashSet

LinkedHashSet

TreeSet

Set doesn’t index concept. We have to remove or search element using value.

**HashSet Example**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

HashSet hs = new HashSet();

System.out.println("Size is "+hs.size());

System.out.println("Empty "+hs.isEmpty());

hs.add(3);

hs.add(5);

hs.add("Ravi");

hs.add(1);

hs.add(true);

hs.add(4);

hs.add(5);

System.out.println("Size is "+hs.size());

System.out.println("Empty "+hs.isEmpty());

System.out.println(hs);

hs.remove(5);

System.out.println(hs);

System.out.println("Search "+hs.contains(4));

System.out.println("Search "+hs.contains(10));

hs.clear();

System.out.println("Size is "+hs.size());

System.out.println("Empty "+hs.isEmpty());

System.out.println(hs);

}

}

**LinkedHashSet :** This class internally extends HashSet and maintains the orders.

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

LinkedHashSet hs = new LinkedHashSet();

System.out.println("Size is "+hs.size());

System.out.println("Empty "+hs.isEmpty());

hs.add(3);

hs.add(5);

hs.add("Ravi");

hs.add(1);

hs.add(true);

hs.add(4);

hs.add(5);

System.out.println("Size is "+hs.size());

System.out.println("Empty "+hs.isEmpty());

System.out.println(hs);

hs.remove(5);

System.out.println(hs);

System.out.println("Search "+hs.contains(4));

System.out.println("Search "+hs.contains(10));

hs.clear();

System.out.println("Size is "+hs.size());

System.out.println("Empty "+hs.isEmpty());

System.out.println(hs);

}

}

TreeSet : TreeSet internally implements SortedSet interfaces and SortedSet interface extends Set interface.

TreeSet display the elements in sorting (ascending order by default).

In TreeSet we have to store same types of values otherwise it will throw ClassCastException (type unchecked exception).

TreeSet provided some extra methods

Like subset, headset, tailset etc

**TreeSet**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

TreeSet hs = new TreeSet();

hs.add(3);

hs.add(5);

hs.add(2);

hs.add(1);

hs.add(7);

hs.add(4);

hs.add(5);

hs.add(null);

System.out.println(hs);

System.out.println(hs.tailSet(3));

}

}

**Queue : First In First Out**

PriorityQueue : **First In First Out depending upon the priority (lower priority).**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

PriorityQueue pq = new PriorityQueue();

pq.add(4);

pq.add(2);

pq.add(3);

pq.add(1);

pq.add(2);

pq.add(5);

System.out.println(pq);

System.out.println(pq.poll());

System.out.println(pq);

System.out.println(pq.poll());

System.out.println(pq);

}

}

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

HashMap

LinkedHashMap

TreeMap

Hashtable

**HashMap Example**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

HashMap hm = new HashMap();

hm.put(2,"Ramesh");

hm.put(1,"Rajesh");

hm.put(4,"Lokesh");

hm.put("abc","Ajay");

System.out.println(hm);

hm.put(1,"Balaji");

hm.put(5,"Ramesh");

System.out.println(hm);

if(!hm.containsKey(4)) {

hm.put(4,"Seeta");

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

}

System.out.println(hm);

System.out.println("name is "+hm.get(4));

hm.remove("abc");

System.out.println(hm);

}

}

LinkedHashMap : maintains the order.

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

LinkedHashMap hm = new LinkedHashMap();

hm.put(2,"Ramesh");

hm.put(1,"Rajesh");

hm.put(4,"Lokesh");

hm.put("abc","Ajay");

System.out.println(hm);

}

}

**TreeMap : sorted as a key. Because it internally implements sortedMap interface.**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

TreeMap hm = new TreeMap();

hm.put(2,"Ramesh");

hm.put(1,"Rajesh");

hm.put(4,"Lokesh");

hm.put(3,"Ajay");

System.out.println(hm);

}

}

**Hashtable** : By default all methods are synchronized.

Hashtable doesn’t allow key as null as well as value as null.

Where HashMap allow one key as null and value may be more than one null value.

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

HashMap hm = new HashMap();

//Hashtable hm = new Hashtable();

hm.put(2,"Ramesh");

hm.put(1,"Rajesh");

hm.put(4,"Lokesh");

hm.put(3,"Ajay");

hm.put(null,"Balaji");

hm.put(6,null);

System.out.println(hm);

}

}

Retrieving elements from collection of classes

1. For each loop : type of loop
2. Iterator
3. ListIterator
4. Enumeration : They are interfaces.

**Retrieve Records from Set API**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

Set ss = new HashSet();

ss.add(10); // auto-boxing

ss.add(20);

ss.add(30);

ss.add(40);

ss.add(50);

System.out.println(ss);

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

for(Object a:ss) {

System.out.println(a);

}

System.out.println("Using Iterator");

Iterator ii = ss.iterator();

while(ii.hasNext()) {

Object obj = ii.next();

System.out.println(obj);

}

}

}

Retrieve records from List

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

List ll = new ArrayList();

ll.add(10);

ll.add(20);

ll.add(30);

ll.add(40);

ll.add(50);

System.out.println(ll);

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

for(Object obj: ll) {

System.out.println(obj);

}

ListIterator li = ll.listIterator();

System.out.println("Forward direction");

while(li.hasNext()) {

System.out.println(li.next());

}

System.out.println("Forward direction");

while(li.hasPrevious()) {

System.out.println(li.previous());

}

}

}

**Enumeration Using Vector**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

Vector vv = new Vector();

vv.add(10);

vv.add(20);

vv.add(30);

vv.add(40);

Enumeration en = vv.elements();

while(en.hasMoreElements()) {

Object obj = en.nextElement();

System.out.println(obj);

}

}

}

**Map Example**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

Map mm = new HashMap();

mm.put(1,"RAvi");

mm.put(2,"Rajesh");

mm.put(3,"Lokesh");

/\*for(Objet obj :mm) {

System.out.println(mm);

}\*/

//Iterator ii = mm.iterator();

Set ss = mm.entrySet(); // converting map to set

Iterator ii = ss.iterator();

while(ii.hasNext()) {

//System.out.println(ii.next());

Map.Entry mp = (Map.Entry)ii.next(); //converting set to Map.Entry interface reference

System.out.println("Key is "+mp.getKey()+" , Values "+mp.getValue());

}

}

}

**Collection Framework with different type of values with Generics**

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

List ll = new ArrayList();

ll.add(10); // auto-boxing

ll.add(10.10);

ll.add("Ravi");

ll.add(20);

Object obj = ll.get(1);

if(obj instanceof Integer) {

Integer i = (Integer)obj;

int n = i.intValue();

System.out.println(n);

}

if(obj instanceof Double) {

Double i = (Double)obj;

double n = i.doubleValue();

System.out.println(n);

}

}

}

**Generics**

**Collection Framework with Generics**

CollectionClassName <Type>referenceName = new CollectionClass<Type>();

Set<Type> std = new HashSet<Type>();

Type may be all wrapper classes or user defined class object or string class.

Set<Integer> ss = new HashSet<Integer>();

import java.util.\*;

public class CollectionExpDemo {

public static void main(String args[]) {

List<Integer> ll = new ArrayList<Integer>();

ll.add(100); // auto-boxing : converting primitive to object

//ll.add("Ravi");

//ll.add(30.40);

ll.add(200);

ll.add(300);

int n = ll.get(0); // auto - unboxing : converting object to primitive

System.out.println(n);

}

}

**Collection Framework with Complex Object**

**Employee.java**

**package** bean;

**public** **class** Employee {

**private** **int** id;

**private** String name;

**private** **float** salary;

**public** **int** getId() {

**return** id;

}

**public** **void** setId(**int** id) {

**this**.id = id;

}

**public** String getName() {

**return** name;

}

**public** **void** setName(String name) {

**this**.name = name;

}

**public** **float** getSalary() {

**return** salary;

}

**public** **void** setSalary(**float** salary) {

**this**.salary = salary;

}

**public** Employee(**int** id, String name, **float** salary) {

**super**();

**this**.id = id;

**this**.name = name;

**this**.salary = salary;

}

**public** Employee() {

**super**();

// **TODO** Auto-generated constructor stub

}

@Override

**public** String toString() {

**return** "Employee [id=" + id + ", name=" + name + ", salary=" + salary + "]";

}

}

**DemoTest.java**

package main;

import java.util.ArrayList;

import java.util.Iterator;

import java.util.List;

import bean.Employee;

public class DemoTest {

public static void main(String[] args) {

List<Employee> listOfEmp = new ArrayList<Employee>();

Employee emp1 = new Employee();

emp1.setId(100);

emp1.setName("Ravi");

emp1.setSalary(14000);

Employee emp2 = new Employee(101, "Ramesh", 16000);

System.out.println("Number of Records are "+listOfEmp.size());

listOfEmp.add(emp1);

listOfEmp.add(emp2);

listOfEmp.add(new Employee(102,"Rakesh",18000));

//System.out.println("Number of records are "+listOfEmp.size());

//listOfEmp.remove(0);

//System.out.println("Number of records are "+listOfEmp.size());

//listOfEmp.remove(emp2);

//System.out.println("Number of records are "+listOfEmp.size());

Iterator<Employee> ii = listOfEmp.iterator();

while(ii.hasNext()){

//Object obj = ii.next(); //without ii.next() method return type is Object class reference.

//Employee emp = (Employee)obj; // down level type casting.

//System.out.println("id is "+emp.getId()+" Name is "+emp.getName()+"Salary is "+emp.getSalary());

//System.out.println(emp);

Employee emp = ii.next();

System.out.println(emp);

}

}

}

**Arrays and Collections -🡪classes**

Both are static classes (all methods are static). Which provide set of methods which to do some operation of primitive array(Arrays) and List (Collections) classes respectively.

Soring for primitive values

**package** main;

**import** java.util.Arrays;

**public** **class** DemoTest1 {

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

**int** abc[]= {4,3,1,6,5,2,7,9,8};

System.***out***.println("Before sorting");

**for**(**int** n:abc) {

System.***out***.print(n+" ");

}

System.***out***.println();

System.***out***.println("After sorting");

Arrays.*sort*(abc);

**for**(**int** n:abc) {

System.***out***.print(n+" ");

}

}

}

**Collections.sort**

**package** main;

**import** java.util.ArrayList;

**import** java.util.Collections;

**import** java.util.List;

**public** **class** DemoTest2 {

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

List<String> listOfStd = **new** ArrayList<>();

listOfStd.add("Vijay"); listOfStd.add("Mahesh"); listOfStd.add("Dinesh");

listOfStd.add("Vikash"); listOfStd.add("Ajay");

System.***out***.println("For each loop Before sort");

**for**(String name:listOfStd) {

System.***out***.print(name+"--");

}

Collections.*sort*(listOfStd);

System.***out***.println("\nAfter sorting Asc");

**for**(String name:listOfStd) {

System.***out***.print(name+"--");

}

Collections.*reverse*(listOfStd);

System.***out***.println("\nAfter sorting Desc");

**for**(String name:listOfStd) {

System.***out***.print(name+"--");

}

}

}

**Comparable and Comparator**

By default all wrapper + String class internally implements Comparable interface. That interface contains compareTo() method. This method help to do sorting.

**Day 9**

**21/01/2020**

**Assignment 7 : Comparator**

Employee -🡪 id,name,salary

Sorting by Id Asc, Desc

Sorting by Name Asc, Desc

Sorting by Salary Asc, Desc

Write Sample example to sort by Id, Name or Salary option takes through keyboards.

Sort by what

Id

Asc /Desc

Name

Asc /Desc

Salary

Asc/Desc

**2nd Mini Project**

**Sprint 1**

Product 🡪 bean package

pid, pname, price

ProductService -🡪 service package don’t use System.out.println🡪 in service

List/Set/Map of Product object.

Business methods

addProduct : object as a parameter (product) from main

product id must be unique

display result in main

updateProduct –object as parameter

update price using pid

deleteProduct 🡪 pid

delete using pid

displayAllProudct()

return all product

retrieveProductPrice()

using productId

main

Product Operation

Main Method

do {

1:Add

2:Update

3:Delete

4:DisplayAll

5: price using Id

switch(){

}

}while()

**IO Package**

Input Output Operation

**Stream :** Flow of data or it is abstraction between source and destination.

Source 🡪 keyboard, file, network, database etc

Destination 🡪 monitor (console), file, network ,database etc.

System.out.println(“”);

System.in

System is a pre-defined class part of lang package.

in, out,err are static property or reference.

in is a Reference of **InputStream**

out and err is a Reference of **PrintStream**

PrintStream ps = System.out;

ps.println(“Welcome to Java.”);

ps is a reference of Standard output device ie monitor.

InputStream is = System.in;

is is a reference of Standard input device ie keyboard.

IO

Stream

byte char

Input Output Input Output

Abstract classes

InputStream OutputStream Reader Writer

DataInputStream DataOutputStream InputStreamReader,OutputStreamWriter

FileInputStream FileOutputStream FileReader, FileWriter

BufferedInputStream BufferedOutputStream BufferedReader ,BufferedWriter

ObjectInputStream,OutputOutputStream

PrintStream PrintWriter

**Byte wise**

Source 🡪 Keyboard

Destination 🡪 Console

**package** com;

**import** java.io.DataInputStream;

**import** java.io.PrintStream;

**public** **class** ByteWiseInputAndOutputOperation {

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

DataInputStream dis = **new** DataInputStream(System.***in***);

PrintStream ps = System.***out***;

ps.println("Enter the id ");

**int** id = Integer.*parseInt*(dis.~~readLine~~()); //convert string to int

ps.println("Enter the name");

String name = dis.~~readLine~~();

ps.println("Enter the salary");

**float** salary = Float.*parseFloat*(dis.~~readLine~~());

ps.println("Id is "+id);

ps.println("Name is "+name);

ps.println("Salary is "+salary);

}

}

**Byte wise**

Source 🡪 Keyboard

Destination 🡪 File

**package** com;

**import** java.io.DataInputStream;

**import** java.io.FileOutputStream;

**public** **class** ByteWiseFileOperation {

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

DataInputStream dis = **new** DataInputStream(System.***in***);

FileOutputStream fos = **new** FileOutputStream("abc.txt");

System.***out***.println("Enter the data");

**int** ch;

**while**((ch=dis.read()) != '@') {

System.***out***.println(ch +"="+(**char**)ch);

fos.write(ch);

}

fos.close();

System.***out***.println("File created");

}

}

**Byte wise**

Source 🡪 File

Destination 🡪 File

**package** com;

**import** java.io.FileInputStream;

**import** java.io.FileOutputStream;

**public** **class** ByteWiseFileOperation1 {

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

FileInputStream fis = **new** FileInputStream("C:\\Users\\91990\\Desktop\\Innoserv Online Training\\Java New Training Notes\\fullstacktrainingforzensar\\Java Programs\\ExpDemo.java");

FileOutputStream fos = **new** FileOutputStream("info.txt");

**int** ch;

**while**((ch=fis.read()) != -1){ //'a' or '@' EOF in java -1 is consider as EOF

fos.write(ch);

}

fis.close();

fos.close();

System.***out***.println("File copied...");

}

}

Buffer : It is temporary memory : It is use to improve the performance of file operation.

**Byte wise with Buffered Operation with file handling**

**package** com;

**import** java.io.BufferedInputStream;

**import** java.io.BufferedOutputStream;

**import** java.io.FileInputStream;

**import** java.io.FileOutputStream;

**public** **class** ByteWiseFileOperation1 {

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

FileInputStream fis = **new** FileInputStream("C:\\Users\\91990\\Desktop\\Innoserv Online Training\\Java New Training Notes\\fullstacktrainingforzensar\\Java Programs\\ExpDemo.java");

BufferedInputStream bis = **new** BufferedInputStream(fis); // connect to buffer

FileOutputStream fos = **new** FileOutputStream("info.doc");

BufferedOutputStream bos = **new** BufferedOutputStream(fos);

**int** ch;

**while**((ch=bis.read()) != -1){ //'a' or '@' EOF in java -1 is consider as EOF

bos.write(ch);

}

bos.flush();

fis.close();

fos.close();

System.***out***.println("File copied...");

}

}

**Char wise classes**

Source 🡪Keyboard

Destination 🡪 console

**package** com;

**import** java.io.BufferedReader;

**import** java.io.InputStreamReader;

**public** **class** CharcaterWiseInputOperation {

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

//InputStreamReader isr = new InputStreamReader(System.in);

//BufferedReader br = new BufferedReader(isr);

BufferedReader br = **new** BufferedReader(**new** InputStreamReader(System.***in***));

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

**int** id = Integer.*parseInt*(br.readLine());

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

String name = br.readLine();

System.***out***.println("Enter the salary");

**float** salary = Float.*parseFloat*(br.readLine());

System.***out***.println("id is "+id);

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

System.***out***.println("salary s "+salary);

}

}

**Character wise file operation**

**package** com;

**import** java.io.FileReader;

**import** java.io.FileWriter;

**public** **class** CharacterwiseFileOperation {

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

FileReader fr = **new** FileReader("info.txt");

FileWriter fw = **new** FileWriter("D:\\infodetails.txt");

**int** ch;

**while**((ch=fr.read()) != -1) { // read data till end -1 EOF

fw.write(ch);

}

fr.close();

fw.close();

System.***out***.println("File copied...");

}

}

**Assignment 9:**

**File Assignment**

1. Convert all file information in upper case in target file.
2. Convert all file information in lower case in target file
3. Convert all sentence first letter in upper case.
4. Display number of character present in file.
5. Display number of words present in file.

Store and Retrieve primitive data types like id,name,salary

DataInputStream with FileInputStream :

DataOutputStrream with FileOutputStream :

**Object Serialization :** Storing the object itself or object property or converting object into stream or serializable format is known as Object Serialization.

Object -🡪property, behaviour and identity

Id,name,salary 🡪 property

toString() or user defined -🡪 behaviour

identity 🡪 emp

**Object De-Serialization** : converting stream object back to object format is known as Object De-Serialization.

Which class object do you want to do serialization that class must be implements Serializable interface.

Serializable interface is a type of maker interface.

It support to do Serialization.

**2nd Mini Project**

**Sprint 2**

Product Object Stored permanently in external file.

**Hint : (Collection Framework to store multiple objects)**

**JDBC**

**Java Database Connectivity :** JDBC is a API(Application Programming interface) which provide set of classes and interfaces which help to connect database (oracle, mysql, db2 or sql server) through Java Technologies.

Steps to connect MySQL database through Java Technologies.

1. import java packages

java.sql.\*;

javax.sql.\*;

1. Write user-defined method or main method with exception handling concept ie try-catch or throws because JDBC through SQLException checked exception.
2. Load the Driver

Driver : piece of software.

Driver : It is pre-defined API provided by vendor whose database going to connect.

**4 types**

1. Type 1 : JDBC ODBC Bridge Driver : removed from Java8 onward. OS Dependent. Performance wise slow. ODBC code written using C.
2. Type 2 : JDBC Native API Driver : Database dependent. Performance very fast.
3. Type 3 : JDBC Net protocol Driver : Server(Web Logic, JBoss, GlashFish) where we have configure Database Source Features.
4. Type 4 : JDBC Pure or thin Driver . Download jar file respective that database. Jar file is database dependent. JDBC type 4 code written using Java.

Class.forName(“driverName”)

Class is a pre-defined class part of lang package. Which contains forName() static method which help to load the driver(API).

1. Establish the connection :

DriverManager is a pre-defined class provided getConnection static method. which takes three parameter url, username,password etc.

DriverManager.getConnection(url,username,password);

**getConnection()** method return type is Connection interface reference.

1. Create Statement :

Types of Statement

1. Statement
2. PreparedStatement
3. CallableStatement

Statement, PreparedStatement, CallableStatement all are interfaces which provide set of methods which help to do some operation on table or procedure or functions.

Syntax to create the Statement

**Statement stmt = con.createStatement();**

* 1. Retrieve :

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

executeQuery method return type is ResultSet interface

reference.

* 1. DML Operation

int res = stmt.executeUpdate(“DML Operation”);

Insert may be exception

Or

res 1

if(res>0) {

System.out.println(res);

}

Delete and update count depending query get effected.

No record effected count is 0 else number records effect hold by count variable.

Statement : Statement interface doesn’t support parameterized query concept.

When we execute any query using Statement, query get compile on java side, send to database, then execute in database and get the acknowledgement may be success or failure.

PreparedStatement : it support parameterized query concept.

When we execute any query using PreparedStatement query compile once and execute n number of times in database.

Using PreparedStatement we can improve the performance.

PreparedStatement reference is use for only one query at time.

Callable Statement is use to execute Stored Procedure or Function from database.

Stored Procedure or Function : Executing more than one query with terms and conditions and stored with named block.

**Sprint 3 Release**

**Day 10**

**22/01/2020**

**Java 7 Features**

In switch we can use variable type is String reference.

switch(variableName) {

case 1 or ‘a’ or “abc”:

}

Try with more than one exception in single catch block syntax

**package** com;

**public** **class** TryWithMutlipleException {

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

**try** {

} **catch** (ArithmeticException | ArrayIndexOutOfBoundsException e) {

}**catch** (NumberFormatException e) {

}

}

}

Try with resources

**Try without Resource with finally**

package com;

import java.io.FileInputStream;

import java.io.FileOutputStream;

public class TryWithOutResource {

public static void main(String[] args) {

FileInputStream fis = null;

FileOutputStream fos = null;

try {

fis = new FileInputStream("C:\\Users\\91990\\Desktop\\Innoserv Online Training\\Java New Training Notes\\fullstacktrainingforzensar\\Java Programs\\Demo.java");

fos = new FileOutputStream("xyz.txt");

int ch;

while((ch=fis.read()) != -1) {

fos.write(ch);

}

} catch (Exception e) {

System.err.println(e);

}finally {

try {

fis.close();

fos.close();

}catch (Exception e) {

// TODO: handle exception

}

}

}

}

**Try with Resources**

In Sprint 2 we have to use exception handling try with resources

**try(**

**Create the object of those classes which class implements AutoCloseable.**

**) {**

**}catch(Exception e) {**

**}**

**Try with resources**

**package** com;

**import** java.io.FileInputStream;

**import** java.io.FileOutputStream;

**public** **class** TryWithResource {

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

**try**(

FileInputStream fis = **new** FileInputStream("C:\\Users\\91990\\Desktop\\Innoserv Online Training\\Java New Training Notes\\fullstacktrainingforzensar\\Java Programs\\Demo.java");

FileOutputStream fos = **new** FileOutputStream("xyz.txt");

)

{

**int** ch;

**while**((ch=fis.read()) != -1) {

fos.write(ch);

}

}**catch** (Exception e) {

// **TODO**: handle exception

System.***err***.println(e.toString());

}

}

}

**Try with Resources**

**package** com;

**class** Employee **implements** AutoCloseable{

**void** display() {

System.***out***.println("business method");

}

@Override

**public** **void** close() **throws** Exception {

// **TODO** Auto-generated method stub

System.***out***.println("close method called..");

}

}

**public** **class** TryWithUserdefinedResource {

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

**try**(Employee emp = **new** Employee()) {

emp.display();

}**catch**(Exception e) {}

}

}

**Java 8 Features**

**Interface :**

Interface can contains method with body from Java8.

But method must be default or static.

interface A {

void dis1();

default void dis2() {

System.out.println("Default dis2() method implementation");

}

default void dis3() {

dis2();

System.out.println("Default dis2() method implementation");

}

static void dis4() {

System.out.println("Default static implementation");

}

}

class B implements A{

public void dis1() {

System.out.println("dis1() method override by B class");

}

public void dis3() {

System.out.println("dis3() default implementation override by B class");

}

}

class Java8Features {

public static void main(String args[]) {

B obj1 = new B();

obj1.dis1();

obj1.dis2();

obj1.dis3();

A.dis4();

}

}

**Functional interfaces :**

The interface which contains only method is known as functional interface. This interface can contains more than one default as well as static but only one abstract methods.

**Functional Interface**

@FunctionalInterface

interface A {

void dis1();

//void dis2();

default void dis3() {}

static void dis4() {}

default void dis5() {}

}

class Java8Features {

public static void main(String args[]) {

}

}

**Inner classes (Java5 onwards).**

Class within another class is known as inner class.

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

**Non Static Inner class**

class Outer {

int a;

void dis1(){

System.out.println("Outer class dis() method");

Inner in = new Inner();

//in.dis2();

}

class Inner {

int b;

void dis2() {

System.out.println("Inner class dis2() method "+a);

//dis1();

}

}

}

class InnerClassDemo {

public static void main(String args[]) {

Outer out = new Outer();

out.dis1();

//Inner in = new Inner();

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

in.dis2();

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

in1.dis2();

Outer.Inner in2 = new Outer().new Inner();

in2.dis2();

}

}

**Static Inner class**

class Outer {

int a;

void dis1(){

System.out.println("Outer class dis() method");

}

static class Inner {

int b;

void dis2() {

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

}

}

}

class InnerClassDemo {

public static void main(String args[]) {

//Outer.Inner in1=new Outer().new Inner(); //Non static Inner class

Outer.Inner in2 = new Outer.Inner(); //Static Inner class

in2.dis2();

}

}

**Anonymous Inner Class**

interface A {

void dis1();

}

class B implements A {

public void dis1() {

System.out.println("B class implements A interface method");

}

}

class InnerClassDemo {

public static void main(String args[]) {

A obj1 = new B(); //Runtime polymorphism

obj1.dis1();

A obj2 = new A(){

public void dis1() {

System.out.println("A interface implementation provided by anonymous inner class first logic");

}

};

obj2.dis1();

A obj3 = new A(){

public void dis1() {

System.out.println("A interface implementation provided by anonymous inner class second logic");

}

};

obj3.dis1();

}

}

**Local Inner class**

class InnerClassDemo {

public static void main(String args[]) {

class Inner {

void dis1() {

System.out.println("Local Inner class");

}

}

Inner in = new Inner();

in.dis1();

}

}

**Lambda Expression**

Lambda Expression is a type of anonymous Inner function or methods.

From Java8 onwards we can say Java is procedure, object oriented and functional programming language like JavaScript.

Inner or nested functions.

Lambda expression we have use only those interface which is known as Functional interfaces.

Simple Lambda Expression Example

@FunctionalInterface

interface A {

void dis1();

}

class B implements A {

public void dis1() {

System.out.println("B class implements A interface method");

}

}

class Java8Features{

public static void main(String args[]) {

//1st way

A obj1 = new B();

obj1.dis1();

//2nd way

A obj2 = new A(){

public void dis1() {

System.out.println("A interface implementation provided by anonymous inner class first logic");

}

};

obj2.dis1();

//3rd way using lambda expression

A obj3 = ()->System.out.println("dis1() method implementation provided by lambda expression");

obj3.dis1();

A obj4 = () -> {

System.out.println("1st statement");

System.out.println("2nd statement");

};

obj4.dis1();

}

}

**Another Example for lambda**

@FunctionalInterface

interface Calculation {

public int add(int x, int y);

}

class Java8Features{

public static void main(String args[]) {

Calculation c1 = (a,b)->a+b;

System.out.println(c1.add(1,2));

Calculation c2 = (int a,int b)->a+b;

System.out.println(c2.add(3,4));

Calculation c3 = (int x,int y)->x+y;

System.out.println(c3.add(5,6));

Calculation c4 = (int x, int y)->{

int sum = x+y;

return sum;

};

System.out.println(c4.add(7,8));

}

}

**Lambda Expression with passing object and return objects**

class Employee {

String name;

float salary;

}

@FunctionalInterface

interface EmployeeInterface {

public Employee passEmployee(Employee emp);

}

class Java8Features{

public static void main(String args[]) {

Employee emp1 = new Employee();

emp1.name="Ravi Kumar";

emp1.salary=24000;

EmployeeInterface empInf = (emp)->{

emp.salary = emp.salary+2000;

return emp;

};

Employee emp2 = empInf.passEmployee(emp1);

System.out.println("Name is "+emp2.name+" Salary is "+emp2.salary);

}

}

**Predefined functional interfaces**

**function** package is a package. It is sub package of util packages.

**Top level functional interfaces**

javap java.util.function.Function

javap java.util.function.Predicate

javap java.util.function.Consumer

javap java.util.function.Supplier

1. **Function :**  apply() function. Takes T parameter and return R value.
2. **Predicate :** test() : which takes T as parameter and return boolean value.
3. **Consumer :** accept() takes T as parameter and no return type.
4. **Supplier :** get() no parameter and return T value.

**Function code**

**package** com;

**import** java.util.function.Function;

**class** MyFunction **implements** Function<Integer, String>{

@Override

**public** String apply(Integer t) {

**return** "You pass value as "+t;

}

}

**public** **class** FunctionDemoTest {

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

Function<Integer, String> r = **new** MyFunction();

System.***out***.println(r.apply(100));

Function<Integer,Integer> r1 = (val)->val+100;

System.***out***.println(r1.apply(200));

}

}

**Consumer Code**

**package** com;

**import** java.util.function.Consumer;

**class** MyConsumer **implements** Consumer<Float>{

@Override

**public** **void** accept(Float t) {

System.***out***.println(t);

}

}

**public** **class** MyConsumerDemo {

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

Consumer<Float> c1 = **new** MyConsumer();

c1.accept(10.10f);

c1.accept(20.20f);

Consumer<Integer> c2 = (v)->System.***out***.println(v);

c2.accept(100);

c2.accept(200);

}

}

**Supplier Code**

**package** com;

**import** java.util.function.Supplier;

**class** DemoSupplier **implements** Supplier<String>{

@Override

**public** String get() {

// **TODO** Auto-generated method stub

**return** "Welcome to Java8 Features";

}

}

**public** **class** MySupplier {

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

Supplier<String> s = **new** DemoSupplier();

System.***out***.println(s.get());

Supplier<String> s1 = ()->"Welcome Java8 Features using Lambda Expression";

System.***out***.println(s1.get());

}

}

**Predicate Code**

**package** com;

**import** java.util.function.Predicate;

**class** MyPredicate **implements** Predicate<Integer>{

@Override

**public** **boolean** test(Integer t) {

// **TODO** Auto-generated method stub

**return** t>100;

}

}

**public** **class** PredicateDemoTest {

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

Predicate<Integer> p1 = **new** MyPredicate();

System.***out***.println(p1.test(50));

System.***out***.println(p1.test(150));

Predicate<String> p2 = (name)->name.length()>10;

System.***out***.println(p2.test("Ravi Kumar"));

System.***out***.println(p2.test("Ajay Kumar Patil"));

}

}

**ArrayList using forEach method**

**package** com;

**import** java.util.ArrayList;

**import** java.util.Iterator;

**import** java.util.List;

**import** java.util.function.Consumer;

**public** **class** ForEachMethodDemo {

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

List<String> stdNames = **new** ArrayList<String>();

stdNames.add("Ravi"); stdNames.add("Seeta");stdNames.add("Reeta");stdNames.add("Ajay");

stdNames.add("Ramu"); stdNames.add("Teeta");stdNames.add("Lokesh");stdNames.add("Vijay");

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

**for**(String name:stdNames) {

System.***out***.print(name+" ");

}

System.***out***.println();

System.***out***.println("Using Iterator");

Iterator<String> li = stdNames.iterator();

**while**(li.hasNext()) {

String name = li.next();

System.***out***.print(name+" ");

}

System.***out***.println();

System.***out***.println("Using Constumer with Lambda Expression");

stdNames.forEach(val->System.***out***.print(val+" "));

}

}

**Stream API:**

**Stream API** is use to process collection of data from collection framework or primitive array. Stream API provide lot method, those methods we can use as a pipe line to load the data on demand. Stream hold the data form temporary purpose.

**Intermediate operator as well as terminal operator**

**Intermediate operator return stream itself.**

**Where terminal operator return non stream means void, int, float, Boolean etc.**

**Intermediate operator is use to solve the business requirement.**

**Collection**

**--🡪 Stream -🡪 in1-🡪in2-🡪in3-🡪in4-🡪Tr.**

**Array of primitive**

**Stream get destroy.**

**Stream doesn’t change your origin data.**

**Day 11**

**23/01/2020**

**Stream API**

Collection framework or Data Structure is an in-memory data structure to hold value and before we start using in Collection. First we have to load the all values or populated all values using loop or iterator or Enumeration etc. If we do any changes in data original data get effected.

Using Stream API we can load the data on-demand. Stream doesn’t effect or update origin data.

Using Stream we can apply one or more operation on stream data.

Stream operator or methods divided into two types

1. Intermediate operator or methods. This method return type is Stream reference or object.
2. Terminator operator or methods. This method return type is non Stream means primitive type or void type.

Streaming You tube video

Source Data

Collection Framework

With primitive or

Complex object -🡪 Stream -🡪 I1🡪I2-🡪In--🡪T: primitive type or

void or Collection or primitive array.

Primitive array --🡪 Stream

Stream API’s Intermediate operator or terminal operator take the help of lambda expression with functional interface or Method reference to achieve the task on demand.

**Stream Example**

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**import** java.util.stream.IntStream;

**import** java.util.stream.Stream;

**public** **class** StreamCreationTest {

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

//1st way Primitive types

//Stream<Integer> s1 = Stream.of(10,20,30,40,50,60);

//s1.forEach(v->System.out.print(v+" "));

//2nd Way Integer object

//Integer abc[]= {10,20,30,40,50,60};

//Stream<Integer> s1 = Stream.of(abc);

//s1.forEach(v->System.out.print(v+" "));

//3rd way primitive array

//int abc[]= {10,20,30,40,50,60};

//IntStream s1 = IntStream.of(abc);

//s1.forEach(v->System.out.print(v));

//4th way Collection

//List<String> listOfStd = new ArrayList<>();

//listOfStd.add("Ravi"); listOfStd.add("Ramesh"); listOfStd.add("Ajay");

//listOfStd.add("Vikash"); listOfStd.add("Akash");

//Stream<String> s1 = listOfStd.stream();

//s1.forEach(v1->System.out.print(v1+" "));

//5th Way Collection with complex object

List<Employee> listOfEmp = **new** ArrayList<>();

listOfEmp.add(**new** Employee(100, "Ravi", 16000));

listOfEmp.add(**new** Employee(101, "Ramesh", 19000));

listOfEmp.add(**new** Employee(102, "Raju", 12000));

listOfEmp.add(**new** Employee(103, "Rakesh", 15000));

Stream<Employee> s1 = listOfEmp.stream();

//s1.forEach(e->System.out.print(e.getId()+" "));

//s1.forEach(e->System.out.print(e.getName()+" "));

//s1.forEach(e->System.out.print(e.getSalary()+" "));

//s1.forEach(e->System.out.println(e));

//listOfEmp.stream().forEach(emp->System.out.println(emp));

}

}

**Map** map is a one type of intermediate operator. Map() produce a new stream applying for each value or data or the original stream.

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**import** java.util.stream.Stream;

**public** **class** StreamWithMap {

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

List<Employee> listOfEmp = **new** ArrayList<>();

listOfEmp.add(**new** Employee(100, "Vikash", 16000));

listOfEmp.add(**new** Employee(101, "Ajay", 19000));

listOfEmp.add(**new** Employee(102, "Mahesh", 12000));

listOfEmp.add(**new** Employee(103, "Rakesh", 15000));

//1st way

//Stream<Employee> s1 = listOfEmp.stream();

//Stream<Employee> s2 = s1.map(emp->emp); // generic map

//s2.forEach(emp->System.out.println(emp));

//2nd way

//listOfEmp.stream().map(emp->emp).forEach(emp->System.out.println(emp));

//3rd : Using map passing emp object and return only name

//listOfEmp.stream().map(emp->emp.getName()).forEach(emp->System.out.print(emp+" "));

//System.out.println();

//listOfEmp.stream().forEach(emp->System.out.print(emp.getName()+" "));

//4th : using map passing emp object and return only name in upper case

//listOfEmp.stream().map(emp->emp.getName().toUpperCase()).forEach(emp->System.out.print(emp+" "));

//5th : using map passing emp object and return only name in upper case with sorted..

// listOfEmp.stream().map(emp->emp.getName().toUpperCase()).sorted().forEach(name->System.out.println(name));

//6th way Dispaly by Id and salary

//listOfEmp.stream().map(emp->emp).forEach(emp->System.out.println("id is "+emp.getId()+" Salary "+emp.getSalary()));

}

}

Filter() : Filter accept a predicate to filter all elements of the stream. This operator is intermediate operator. To get the data from filter() we have to connect terminal operator.

**Filter example**

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**public** **class** StreamWithFilter {

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

// **TODO** Auto-generated method stub

List<Employee> listOfEmp = **new** ArrayList<>();

listOfEmp.add(**new** Employee(100, "Vikash", 16000));

listOfEmp.add(**new** Employee(101, "Ajay", 19000));

listOfEmp.add(**new** Employee(102, "Mahesh", 12000));

listOfEmp.add(**new** Employee(103, "Rakesh", 15000));

//1st filter by id

//listOfEmp.stream().filter(emp->emp.getId()==100).forEach(emp->System.out.println(emp));

//2nd filter by Name

//listOfEmp.stream().filter(emp->emp.getName().contains("e")).forEach(emp->System.out.println(emp));

//3rd Filter by salary

//listOfEmp.stream().filter(emp->emp.getSalary()>15000).forEach(emp->System.out.println(emp));

//4th Filter with Map to display Name with salary condition

//float salary = 16000;

//listOfEmp.stream().filter(emp->emp.getSalary()>salary ).map(emp->emp.getName()).forEach(name->System.out.println(name));

//listOfEmp.stream().filter(emp->emp.getSalary()>15000).forEach(name->System.out.println(name));

//5th filter with two conditions

listOfEmp.stream().filter(emp->emp.getSalary()>15000 && emp.getId()==101).map(emp->emp.getName()).forEach(name->System.***out***.println(name));

}

}

**collect:** This is know as Terminal operator which help to repacking the elements or data into collections.

DAO Layer

**Collect example**

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**import** java.util.Set;

**import** java.util.stream.Collectors;

**public** **class** StreamWithCollect {

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

List<Employee> listOfEmp = **new** ArrayList<>();

listOfEmp.add(**new** Employee(100, "Vikash", 16000));

listOfEmp.add(**new** Employee(101, "Ajay", 19000));

listOfEmp.add(**new** Employee(102, "Mahesh", 12000));

listOfEmp.add(**new** Employee(103, "Rakesh", 15000));

System.***out***.println("Before Stream Number of records are "+listOfEmp.size());

//1st Way Collect all object with filter the data.

//List<Employee> listOfEmp1 = listOfEmp.stream().filter(emp->emp.getSalary()>=16000).collect(Collectors.toList());

//System.out.println("Number of Records are "+listOfEmp1.size());

//2nd Way Collect only name with filter data

//List<String> names = listOfEmp.stream().filter(emp->emp.getSalary()>=16000).map(emp->emp.getName()).collect(Collectors.toList());

//System.out.println("Names are "+names.size());

//System.out.println(names);

//3rd Way Collect all object with filter the data and store in Set

//Set<Employee> listOfEmp1 = listOfEmp.stream().filter(emp->emp.getSalary()>=16000).collect(Collectors.toSet());

//System.out.println("Number of Records are "+listOfEmp1.size());

}

}

More intermediate operator

**skip(), limit(),distinct() etc**

**Terminal Operator**

count()

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**public** **class** StreamWithIntermediateOperator {

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

List<String> listOfStd = **new** ArrayList<>();

listOfStd.add("Ramesh"); listOfStd.add("Ajay");

listOfStd.add("Ajay");listOfStd.add("Vikash");

listOfStd.add("Mahesh"); listOfStd.add("Dinesh");

listOfStd.add("Seeta");listOfStd.add("Meeta");

//1st all names

listOfStd.stream().forEach(name->System.***out***.print(name+" "));

//2st all names with skip few names

System.***out***.println();

listOfStd.stream().skip(3).forEach(name->System.***out***.print(name+" "));

//3rd limit the names

System.***out***.println();

listOfStd.stream().limit(4).forEach(name->System.***out***.print(name+" "));

//4th distinct

System.***out***.println();

listOfStd.stream().distinct().forEach(name->System.***out***.print(name+" "));

//5th count

**long** numberOfRec = listOfStd.stream().count();

System.***out***.println();

System.***out***.println("Number of records "+numberOfRec);

//6th count with remove duplicate

**long** uniqueRec = listOfStd.stream().distinct().count();

System.***out***.println();

System.***out***.println("Number of records "+uniqueRec);

}

}

reduce() : It is a type of terminal operator which help to generate result base upon the conditions.

**max(),**

**min()**

**avg()**

**reduce example**

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**import** java.util.Optional;

**public** **class** StreamWithReduce {

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

List<String> listOfStd = **new** ArrayList<>();

listOfStd.add("Ramesh"); listOfStd.add("Ajay");

listOfStd.add("Ajay");listOfStd.add("Vikash");

listOfStd.add("Mahesh"); listOfStd.add("Dinesh");

listOfStd.add("Seeta");listOfStd.add("Meeta");

Optional<String> str = listOfStd.stream().filter(s->s.endsWith("b")).reduce((s1,s2)->s1+""+s2);

**if**(str.isPresent()) {

System.***out***.println("yes");

}**else** {

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

}

}

}

**match()** : match operator are type of terminal operator which return type is Boolean base upon the intermediate filter() operator.

**Match operator**

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**public** **class** StreamWithMatchOperation {

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

List<String> listOfStd = **new** ArrayList<>();

listOfStd.add("Ramesh"); listOfStd.add("Ajay");

listOfStd.add("Ajay");listOfStd.add("Vikash");

listOfStd.add("Mahesh"); listOfStd.add("Dinesh");

listOfStd.add("Seeta");listOfStd.add("Meeta");

//1st match operation

**boolean** res1 = listOfStd.stream().anyMatch(name->name.startsWith("A"));

//2nd match operation

**boolean** res2 = listOfStd.stream().allMatch(name->name.startsWith("A"));

//3rd operation

**boolean** res3 = listOfStd.stream().noneMatch(name->name.startsWith("B"));

System.***out***.println(res1);

System.***out***.println(res2);

System.***out***.println(res3);

}

}

**Method Reference :**

Java 8 Provide method reference concept. Method reference is use to refer method of functional interface. It is compact and easy form of lambda expression. Method is reference is a replacement of lambda expression.

To achieve the method reference we have to use

**::** Opterator

Static method reference

Non static method reference

Constructor method reference

**package** com;

**interface** A {

**void** dis1();

}

**class** B {

**public** **static** **void** dis1() {

System.***out***.println("This is static method reference");

}

}

**class** C {

**public** **void** dis1() {

System.***out***.println("This non static method reference");

}

}

**public** **class** MethodReferenceDemo {

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

A obj1 = ()->System.***out***.println("Provided by using Lambda Expression 1 time");

obj1.dis1();

A obj2 = ()->System.***out***.println("Provided by using Lambda Expression 1 time");

obj2.dis1();

// Non static method reference

A obj3 = B::*dis1*; // Link B class with static Method reference concept.

obj3.dis1();

A obj4 = B::*dis1*;

obj4.dis1();

C ref = **new** C();

A obj5 = ref::dis1; // Link C class with Non static method reference concept

obj5.dis1();

}

}

**Stream API with method Reference**

**package** com;

**import** java.util.ArrayList;

**import** java.util.List;

**import** java.util.function.Function;

**public** **class** SteamWithMethodRefernce {

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

Function<String, Integer> str = (op)->Integer.*parseInt*( op);

System.***out***.println(str.apply("100"));

Function<String, Integer> str1 = Integer :: *parseInt*;

System.***out***.println(str1.apply("100"));

List<String> listOfStd = **new** ArrayList<>();

listOfStd.add("Ramesh"); listOfStd.add("Ajay");

listOfStd.add("Ajay");listOfStd.add("Vikash");

listOfStd.add("Mahesh"); listOfStd.add("Dinesh");

listOfStd.add("Seeta");listOfStd.add("Meeta");

//Retrieve all records using lambda expression

System.***out***.println("Using Lambda Express");

listOfStd.stream().forEach(v->System.***out***.print(v+" "));

System.***out***.println();

System.***out***.println("Using Method reference");

//Retrieve all records using Method reference.

listOfStd.stream().forEach(System.***out***::print);

}

}

**Spring2 Limitation : Storing the data in file base system**

**Sprint 3 : Storage file system replace by database system.**

**Database as well as Java8 Stream API**

**3nd Mini Project**

**Sprint 3**

Product 🡪 bean package

pid, pname, price,datepurchase

Pure Business Logic

ProductService -🡪 service package don’t use System.out.println🡪 in service

List/Set/Map of Product object.

addProduct() : product object as parameter

price > 500 Before calling database

Dao method call to store the records

deleteProduct() delete using Pid no business logic

updateProduct() no business logic

pid, price

displayProduct() after retrieve business logic

20% + actual price using Stream API

dispalyAllProductLowPrice() Asc Price

displayAllProductHighPrice() Des Price

displayAllProductName() Asc

displayAllProductName() Desc Using Stream API

ProductDao : dao package

DAO Layer (Pure JDBC Logic)

addProduct(Product pp) {

JDBC code to store the product

Primary key

}

deleteProduct(pid ) {

}

updateProduct(Product pp) {

}

List<Product> retrieveAllProduct() {

Using ResultSet retrieve all records and convert to object and store in List/Set/Map

}

Product table 🡪 Product class

PID pid

PName pname

PRICE price

main

Product Operation

Main Method

do {

1:Add

2:Update

3:Delete

4:DisplayAll

5: ProductNameAsc

6:ProductNameDesc

7:PriceLow

8:PriceHigh

switch(){

}

}while()

Before Java 8 to work with Date API

**Date :** Part of Util package.

This Date class contains few method to do basic operation.

To do more complex operation we were depending upon Calendar class.

Calendar is a type of abstract class.

If we want to format the date we depend up the SimpleDateFormat class part of **text** package.

Date class part of util package is **mutable** date class.

setDate() and getDate() we were using clone concept with date api not allow to change my dateOfJoinng or DateOfBirth property.

Java 8 Date

All date operation related classes kept in **time** package.

In Java8 all date classes immutable means we can’t changes actual date details.

**Multi threading :**

Program : Set of instruction to perform a specific task.

Process : time taken to execute the code or program in process.

Processor : Processor is responsible to execute the code.

Thread : Thread is a small execution of a code within a process. Thread also known as light weighted process.

Heavy : Processor is a heavy weighted means takes more memory or more resource for your machine to do the task.

Thread are light weighted process which takes less memory or less resources from your machine to do the task.

By default java is thread base programming language. Inside a main method always one default thread will execute.

Thread : Thread is a pre-defined class part of lang package. Which contains currentThread() method and it is a static method.

Thread.currentThread();

currentThread() method return type is Thread class reference.

Thread t = Thread.currentThread();

System.out.println(t); Thread[main,5,main];

main 🡪 name of the thread

5🡪 priority of the thread

main 🡪 group of the thread

Norm priority 🡪 5

Max priority 🡪10

Min priority 🡪1

We can’t set less 1 or we can’t set more than 10.

**Default Thread Demo**

**package** com;

**public** **class** DefaultThreadDetails {

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

Thread t = Thread.*currentThread*();

System.***out***.println(t);

String name = t.getName();

System.***out***.println("Name of the thread "+name);

**int** i = t.getPriority();

System.***out***.println("Priority of the thread "+i);

t.setName("My Thread");

t.setPriority(2);

System.***out***.println(t);

t.setPriority(Thread.***MAX\_PRIORITY***);

System.***out***.println(t);

t.setPriority(0);

System.***out***.println(t);

}

}

Multi tasking

1. Process base
2. Thread base

Task1 Task2 Task3

Basic concept (Creating user defined Thread)

1. Extends Thread class
2. Implements Runnable interface.

Extends thread class

1. User-defined class and extends Thread class
2. Create the thread class reference.
3. Using the reference class start(). It is a part of Thread class which help to thread to ready to start (Runnable state).
4. start() method internally call run() method. Thread class contains run() method with empty body.
5. If we want to execute any user-defined code then we have to override run() method.

**Extends Thread example**

**package** com;

**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);

}

}

}

**public** **class** ExtendsThreadClassTest {

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

// **TODO** Auto-generated method stub

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

B obj2 = **new** B(); // thread class reference.

obj1.start();

obj2.start(); // ready to run not running yet . Runnable state.

}

}

**Implements Runnable interface**

**package** com;

**class** C **implements** Runnable{

@Override

**public** **void** run() {

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

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

}

}

}

**class** D **implements** Runnable {

@Override

**public** **void** run() {

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

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

}

}

}

**public** **class** ImplementsRunnableInterface {

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

C obj1 = **new** C();

D obj2 = **new** D();

//obj1.start();

//obj2.start();

Thread t1 = **new** Thread(obj1); // Thread class parameterized constructor receive the parameter as Runnable interface reference.

Thread t2 = **new** Thread(obj2);

t1.start();

t2.start();

}

}

**Thread life cycle**

isAlive()

join()

sleep()

wait()

notify()

notifyAll()

Create ----------------🡪 Runnable----------🡪 running ----------🡪Destroy

obj1/obj2 obj1.start() run() i=10

t1/t2 t1.start() run() j=10

**join** This method is use join child thread to parent thread so parent thread will wait till child thread get destroy.

**Life cycle method example**

**package** com;

**class** Task1 **implements** Runnable{

@Override

**public** **void** run() {

Thread t = Thread.*currentThread*();

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

System.***out***.println(t+" "+i);

**try** {

Thread.*sleep*(500);

} **catch** (Exception e) {

// **TODO**: handle exception

}

}

}

}

**class** Task2 **implements** Runnable {

@Override

**public** **void** run() {

Thread t = Thread.*currentThread*();

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

System.***out***.println(t+" "+j);

**try** {

Thread.*sleep*(1000);

} **catch** (Exception e) {

// **TODO**: handle exception

}

}

}

}

**public** **class** ThreadLifeMethods {

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

Task1 obj1 = **new** Task1();

Task2 obj2 = **new** Task2();

Thread t1 = **new** Thread(obj1);

Thread t2 = **new** Thread(obj2);

t1.setPriority(Thread.***MAX\_PRIORITY***);

t2.setPriority(Thread.***MIN\_PRIORITY***);

t1.setName("Bike 1");

t2.setName("Bike 2");

System.***out***.println("1...");

Thread.*sleep*(1000);

System.***out***.println("2...");

Thread.*sleep*(1000);

System.***out***.println("3...");

Thread.*sleep*(1000);

System.***out***.println("Game Start...");

//System.out.println("First Thread "+t1.isAlive());

//System.out.println("Second Thread "+t2.isAlive());

t1.start();

t2.start();

//t1.start();

//System.out.println("First Thread "+t1.isAlive());

//System.out.println("Second Thread "+t2.isAlive());

t1.join();

t2.join();

System.***out***.println("Game End....");

}

}

**Synchronization :** synchronization is use to achieve locking mechanism. Which help to lock or block or use all resource or particular resource for only one thread at time.

To achieve synchronization java provide synchronized keywords.

Synchronized keyword we can use with method or block.

**package** com;

**import** java.awt.print.Book;

**class** Booking **implements** Runnable{

**int** avl=1;

@Override

**public** **synchronized** **void** run() {

String name = Thread.*currentThread*().getName();

**if**(avl==1) {

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

avl=avl-1;

}**else** {

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

}

}

}

**public** **class** BookingTest {

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

Booking b1 = **new** Booking();

//Booking b2 = new Booking();

//Booking b3 = new Booking();

Thread t1 = **new** Thread(b1,"Ravi");

Thread t2 = **new** Thread(b1,"Ajay");

Thread t3 = **new** Thread(b1,"Vijay");

t1.start();

t2.start();

t3.start();

}

}

wait(), notify(), notifyAll() : Inter Thread communication.

This 3 methods belong to Object. (check why 3 method in Object class).

Wait() method is use to make the thread to wait() or suspend. Notify method is use to call back waited thread or resume suspended thread.

More than one thread must be created in same memory.

The method must be synchronized.

**Wait(), notify(), notifyAll()**

**package** com;

**class** Abc **implements** Runnable{

@Override

**public** **synchronized** **void** run() {

String name = Thread.*currentThread*().getName();

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

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

**try** {

Thread.*sleep*(1000);

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

wait();

}

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

wait();

}

**if**(name.equals("Vijay") && i==2) {

notifyAll();

}

} **catch** (Exception e) {

// **TODO**: handle exception

}

}

}

}

**public** **class** WaitAndNotifyExample {

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

Abc obj1 = **new** Abc();

Thread t1 = **new** Thread(obj1, "Ajay");

Thread t2 = **new** Thread(obj1, "Vijay");

Thread t3 = **new** Thread(obj1, "Mahesh");

t1.start();

t2.start();

t3.start();

}

}

Wait(), notify() and notifyAll()

**Assignment : Consumer Producer**

Consumer and Producer : using inter thread communication

Put and Get

Pay amount and Get Ticket : Resources

Withdraw and Deposit : Amount Resources

Deposit put consumer

Withdraw get produce

Deposit put consumer

Withdraw get produce

Deposit put

Withdraw

Deposit

Withdraw

**Day 12**

**27/01/2020**

Deadlock : When two thread try to access other thread resources which already lock by same thread in synchronized method. Both the thread are waiting to release the lock that time dead lock occurs.

**DeadLock mechanism**

class A implements Runnable {

String s1,s2;

A(String s1, String s2) {

this.s1 = s1;

this.s2=s2;

}

public void run() {

synchronized(s1) { //lock s1 java object

System.out.println("Thread1 object lock as s1"+s1);

try{

Thread.sleep(1000);

System.out.println("Thread1 is waiting for to release the resource");

}catch(Exception e){}

synchronized(s2) {

System.out.println("Thread1 object lock as s2");

}

}

}

}

class B implements Runnable {

String s1,s2;

B(String s1, String s2) {

this.s1 = s1;

this.s2=s2;

}

public void run() {

synchronized(s2) { // s2 lock

System.out.println("Thread1 object lock as s2");

try{

Thread.sleep(1000);

System.out.println("Thread2 is waiting for to release the resource");

}catch(Exception e){}

synchronized(s1) {

System.out.println("Thread1 object lock as s1");

}

}

}

}

class DeadLock {

public static void main(String args[]) {

String str1="Java";

String str2="Python";

A obj1 = new A(str1,str2);

B obj2 = new B(str1,str2);

Thread t1 = new Thread(obj1);

Thread t2 = new Thread(obj2);

t1.start();

t2.start();

}

}

**Testing :**

It is use to find the defect or bugs or error in the application.

Input keyboards, file, database, networking

Process

Output monitor, file, database, networking

Initialization or read value of a and b

Computer sum = b+b

Display the value or write the value.

public int add(int x, int y) {

int sum = x+x;

return sum;

}

**No main method :**

**Testing :**

**Black box testing : Input Output**

**White box testing : Input Process Output**

**Unit testing :** Unit means where you are writing the code it may be function or class or package or module.

The code do only one type of specific operation.

**jUnit :** jUnit is a small framework provided by third party vendor which help to do the unit testing for the Java code.

Unit concept is base upon the **assert Assumption.**

**Download the jar file from net**

**junit-4.12 or junit-4.10**

**hamcrest-all-1.3 or**

**jUnit Test Case : jUnit test case is type of class which help to do the testing or validate the function functionality depending upon the application requirements.**

**jUnit Test Suite : A jUnit Test suite is a collection of test cases that grouped for test execution.**

**3nd Mini Project**

**Sprint 3a**

Product 🡪 bean package

pid, pname, price,datepurchase

Pure Business Logic

ProductService -🡪 service package don’t use System.out.println🡪 in service

List/Set/Map of Product object.

addProduct() : product object as parameter

price > 500 Before calling database

Dao method call to store the records

deleteProduct() delete using Pid no business logic

updateProduct() no business logic

pid, price

displayProductUsingMargin() after retrieve business logic

20% + actual price using Stream API or without Stream API

displayAllProduct(): Call DAO Method

dispalyAllProductLowPrice() Asc Price

displayAllProductHighPrice() Des Price

displayAllProductName() Asc

displayAllProductName() Desc

Using Stream API but don’t call DAO methods

**Resource Layer**

Get Db Connection

Singleton (optional)

DAO Layer (Pure JDBC Logic)

addProduct(Product pp) {

JDBC code to store the product

Primary key

}

deleteProduct(pid ) {

}

updateProduct(Product pp) {

}

List<Product> retrieveAllProduct() {

Using ResultSet retrieve all records and convert to object and store in List/Set/Map

}

Product table 🡪 Product class

PID pid

PName pname

PRICE price

jUnit testing package

Testing for Service Layer

Testing for Dao Layer

Testing for Resource Layer

jMockit

Mock Testing

**Web Application**

HTML,CSS,JavaScript

DAO and Service layer

Data Access Object : Pure database logic.

1. If we change form one database to another database. Then query get change.
2. Predefined function in database are different.

Service Layer : Pure business Logic

Server Layer

1. Store records in table after condition satisfied
2. After retrieve records from database apply conditions on data.
3. Before store and after retrieve apply condition .
4. Depending upon on table configuration do operation on another tables.
5. Some time don’t want to condition as of now. It can implement in future.

**GOF :**

**Day 13**

**28/01/2020**

DAO Method return types

DML Operation

Insert Delete and Update

executeUpdate() : return type is int

Select Query with primary key where clause

executeQuery() : return type must be Complex object like Customer, Employee, Account

Select query with all records or where with non primary key value

executeQuery() : returnType must be collection Set/List/Map with complex object.

executeUpdate() : return type int DML

executeQuery() : return type ResultSet Select

execute() : return Boolean DDL

TestSuite : Testsuite contains or collection of more than one testcases

TestSuite contains more than one TestCases and TestCase contains more than on @Test Annotation methods and Very @Test Annotation methods contains more than assertXXX.

jUnit Testing classes test only its that class (Service, DAO, Bean) functionality not that class dependencies.

Mock: Using Mocking mechanism we have to give the fake data to the testing.

Third party framework

jMockit

jEasyMock

jMockito

etc

**jMockito :** It provide set of API to do Mock the objects.

**package** test;

**import** **static** org.junit.Assert.\*;

**import** **static** org.mockito.Mockito.*when*;

**import** org.junit.Test;

**import** org.junit.runner.RunWith;

**import** org.mockito.InjectMocks;

**import** org.mockito.MockitoAnnotations.~~Mock~~;

**import** org.mockito.runners.MockitoJUnitRunner;

**import** com.EmployeeDao;

**import** com.EmployeeService;

@RunWith(MockitoJUnitRunner.**class**)

**public** **class** EmployeeTestMock {

@~~Mock~~

EmployeeDao ed; //mock object for DAO layer

//@Test

**public** **void** testMock() {

//EmployeeService es = new EmployeeService();

*when*(ed.simpleMessage()).thenReturn("hello"); //fake return type

*assertEquals*(ed.simpleMessage(), "hello hi");

}

@Test

**public** **void** testAccountBalance() {

// EmployeeDao ed = new EmployeeDao();

//when(ed.getAccountBalance(1010)).thenReturn(10000.0f); //fake amount return

*when*(ed.getAccountBalance(1010)).thenCallRealMethod();

*assertEquals*(ed.getAccountBalance(1010), 100,0.0);

}

}

**Java**

**J2SE J2EE J2ME**

**JavaSE JavaEE JavaME**

**JSE JEE JME**

**Java Enterprise Micro**

**Standard Edition Edition Edition**

**Core Java**

**AWT GUI JDBC MySQL/Oracle**

**Swing**

**Standalone application or Desktop application**

**The application which running on one machine is known as standalone application.**

**Limitation of Standalone application**

1. To run that application we required necessary software in every machine.
2. Using standalone we can develop single user application.
3. In Future if we want to do any changes we have to update every machines mandatory.

**Web Application**

http://[www.google.com](http://www.google.com) -🡪 URL (Uniform Resource Locator )

---------req(http/https)------🡪

Client Server

🡨-----res(http/https)------

HTML

HTML : Hyper text Markup language which is use to create the web pages.

HTML is use to create static as well as dynamic web page.

**HTML 1,2,3,4,5 etc**

**CSS**

**CSS** Cascading Style sheet.CSS provide lot of formatting style which help to create good look and feel type of application as well as with help of CSS we can

achieve separation of concern.

**Actual Content and Formatting style.**

**CSS 1, 2 and 3**

**JS : JavaScript**

**JavaScript** : JavaScript was object based interpreter scripting language. Which help to do validation on client side as well as to create dynamic web page.

Now a day we can do validation using

1. JavaScript
2. HTML5 Features.

CGI : Process base

JEE : Thread base, Secure

Servlet , JSP and EJB

Servlet

JSP : Java Server Pages

Enterprise Java Bean

Asp.net

Php

Python

Node JS

HTML

CSS

JavaScript

XML /JSON : format of data . which help to share the data between two technologies.

Servlet

JSP

EJB : Web application using Java technologies.

**HTML :** Hyper text markup language. It is use to create the web pages.

HTML provide lot of pre-defined tags or elements

Syntax

<tagName> opening tag

</tagName> closing tag

Few tag contains no closing tar or self closing tags.

HTML is not a case sensitive.

1. Html : divided into two part head and body part
2. Head
3. Body

Write html program

Save the program with any name with extension .html or .html

1. Title : This tag is use to display the title message of browser title bar.

This tag must in between head tag.

Body tags contents

1. Paragraph tag : p
2. Heading tag : 6 types
   1. H1 largest
   2. H2
   3. H3
   4. H4
   5. H5
   6. H6 smallest
3. b :bold
4. i : italics
5. u : underline

**Attribute :** Attribute is know as properties of a tags. We can write attribute in opening tag in the form of key/value or name/value pairs.

Syntax

<tagName name1=’value1’ name2=”value2” name3=value3></tagName>

<p align=’center’></p>

<h1 align=”right”></h1>

**Font :** it is use to change the color, size and style (face)

To add image

<img src=”NameOftheImage.formatOfImage”/>

<img src=”pathOfImage.formatOfImage”/>

**Linking from one page to another page**

Hyperlink help to connect one page to another page

1. external hyperlink

<a href=”tagetPageName.html”>Text</a>

a means anchor tag

href hyperreference

1. internal hyperlink or bookmark

**List Tags**

1. Unorder List
2. Order list
3. Definition List

**Table Tags**

**Id Name Salary**

100 Ravi 12000

101 Ramesh 14000

Tr 🡪 table row

Th🡪 table heading

Td 🡪 table data

**Day 14**

**29/01/2020**

**Form Tags**

**Login Page**

Creating HTML form component

<input type=”text/password/radio/checkbox/button/reset/submit/file” />

By default form method is consider as Get method. if method is get information send through url using query param concept.

URL?key=value&key=value&key=value&key=value

Data is not a secure if method is Get.

If you want to secure data. Then we have use post method

<form action="home.html" method="post">

<label>UserName</label>:<input type="text" name="user"/><br/>

<label>Password</label>:<input type="password" name="pass"/><br/>

<input type="button" value="Submit"/>

<input type="submit" value="Sign In!"/>

<input type="reset" value="Clear"/>

</form>

**CSS :** Cascading Style Sheet

1. CSS provide set of property and value with the help of those property and value we can apply good look and feel for we page which is not possible with the help of HTML tags.
2. Without CSS actual contents and formatting style combined in one place. Means we can’t achieve separation of concern.

3 types of CSS

1. Inline CSS

Syntax

<tagName style=”property:value;property:value;”></tagName>

P,h1, h6,form,div, span, ol, ul, li etc

1. Internal or embedded CSS

It must be in head tag

<style>

Selector {property:value;property:value}

</style>

Selector

1. Universal selector : \*

\* {color:blue;}

1. Specific selector

tagName {property:value;property:value}

p {color:blue}

h1 {color:red}

div{color:orange}

1. Multi specific selector :

tagName,tagName,tagName {property:value}

h1,div {color:red}

1. Class selector : Local class selector

tagName.className {property:value}

p.abc {color:red}

p.xyz{color:green}

<p class=”abc”>Welcome to HTML Page</p>

<p>Welcome to HTML Page</p>

<p class=”xyz”>Welcome to HTML Page</p>

1. Global class selector :

.className {property:value}

.mno {color:yellow}

1. Id selector :

Id selector means unique and class selector is group of the tags.

1. External CSS

We have to create external CSS file with rules and save the file with extension .css

Then in every web page we have to include the external CSS file

Write this tag in between head tag

<link rel="stylesheet" type="text/css" href="abc.css"/>

**Div** : it is known as container tag or collection or combination of more than one tags.

**Tag and Attribute**

Tag can contains more than one child tags

Attribute can’t extendable.

<div>

This is simple message

</div>

If tag contains only message then it is known as **simple tag**

<div>

<p></p>

<b></b>

<div></div>

</div>

If tag contains only message then it is known as **complex tag**

HTML 4.x

URL.dtd (Document Type Definition) This file contains the rules about the HTML tags.

<!doctype PUBLIC url=”path.dtd”>

Rules

<html>

<head></head>

<body></body>

</html>

HTML 5.x

<!doctype HTML/>

UI Technologies

Notepad ++

Bracket

VSCode

Atoms

Eclipse

**Product Management System or Online Shopping**

Customer and SalesPerson

ProductApp

Product Table 🡪 PId,Pname,Price,storeDate

**Assignment in UI -1**

**4 pages**

**index.html or login.html**

UserName TextField username and password

Password Password admin (salesperson)

RadioButton

Customer SalesPerson

Submit Reset

**SignUp Page through hyperlink**

**customerCreate.html**

**FirstName**

**Gender**

**Age**

**PhNumber**

**UserName**

**Password**

**Submit Reset**

**Two dashboards**

**Admin or SalesPerson**

**Customer Dashboards**

**JavaScript :**

JavaScript was object based interpreter scripting language.

**ES5 Features**

**ECMA Script : European Computer Manufacture Association**

ECMA is a concept.

Implementation of ECMA is JavaScript.

Object Based Vs Object Oriented :

Syntax

<script type=”text/JavaScript” Language=”JavaScript”> opening tag

</script> closing tag

This tag we can write in between head or body of html web page.

HTML : Content

CSS : look and feel or presentation

JS : action or event

Internal JavaScript file

**.html**

JavaScript is a case sensitive. It is not mandatory every statement in JavaScript end with semi colon.

**variable :** In JavaScript we can declare the variable using keywords as var

var variableName;

data types in JavaScript

1. number (int and float)
2. string
3. boolean
4. object reference
5. undefined

**Operators :**

1. Arithmetic Operator
2. Relational Operator
3. Conditional Operator
4. Assignment operator
5. Increment and decrement
6. typeOf()
7. = == ===

If statement

Switch statement

Looping

While loop

Do while loop

For loop

**Function and events**

function : function is use to write set of instruction to perform a specific task.

Two types

1. Pre-defined function
   1. alert(“msg”) : it is use display the pop up message.
   2. prompt(“Msg”): This function is uses to receive the value from keyboards.
2. User-defined function

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    </script>

</head>

<body>

    <script type="text/JavaScript">

    //alert("Welcome to User defined function.")

    //var name = prompt("Enter the name")

    //alert("User Name is "+name);

    //var a = prompt("Enter the value of a ")

    //var b = prompt("Enter the value of b ")

    //var sum = eval(a)+eval(b);

    /\*

    parseInt() : it is use to convert string to int

    parseFloat(): it is use to covnvert string float

    eval() : it is use to cvonert to number

    \*/

    //alert("sum is "+sum);

    var res = confirm("select any button")

    alert(res);

    </script>

</body>

</html>

**Assignment 2**

do {

1: add alert()

2 : sub prompt

eval

switch(){

case 1: add

case 2: sub

}

confirm()

}while(var);

**User-defined function**

Syntax

function functionName(parameterList) {

}

User-defined function

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

        function display() {

                alert("Welcome to User defined function")

        }

        function add(a,b){

            var sum = a+b;

            alert("Sum of two number is "+sum)

        }

        function empInfo(id,name,salary,desg){

                if(desg==="Manager"){

                    salary=salary+5000;

                }else if(desg==="Programmer"){

                    salary = salary+3000;

                }else {

                    salary + salary +1500;

                }

                return salary;

        }

        function sayHello() {

            return "Welcome to My Function"

        }

        display();

    </script>

</head>

<body>

    <script type="text/JavaScript">

    add(100,200);

    var updatedSalary = empInfo(100,"Ramesh",25000,'Programmer');

        alert(updatedSalary);

        var msg = sayHello();

        alert(msg)

    </script>

</body>

</html>

**Events :** Event is a interaction between user and components (All html tags, forms components like button, text fields, checkbox, radio button).

Event provide the bridge between html code and JavaScript function.

Type of events

All event in JavaScript start with on followed by name of the events.

onClick

onDblClick

onMouseOver

onMouseOut

onKeyUp

onKeyDown

onSubmit

onBlur

onFocus

onChange

onLoad

onUnLoad

etc

DOM : Document Object Model : DOM Provide set of property and function which help to read, write and update html tags value dynamically.

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    function display() {

       // alert("Welcome to User defined function")

       //1st way

       //document.formName.componentName.value

       //var userName =  document.ff.user.value;

       //alert("Welcome "+userName);

       //2nd way

       var userName = document.getElementById("user1").value;

       alert("UserName is "+userName)

    }

    </script>

</head>

<body>

    <form name="ff">

        <label>UserName</label>

        <input type="text" name="user" id="user1"/><br/>

        <input type="button" value="Click here" onclick="display()"/>

    </form>

</body>

</html>

Assignment 3

Online Calculator



**Form Validation**

1. Using JavaScript
2. Using HTML 5 Features

Div and span

Div is also known as Container tag which can contains more than one different type of tags. Div has internally logic which automatically contents display in next after first or second div.

<p><span style=”color:red”>Welcome</span> to <span style=”green”>My</span> Web <span style=”color:blue”>Page</span> </p>

Welcome in red

My in green

Page in blue

**HTML5 Validation**

Required

Minlegth

Maxlength

Pattern using Regular Expression

[abc]

[abc]? : optional o or 1

[abc]\* : 0 and many

[abc]+ : 1 and many

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    function validate() {

      var user = document.getElementById("user").value;

      var pass = document.getElementById("pass").value;

      if(user.length==0){

        document.getElementById("e1").innerHTML="User Name is required"

        document.getElementById("e2").innerHTML=""

          return false;

      }else if(pass.length==0){

          document.getElementById("e2").innerHTML="Password is required"

          document.getElementById("e1").innerHTML=""

          return false;

      }

      else {

          return true;

      }

    }

    </script>

</head>

<body>

    <p><span style="color:red;">Welcome</span> to <span style="color:green;">My</span> Web <span style="color:blue">Page</span> </p>

    <h2>Login Page - Validation using JavaScript</h2>

    <form action="home.html" method="get" onsubmit="return validate()">

        <label for="">UserName</label>

        <input type="text" name="user" id="user"><span id="e1" style="color:red;"></span>

        <br/>

        <label for="">Password</label>

        <input type="password" name="pass" id="pass"><span id="e2" style="color:red;"></span>

        <br/>

        <input type="submit" value="submit">

    </form>

    <h2>Login Page - Validation using HTML5</h2>

    <form action="home.html" method="get">

        <label for="">UserName</label>

        <input type="text" name="user" required>

        <br/>

        <label for="">Password</label>

        <input type="password" name="pass" required>

        <br/>

        <input type="submit" value="submit">

    </form>

    <br/>

    <form action="home.html">

        <label for="">FirstName</label>

        <input type="text" name="fname" id="fname" required minlength="3"><br/>

        <label for="">LName</label>

        <input type="text" name="lname" id="lname" required maxlength="8"><br/>

        <label for="">EmailId</label>

        <input type="email" name="email" id="email" required><br/>

        <label for="">EmployeeId</label>

        <input type="text" name="empId" id="empId" required pattern="ZEN\d{3}"><br/>

        <br/>

        <in

        <input type="submit"/>

    </form>

</body>

</html>

**Assignment 4 : Validation using HTMl5 as well as JavaScript**

**Login username,password and radio button using HTML5**

**Username is required**

**Password : it must contains 1 digit, 1 alphabets, 1 special symbol and minimum 5 and max 8 (alphanumerical character).**

**Customer Account Creation Validation using JavaScript**

FirstName,LastName,Age, gender, phNumber, username,password

firstName and lastName required,

age > 21

gender required

phNumber : 10 digits (it must be number)

username :

password :

**it must contains 1 digit, 1 alphabets, 1 special symbol and minimum 5 and max 8 (alphanumerical character).**

**JavaScript Regular Expression object.**

**Code using HTML5 and JavaScript Validation**

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript" src="externalValidation.js"></script>

</head>

<body>

    <p><span style="color:red;">Welcome</span> to <span style="color:green;">My</span> Web <span style="color:blue">Page</span> </p>

    <h2>Login Page - Validation using JavaScript</h2>

    <form action="home.html" method="get" onsubmit="return validate()">

        <label for="">UserName</label>

        <input type="text" name="user" id="user" onkeyup="validateUser()">

        <span id="e1" style="color:red;"></span>

        <br/>

        <label for="">Password</label>

        <input type="password" name="pass" id="pass"><span id="e2" style="color:red;"></span>

        <br/>

        <input type="submit" value="submit">

    </form>

    <h2>Login Page - Validation using HTML5</h2>

    <form action="home.html" method="get">

        <label for="">UserName</label>

        <input type="text" name="user" required>

        <br/>

        <label for="">Password</label>

        <input type="password" name="pass" required>

        <br/>

        <input type="submit" value="submit">

    </form>

    <br/>

    <form action="home.html">

        <label for="">FirstName</label>

        <input type="text" name="fname" id="fname" required minlength="3"><br/>

        <label for="">LName</label>

        <input type="text" name="lname" id="lname" required maxlength="8"><br/>

        <label for="">EmailId</label>

        <input type="email" name="email" id="email" required><br/>

        <label for="">EmployeeId</label>

        <input type="text" name="empId" id="empId" required pattern="ZEN\d{3}"><br/>

        <br/>

        <in

        <input type="submit"/>

    </form>

</body>

</html>

Employee Table

PK FK

EmpId FName LName Age ProductId

100 Akash Kale 38 123

101 Akash Kale 32 124

102 Ravi Patil 34 123

PK

ProjectId ProjectName Startdate EndDate

123 Java

124 Python

JavaScript was object based

objects : property and behaviour

2 types

Pre-defined object

object

property

behaviour

object

property

behaviour

object

property

behaviour

object

BOM Hierarchy : Browser Object Model : Meta data information

DOM Hierarchy : Document Object Mode : data information

window : property

behaviour

document

property

behaviour

object

User-defined object

window.document.write()

alert()

prompt()

eval()

confirm()

document.write()

<div>

<p class=”abc” id=”p1”>Hi</p>

<p class=”abc” id=”p2”>Hello</p>

<p class=”abc” id=”p3”>How r you</p>

</div>

var res = document.getElementById(“p1”).value Hi

var node = document.getElementsByClassName(“abc”);

node[0].value; Hi

**JavaScript asynchronous pre-defined functions**

**Synchronous communication**

**L1**

**L2**

**L3**

**Abc()**

**Xyz()**

**Mno()**

**Client Server**

**1st -----------------🡪**

**2nd ------------------🡪**

**3rd -------🡪**

**nth req -🡪**

**Asynchronous communication**

Set of statement execute independently or user defined function execute independently or n request execute independent.

AJAX : Asynchronous JavaScript and XML

setTimeout()

setInterval()

clearInterval()

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    var i=0;

    function display() {

        var obj = new Date();

        document.getElementById("info").innerHTML=obj;

        if(i%2==0){

            document.bgColor="red"

        }else {

            document.bgColor="blue"

        }

        i++;

    }

    function abc(){

        setTimeout("display()",3000);

    }

    var obj;

    function xyz(){

        obj = setInterval("display()",1000);

    }

    function mno() {

        clearInterval(obj);

    }

    </script>

</head>

<body>

    <input type="button" value="call display" onclick="display()"/>

    <input type="button" value="setTimeout" onclick="abc()"/>

    <input type="button" value="setInterval" onclick="xyz()"/>

    <input type="button" value="clearInterval" onclick="mno()"/>

    <div id="info">

    </div>

</body>

</html>

**Display all images as a banner (Product Images)**

**Using setInterval() with document.getElementById() property**

JavaScript Basic Pre-defined objects

Array

Date

String

Boolean

Number

Html -🡪 Node or Root node

Head body

Meta p

Title h1

**Assignment:**

**Array Object all methods code**

**JSON**

JavaScript Object Notation : It is use to share the data between two technologies. Json store the information in the form key-value pairs like a Map.

Convert String to json and json to String.

Syntax

{“key”:value,”key”:value}

Value may be number, Boolean,

Simple JSON Data of one records

var obj = '{"id":100,"name":"Ravi"}';       // obj consider as string data.

    document.write(obj);

    document.write("<br/>")

    var id = obj.id;

    document.write("id is "+id);

    var name = obj.name;

    document.write("<br/>name is "+name);

        var objJson = JSON.parse(obj);      // converting string to json

    document.write("<br/>")

    document.write(objJson);

    document.write("<br/>")

    var id1 = objJson.id;

    document.write("<br/>id is "+id1);

    var name1 = objJson.name;

    document.write("<br/>name is "+name1);

            var objString = JSON.stringify(objJson);        // converting json to string

    document.write("<br/>")

    document.write(objString)

    document.write("<br/>")

    var id2 = objString.id;

    var name2 = objString.name;

    document.write("<br/>Id is "+id2);

    document.write("<br/>Name is "+name2)

JSON Data convertation

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    var obj = '{"id":100,"name":"Ravi","add":{"city":"Bangalore","state":"Kar"},"skillSet":["Java","Spring","Angular"]}';       // obj consider as string data.

   var employees ='{"emps":[{"id":100,"name":"Ajay"},{"id":101,"name":"Vijay"}]}';

   var empJsons = JSON.parse(employees);

    var empJson = JSON.parse(obj);

    var firstId = empJson.id;

   var city = empJson.add.city;

   var skillSet = empJson.skillSet[0];

   var empFirstId = empJsons.emps[1].id;

    document.write("id is "+firstId);

   document.write("<br/>city is "+city);

   document.write("<br/>Skill is "+skillSet);

 document.write("<br/>First array emp id is  "+empFirstId);

  var empJsons = JSON.parse(employees);

   document.write(empJsons.emps.length)

   var leng = empJsons.emps.length;

   for(var i=0;i<leng;i++){

       document.write("<br/>")

       document.write("id is "+empJsons.emps[i].id+" Name is "+empJsons.emps[i].name)

   }

   var id = empJsons.emps[0].id;

   document.write("<br/>")

   empJsons.emps[0].id=105;

   var id1 = empJsons.emps[0].id;

   document.write("id is "+id+"Id is "+id1);

    </script>

</head>

<body>

</body>

</html>

**User Defined object using ES5 style**

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    //object : any real world entity

    function Employee(id,name,salary) {

            var id = id;

            this.name = name;

            this.salary = salary;

            this.display = function() {

                document.write("<br/>id is "+this.id+"Name is "+this.name+"Salary is "+this.salary)

            }

    }

    //Employee();

    var emp = new Employee(100,"Ajay",25000);

    var emp1 = new Employee(101,"Vijay",26000);

    document.write("id is "+emp.id)

    document.write("<br/>Name is "+emp.name)

    document.write("<br/>Salary is "+emp.salary)

    emp.display();

    /\*

        class Employee {

                int id;

                String name;

                float salary;

                void display() {

                        System.out.println("id is "+id);

                }

        }

        Employee emp = new Employee();

        System.out.println(emp.id);

        emp.display();

    \*/

    </script>

</head>

<body>

</body>

</html>

OOPs Concept using ES5 style

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

    <script type="text/JavaScript">

    //object : any real world entity

    function Person() {     //it is a function itself behave like a class as well as contructor

            var name = "Ravi";      //Name is normal local variable not a part of Person object.

            this.pid =100;          //pid is a instance variable part of person object.

            function dis() {           //normal function but not a part of Person object.

                alert("Hello");

            }

            this.info = function() {    // this function is a part of Person object.

                alert("This is person funtion or behaviour ")

            }

    }

    let p = new Person();

    alert(p.name)

    alert(p.pid)

   // p.dis();

   p.info();

   p.age =21;           // run time added the age property.

   alert(p.age);

   p.info1 = function() {

       alert("The age is "+this.age);       //run time added info1 function

   }

   p.info1();

    </script>

</head>

<body>

</body>

</html>

User defined object

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Document</title>

</head>

<body>

    <script type="text/JavaScript">

    //Creating user defined object using literal style.

    let emp = {id:100,name:"Ravi Kumar",salary:24000,add:{city:"Bangalore","State":"Karnata"}};

    document.write(emp.id+"<br>")

    document.write(emp.add.city+"<br>")

    let empString = JSON.stringify(emp);        // converting emp object into string

    document.write(empString.id)

    let empJson = JSON.parse(empString);        // converting string to json object format.

    document.write("<br/>")

    document.write(empJson.id)

    </script>

</body>

</html>

**CSS Transformation Property**

CSS3 provide Transition property which help to do animation.

We have to use those property where value changes smoothly.

Width, height, color etc.

**XML :** eXtensible Mark up Language.

**HTML Vs XML**

Html

1. HTML is use to display the data
2. HTML provide lot of pre-defined tags like html, head, body, p etc.
3. In HTML we can display the message without tags. So tags are optional.
4. HTML is not a case sensitive.
5. In html it is not mandatory every opening tag we have to close.
6. HTML tags non mandatory nested properly.

<p> <b> <i> Hello </b> </i> </p>

XML

1. XML is use to describe the data or help transfer the data or carry the data or it use to hold the data.
2. In XML we can create user-defined tags. It contains pre-defined tags depending upon the tools or technologies or server can understand.
3. In XML we can’t display the data without tags. it required at least one tag that tag is known as root tag or parent tag or document tag.
4. XML is case sensitive means if we open the tag with upper case or lower we have to use tag case to close the case.
5. In XML we have to closing every tags properly.
6. IN XML tags must be nested properly.

XML/JSON

Java XML/JSON .net

Web Service

In XML tags are divided into 2 types

1. Complex Tag : The tag which contains one or more child tags is know as complex tag
2. Simple tag : the tag which contains only information or text that tag is known as simple tag.

**Attribute :** Attribute is known as a properties of tags.

Attribute always we have to use in opening. In the form of key value pairs where value must be single or double quote in XML.

**DTD : Document Type Definition**

**XSD :XML Schema Definition**

XML file divided into 2 types

Well forms points ( top 6 points follows)

1. Well form xml file or Non Validation XML file
2. Validation XML file

JAX\_B : Java API for XML Binding : It is use to covert Java to XML and Vice-versa.

Using DTD and XSD we can create valid xml file.

What is root tag names, that tags contain how many child tags, order of child tags, optional or mandatory and data type of contents inside a tags.

PhNumber 1 or many

LastName optional

DTD doesn’t provide more features . Using DTD we can’t validate data types.

XSD:

Employees : Root tag

Emp : child tag min 2 max 4

FirstName Mandatory

LastName Optional

Age number

**JEE : Java Enterprise Edition**

Servlet , JSP (Java Server Pages) and EJB (Enterprise Java Bean)

Servlet, JSP and EJB are server side technologies. To run this application it require server.

Server : mainly divided into 2 types

1. Web Server : Tomcat part of apache company
2. Application Server or App server : Jboss, Web Logic, Glashfish, WAS

In Servlet , JSP and EJB doesn’t contains main method. In web technologies we have to compile program and deploy on server using war files

Jar files : .java and .class files

War files : .java/.class/.html/.css/.js/.xml /.jsp (Servlet is a type of .java class)

Ear files : same as war + ejb programs (.java programs).

Container : Container is a part of server which also known as engine or runtime environment for that application. Responsible to execute Servlet, JSP and EJB Program. Load the class, creating the object, calling the life cycle methods and destroy the object.

1. Web Container : if Server is a type of web server then it contains only one type of container that web container. Web container execute only Servlet and JSP application according to java point.
2. EJB Container : If server is a application server then it contains different type of container ie web container, ejb container and more.

Web Container is responsible to execute Servlet and JSP

EJB Container is responsible to execute EJB application.

Application Server :

More than one Web Container + EJB Container + JMS Container + Other container + They provide others services like Connection pooling, Thread management, Resource management, Security etc.

Servlet and JSP : Tomcat : Open Source Web Server

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

Servlet API :

javax.sevlet.\*;

servlet is a package which contains set of classes and interfaces

javax.servlet.Servlet;

Servlet is a interface. This interface contains 5 methods.

init()

service()

destroy() 3 is known as life cycle methods.

getServletInfo()

getServletConfig()

**1st way**

public class Demo implements Servlet {

all 5 method we have to override.

}

**GenericServlet** It is type of abstract class part of servlet package. Which internally implements Servlet interface and provide body for all methods except service methods.

**2nd Way**

public class Demo extends GenericServlet {

we have to override service method mandatory.

}

**HttpServlet :** it is a type of abstract class which internally extends GenericServlet and provided the body for service method. This class provided some extra methods in the form of doXXX.

Like

doGet()

doPost()

doDelete()

doPut()

doHead()

doTrace()

doOption()

**3rd way**

public class Demo extends HttpServlet {

override service or doGet() or doPost() any one

good override doGet() or doPost()

public void service(ServletRequest req, ServletRespones res) {

}

public void doGet(HttpServletRequest req, HttpServletResponse res) {

}

}

JEE project structure



DD file : Deployment Descriptor file

After run the application on tomcat server

To call the servlet program using browser

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

By default port number for tomcat is 8080

**Createcustomer.html**

Created…

**Customer table**

firstName

lastName

gender

age

phnumber

username

password

**store 2 or 4 records in database.**

**Servlet with Databases**

login.html

username

password

doGet

JDBC Code to check username and password from database.

Successfully Login or Failure.

**Insider lib folder copy paste mysql connector jar files.**

Load the Driver

Establish the connection

PreparedStatement

ResultSet

After success or failure I want to re-direct to different page.

**RequestDispatcher :** It is a interface which provide set of methods which help to re-direct or navigate from one page to another page(html,jsp or servlet).

Syntax to create the RequestDispather interface reference.

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

Path

Target page is Servlet : Then Target page url pattern.

Target page is HTML/JSP : Then pageName.html / pageName.jsp

rd1.forward(request,reponse); Output only target page

or

rd1.include(request,response); Source Page + Target page as page output

**get and post methods**

by default form method is consider as get method if method is get it will servlet doGet() method. If method is get the data send through in the form of query param concept.

url?key=value&key=value&key=value

in form we can use method =post. If method is post then in Servlet it call doPost() . When method post the data send through body part of request.

Performance wise post is slower than get.

In Get we can send maximum 255 character data.

doGet() method we can call through URL, hyperlink as well as submit button

doPost() method we can call only through submit button

Servlet Life cycle

1. When client send the request to Servlet using URL pattern mention in web.xml file. If it is a first request to that application.
2. The container load the servlet class, create the object and in that object create 1 thread and allocate that thread to specific client.
3. Then init() method get call.

Syntax

public void init(ServletConfig con) {

}

This method call only once.

ServletConfig it is interface. The reference is use to receive the value through web.xml file (any initialization for that specific servlet).

1. After that service method call.

public void service(HttpServletRequest req, HttpServletResponse res){

}

This method call again and again when client send the request to same servlet.

1. At last destroy method get all if no one client accessing that application.

public void destroy() {

}

ServletConfig and ServletContext

Both are interfaces which is use to receive value or resources from web.xml file.

ServletConfig value or resources specific for servlet.

ServletContext value or resources for all servlet.

**Session Management**

**Session :**  Collection ofhttp request and response within a particular period of a time.

By session time is 3 minutes.

Http is by default stateless protocol.

1st ------------------------------🡪

2nd --🡪req +uniqueid ----🡪

Client Server

🡨-------res + cookies ---------

1. Cookies : It is a small text file created by server when client send first request to server and file store in client machine. Which contain lot information. Like sessionId, session expiry etc.
2. Hidden form field
3. URL rewriting : This technique is use when client can disable cookies option on client browser. SessionId they append through URL.
4. HttpSession : it is API provide by Java to maintain the session.
5. SSL : Secure Socket Layer : Https ( Application Server )

**JSP** : Java Server Pages : JPS is a tag base 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 the application in server.
2. Servlet is complex. Means to display simple message through servlet we have to create normal java class extends or implements type of servlet and override methods doGet/doPost and create PrintWriter class object. Then we have to give the servlet details through web.xml file or annotation.
3. If we want to write any html code or presentation logic in servlet. It is very complex.

pw.println(“<font color=red>Simple Message</font>”);

JSP Tags

1. Scripting
   1. Scriptlet

<%

Java coding (The code which we write inside a method

%>

* 1. Declarative tag

<%!

Variable declaration or object creation

%>

* 1. Expression tag

<%=

%>

1. Implicit object
   1. out : PrintWriter class reference.
   2. request : HttpServletRequest interface reference
   3. response : HttpSevletReponse interface reference
   4. config : ServletConfig interface reference
   5. application : ServletContext interface reference
   6. session : HttpSession interface reference.
2. Directive tags
   1. Page
   2. Taglib
   3. Include
3. Action tags
   1. Jsp include
   2. Jsp forward
4. JSTL tags

int a;

int b=20;

int c;

a=30;

**Limitation of JSP**

1. JSP is a type of servlet. When we run jsp on browser in server environment it convert JSP to Servlet ie Page Translation.

Performance wise jsp is slower than Servlet.

1. JSP is not secure.
2. In JSP we can’t do re-usability we can include or forward whole page but not a part of code we can’t include.

**Scope object or Variables.**

class A {

int a=10; //instance variables.

B obj = new B();

obj.pass(a);

}

class B extends A{

//A obj = new A();

//obj.a

void pass(int a) {

}

}

class A { Servlet class or JSP Page

int a=10

}

class B { Servlet class or JSP Page

}

4 scope

1. Page Scope or Servlet Scope
2. Request scope : request.setAttribute(“obj”,value);
3. Session scope : session.setAttribute(“obj”,value);
4. Application scope or ServletContext scope

**MVC : Model View Controller :**

Employee : Insert and retrieve

View 🡪 HTML/JSP/CSS/JavaScript

Controller --🡪 Servlet (Type of Servlet )

Model -🡪 Normal Java Classes

JavaBean

Service

Dao Layer

Resource

**05-02-2021**

Employee

doGet() : retrieve Employee

doPost() : Create Employee

Delete Employee

Update Employee Using Hidden form field

doPut() :

doDelete() :

AJAX :

jQuery :

Project

Insert

Delete

Update

Retrieve

Back button for all view pages

Good UI with CSS

Login

UserName

Password

Radio Button Radio Button

Admin/SalesPerson/ Customer

Submit Reset

Admin Home Pages

Project

Insert

Delete

Update

Retrieve

Customer Order Details

Customer Home Page

Retrieve the Product

Order the Product

View Page html/jsp -🡪 Form Login.html / Login.jsp

username,password

Success.jsp Failure.jsp

Java : JavaBean class

Login.java

Username,password property

Setter and getter methods

Database

Login table

Username,password columns

**EJB :**

doGet() : get resource

doPost() create resource

doPut() update resource

doDelete() delete resources

**Limitation of MVC Project (Employee MVC)**

View : HTML /JSP : jsp object creation taken care web container.

Controller : type of servlet HttpServlet, GenericServlet, Servlet interface.

Life of Servlet program taken care by web container.

**Model Layer :**

Creating JavaBean class

Service class object

Dao class object

Loading the Dao layer

Model layer is local to web application.

**EJB :** Enterprise Java Bean :EJB is use to create distributed , high secure environment application. For EJB client is Servlet or JSP not end user.

Model layer to EJB developer

To deploy the EJB it require application server. JBoss, Web Logic, Glashfish etc.

Life of the model layer(java bean, service layer, dao layer , resources layer) taken care by EJB container.

**EJB : Type of EJB**

2.x 3.x

1. Session Bean : EJB keep the track about that bean till the session is available.
   1. Stateless Session Bean
   2. Statefull Session Bean
2. Entity Bean : Persistence data (Database RDBMS ) DAO using JDBC
3. Message driven bean

Session Bean and Entity Bean is use to achieve synchronous communication.

Client Side Asynchronous communication we can achieve using AJAX

Server Side Asynchronous communication using MDB

JMS : Java Messaging Service . JMS is a type of Middleware application.

“Every DAD required MOM” MQ ActiveMQ

Distributed Application Developer : EJB or RMI : Remote Method Invocation

Message Oriented Middleware

JMS : Queue /Topic

P2P Pub / Sub

Point to Point communication Publisher and Subscriber

JNDI : Java Naming Directive Interface Look up

EJB 2.x XML file

EJB 3.x Using Annotation

1. Session Bean :
   1. Stateless session bean
   2. Statefull session bean
   3. Single ton session
2. Entity Bean : JPA Java Persistence API (Application Programming Interface)
3. Message Driven Bean : Using annotation

**ORM : Objet Relation Mapping**

**Hibernate :**

**JPA :**

08-02-2021

**ORM : Object Relation Mapping :**

It is use to improve the DAO (Data Access Object ) Using JDBC.

1. Using JDBC we can’t store as well as retrieve object from database.

We have convert java object into sql format and vice-versa.

1. JDBC use SQL Language SQL is database dependent language.
2. JDBC throw checked exception. So we have to write JDBC code using try-catch or throws exception. The Exception hierarchy is database dependent.
3. JDBC doesn’t support OOPs relationship. Is a (Inheritance) has a relationship (association, aggregation and composition).
4. JDBC doesn’t support Collection framework.

Object Relation

Mapping

class Login { Table

username LOGIN

password username,password

}

Using XML file

Using Annotation

Login class 🡨-🡪 LOGINinfo Table

Username username data types

Password password data types

PK

According to ORM concept JavaBean class is known as Entity class.

Configuration file

Using XML file

Using Java class

Using properties

Database Details

DriverName

url

username

password

entity class details with xml file

or

entity class details with annotation

Configuration file contains database details and entity class information.

Java ORM tools

JPA : Java Persistence API(Application Programming interface). JPA is a technologies or JPA is a type of EJB. JPA is a specification as well as implementation.

Hibernate : Hibernate is a Framework part of JBoss. Hibernate is third party framework. Hibernate is a implementation of JPA.

java

javax.

**In JPA configuration file names must be persistence.xml**

JPQL : Java Persistence Query Language

Sql

Select \* from product

(product is a table )

JPQL

select p from Product p

(Here product is entity class name which is case sensitive).

**Maven :** Maven is a build tool. Build tool is help to compile, run, creating, jar file, war file, ear file, creating the documentation, help to add the dependencies jar file etc.

IDE : netbean

Eclipse

My eclipse

Maven

POM : Project Object Model : It is a type of xml file which contains all description details for the projects.

Goals or Life cycle which help to convert one format to another format.

Pom: Project Object Model

Maven life cycle divided into 3 parts

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

Ever life cycle contains more than one phase

Imp

1. validate : check all information from pom.xml file valid or invalid
2. compile : compile the source code or java classes.
3. test : run the testing program
4. test-compile : compile the testing classes
5. package : it is use to create jar or war files.
6. install : it is use to add user-defined jar file in local repository
7. integration-test : is use to do integration testing
8. deploy : it is use to deploy the application server.

**pom.xml**

<?xml version=”1.0” encoding-“UTF-8”?>

<project>

<modelVersion>4.0.0</modelVersion>

<groupId>com.akashproject</groupId>

<artifactId>SampleDemo</artifactId>

<version>1.0</version>

</project>

project : the root element for a new project

modelVersion : we recommended that use version 4.0.0

groupId : it contains more than one project with unique id

artifactid : actual Project Name

version : tagName given for the projects.

**Gradle :**

**09-02-2021**

SQL

Select \* from tableName

select \* from product ( retrieve the records from table)

JPQL

Select objectName from JavaBeanClassName

Select pobj from Product pobj ( retrieve from Entity class)

Through JDBC whenever we do any DML (Insert , Delete and Update operation) auto commit is enable by default.

Connection con = DriverManager.getConnection(url,user,password);

con.setAutoCommit(false); By default true

PreparedStatement pstmt = con.prepareStatement(“DML Operation”);

int res = pstmt.executeUpdate();

If correct

con.commit(); //stored

or

con.rollback();

In My SQL Database by default all DML Operation are auto commit.

In Oracle database by Default all DML Operation are not auto commit.

ORM : JPA or Hibernate : through ORM by default DML Operation are not auto commit.

Sql query

1. select \* from product (product is a tablename)
2. select \* from product where id =100; ( id is a column name)

JPQL Query

1. select p from Product p (Product is a javabean class)
2. select p from Product p where p.id =100 (p is object and id is variableName)

Join using SQL

select e.employee\_id,d.department\_name from employee e, department d where e.department\_id = d.department\_id;

Join using JPQL

Select e.employeeId,d.departmentName from Employee e, Department d where e.departmentId = d.departmentId;

JPQ support sql query

Assignment in JPA

JPA CRUD Operation Using any entity

Login Entity

Customer Entity

Employee Entity

<properties>

<maven.compiler.source>1.8</maven.compiler.source>

<maven.compiler.target>1.8</maven.compiler.target>

</properties>

JPA Relationship

Has relationship :

Association

Aggregation

Composition

class A {

B obj1 = new B(); 0 1, many

}

class B {

A obj2 = new A(); 0, 1, many

}

class Employee {

Address add = new Address();

List<Address> listOfAdd = new ArrayList<Address>();

}

class Address {

}

Aggregation : Aggregation is a type of association but weak association.

class Student {

StudentHistory sh = new StudentHistory();

}

class StudentHistroy {

}

Composition : It is type of association. It is a strong association.

mysql> create database relationship;

mysql> use relationship;

Database changed

mysql> create table trainer(tid int primary key,tname varchar(10) not null, tech varchar(10) not null);

mysql> create table student(sid int primary key,sname varchar(10) not null, age int, tsid int, constraint ts\_fk foreign key(tsid) references trainer(tid));

Is relationship :

**10-02-2021**

**Framework :** Framework contains set of classes and interfaces which internally connected to each other to perform a specific task.

Framework follow standard rules and regulation.

The implementation of all design pattern taken care by framework.

70 to 80% task taken care by framework. But framework is not a final product. It is template or protocol.

Framework is good when application are

Enterprise Application.

MVC is good enterprise Application.

**Struts : 1.x and 2.x :** it is a open source web framework provided by apache company. Struts internally follow MVC Design pattern. Struts internally follow FrontController design pattern.

Struts is known a Controller Centric Framework.

LoginController

ApplicationController

CustomerController

EmployeeController

**JSF : Java Server Faces :** It is open source framework part of java people. JSF internally follow MVC Design pattern. JSF internally follow FrontController design pattern.

JSF is known as View Centric Framework

JSP : it is a technologies. Basic look and feel. Stateless HTML components

JSF : it is a framework. JSF provide statefull components. All those components like textfield, password, button bind with javabean class.

JSF is heavy component and JSF bind or tightly coupled with Java technologies.

HTML5/CSS3/Angular/ReactJS/Vue VS JSF

80% 10% to 20%

Spring Framework Vs EJB

90% 5%,10%

**Spring Framework :** Spring is a open source framework. Spring also know as onion architecture framework or layer architecture framework.

Spring provide lot of modules or layer to improve all type of application.

1. Spring core
2. Spring context
3. Spring Web module
4. **Spring MVC : Spring MVC Model Centric Framework.**
5. Spring DAO : Statement, PreparedStatement and CallableStatement.
6. Spring ORM with JPA, Hibernate, iBaties etc
7. Spring Rest : Web Service Type of web SOAP and REST
8. Spring AOP (Aspect Oriented Programming).
9. Spring Data
10. Spring boot
11. Spring cloud
12. Spring micro service

Docker

Spring logger

1. Spring with Docker
2. Spring Rabit MQ
3. Spring kafka
4. Spring Reactive programming

Etc

**Spring Core :**

**IOC :** Inversion of Control : Concept  **:** it is a design pattern or programming pattern. In place of creating resource or maintaining explicitly allow to create the resource by container.

If container create the Resource. It maintain the life of the resources. In simple explicitly don’t create the resource whenever we want try to pull from container use it and leave it. Life of the resource maintainer by container.

Employee emp = new Employee(); Push the object explicity

Employee emp -🡪 Code Pull the object from container

Resource (Java class resources, Database resources, security resource, thread management resources).

Web Container or EJB container or any type of container are heavy. Because to get those container it require that type of server.

Every container maintain the resource if resource is type of resource.

Web Container -🡪 It will create the object of that class if class is type of Servlet or JSP.

EJB Container 🡪 it will create the object of EJB application is class is type of EJB.

Struts and JSF : Web Container will create the object of class if that class is a type of Struts or JSF.

Spring framework container is light weighted part of jar file. It create the object for Normal Java bean class or POJO(Plain Old Java Object) The class not to extends or implements any pre-defined class or pre-defined interface.

**DI :** Dependency Injection : Implementation of IOC :

Type of DI

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

Spring framework support only two type of DI Constructor Base and Setter Base

We have to configure DI using

1. XML file
2. Using Annotation

**Constructor Base DI Using XML file**

BeanFactory is a interface which provide set of methods which help to pull the object from Spring container.

**Setter Base DI Using XML File**

**Different between constructor and setter**

**Autowiring**

Autowiring helps you resolve dependency injection automatically. Using Autowiring container search bean instance with the help of type of autowire.

Auto wire we can do on complex data type (user-defined or pre defined class objects).

Without autowiring we can achieve DI for primitive types but not for complex objects.

Type of auto wire

**byType : it contains only one of same class complex object DI.**

**byName : bean class id name and complex object reference name must be same**

Spring container can auto –wire relationship between collaboration beans replacement of <property name=”variableNae” ref=””/> or <constructor ref=””/>

class Employee {

Address add1,add2;

Customer cust1;

}

byName

**DI Using Annotation**

**@Component :** Generics annotation we have to write the normal java class or bean class.

@Autowired annotation by default are not enable we have to enable using xml file or using java classes with annotation help.

1. Enable the annotation using XML.

ApplicationContext : It is a interface which internally extends BeanFactory interface.

BeanFactory interface provide only core DI.

ApplicationContext provide more features apart from DI.

ApplicationContext it support annotation base DI.

@Component

@Autowired

@Scope

@Value

@Configuration

@ComponentScan

@Bean

**Annotation base DI without xml file**

**Spring with JDBC with Resource Layer**

**DataSource :** DataSource is responsible to provide the Database connection with high secure environment with Application Server.

JNDI : Java Naming Directive Interface. Using JNDI lookup we search Database details from Application server.

**DAO layer we have to use annotation as @Repository : it is a DAO layer specific annotation.**

**Service Layer we have to use annotation as @Service: it is a service layer specific annotation.**

**JDBC**

Class.forName(“DriverName”)

Connection con = DriverManager.getConnection(url,user,password);

PreapredStatemetns pstmt = con…….

**JPA**

persistence.xml

EntityManagerFactory = Persistence.createEntityManagerFactory(“peristencUnitName”)

Spring DAO : Spring Data Access Object

DAO Layer using Core JDBC part of Java technologies

They provide core API to do basic operation.

jdbcTemplate : it is a type of API provided by Spring framework through spring-jdbc module which help to improve the DAO layer.

Spring with ORM (JPA)

*org.springframework.orm.jpa.LocalContainerEntityManagerFactoryBean*

It is a predefine API provided by Spring ORM module which help to Achieve ORM concept using Spring with JPA.

org.springframework.orm.hibernate5.LocalSessionFactoryBean;

It is a predefine API provided by Spring ORM module which help to Achieve ORM concept using Spring with Hibernate.

**12-02-2021**

**Spring MVC :**

**Spring MVC Internally follow MVC architecture. Provided lot of API for Model and Controller layer. Improve view layer using taglib directive tags from JSP. It provide FrontController design pattern concept. The FrontController is a type of servlet class provided by Spring MVC. That front controller name is DispatcherServlet.**

**org.springframework.web.servlet.DispatcherServlet**

Struts 🡪 ActionServlet is a front controller 1.x

StrutsPreparedAndExecute is a front controller 2.x

JSF 🡪 FacesServlet is a front controller is 1.x and 2.x

Spring MVC 1.x to 5

DispatcherServlet

@Controller : Annotation is replacement of all 14 type of controller.

@RequestMapping : It is a annotation which is use to map the request.

Spring MVC means dynamic web project with tomcat server.

Web Container

Jar files.

**Create dynamic web project and convert to maven project to get the pom.xml**

DispatcherServlet search spring configuration file start with

servletname-servlet.xml

@Controller : To enable that annotation we have to use

This tag

<context:component-scan base-package=*"com"*></context:component-scan>

index.html-🡪web.xml file -🡪 dispatcher-servlet.xml -🡪 SampleController 🡪display.jsp

**Create Maven web project and add tomcat sever manually.**

**15-02-2021**

**Web Service:**

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

Req(http/https)🡪

Client Server java(req) Server

<-Res(http/https) HDFC XML/JSON HSBC

Tomcat .net(res) IIS

JEE Asp.net

Spring Framework

View : HTML/JSP

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

2 types

1. SOAP Base web Service or Big Web Service:

SOAP : It is a type of protocol. Simple Object Access Protocol.

SOAP is a standard base upon SOA Architecture.

Service Broker

Service Consumer Service Provider

Service Requester

SOAP Web Service is a one of the implementation of a SOA Architecture.

Registry : UDDI : Universal Description Discovery Integration We have to configure with any database and that database can store only WSDL file.

WSDL :

Web Service Description

Language.

Service Consumer SOAP/http req

Service Provider

Search WSDL file

In UDDI registry SOAP/http res

Simple method

Java Asp.net

In Java

SOAP Web Service we can implementing using 2 ways

1. Using RPC Style (Remote Process Call) : Using XML file
2. Using JAX\_WS : Using annotation

Java API for XML Web Service

Tools or vendor provide some jar files to achieve SOAP Web Service

1. Axis tools
2. Metro tools
3. Spring boot
4. JDK 8

SOAP Web Service Using 2 approach

1. Top down approach -🡪 WSDL to Java classes to call web service : Consumer
2. Bottom up approach 🡪 Java methods convert to WSDL file : Service Provider.

Create simple Maven project

REST Full Web Service

Difference Between SOAP Vs RESTFull Web Service

SOAP

1. In SOAP Web Service data must only in the xml format.
2. SOAP Req and Res are heavy.
3. SOAP is standard base upon SOA architecture.
4. SOAP Web Service support any protocol.
5. SOAP Web Service provide their own security features.
6. Using SOAP we are creating java class which contains interfaces and helper classes which help to call Service.
7. WSDL file in Soap Web service as contract file . Web Service Description language. (This file provide the Service details like service name, url, service method name, parameter and return type).
8. JAX\_WS new Version or old Version JAX\_RPC
9. Spring boot, Axis 2 tool, Metro, JDK 8

REST

1. In RestFull Web Service we can consume and produce data in any format apart from xml like XML as well as Non XML (JSON). Plain text, html, xml, json etc.
2. Rest Full Web service data is light weighted.
3. RestFull Web is a just like style expose our resources as we web service. Resources means in Java Servlet, or JSP.
4. Rest full web service support only http or https protocol.
5. Rest Full doesn’t support any security features. We have to use Spring or JEE Security features.
6. Rest full web service using URL to invoke the Web Services.
7. WADL file in Rest as a contract file. WADL Web Application Description Language. (All Service details like Get, Post, Put and Delete with what type of data we consume and produce).
8. JAX\_RS (Java API for XML RestFull Service);
9. Apache CXF, jersey tool , WAS(Web Sphere), Spring framework/boot etc.

REST Representational State Transfer

Normal Controller for Servlet -- > for Get method we can call through URL

Spring Controller with @Controller annotation -🡪 User defined methods as get, post, put and delete. Return @Controller ModelAndView means it tightly coupled with View Part.

Spring Controller with @RestController : No ModelAndView return String as well as user defined class object in form of xml or json format.

@RestController with

**Get Methods**

1. **Plain text**
2. **Xml format**
3. **Html format**
4. **Passing the data to get methods** 
   1. **Query param**

**url ?key=value&key=value&key=value**

**By default form from html takes the help of query param if method is get**

[**http://localhost:8080/SpringRest/qry?name=Ajay&salary=16000**](http://localhost:8080/SpringRest/qry?name=Ajay&salary=16000)

* 1. **Path param**

**16-02-2021**

class Calculator {

public void add() {

}

public void sub() {}

public void mul() {}

public void div() {}

}

class Square {

}

**@ResponseBody** : annotation is responsible to convert complex object into xml or json format depending upon the mediatype.

To check Rest full web service post, put and delete method

Browser plugin

Post method : Create the Resource : Insert the Records Database like Employee, Customer, Manager, Orders etc.

**Put Method :** Update the Resource : Update Query in Database

Salary using Id

Salary, name using id

**Delete method :** Delete the resource : Delete using one or more property.

In Delete we have to use pathParam concept.

**Assignment**

**Spring Rest with JPA : CRUD Operation**

**Employee :**

bean package

rest / controller /restcontroller

service

dao

**dispatcher-servlet.xml**

enable package

mvn annotation

datasource

EntityManagerFactory

**web.xml**

pom.xml file

**all dependencies.**

**Top : 5**

1. **Rohit Narkhede**
2. **Ujjwal Kumar**
3. **Yogita Shirsale**
4. **Manthan Pelne**
5. **Aashu Kumar**

**Spring Framework Limitation**

1. Maintain the dependencies with version of dependencies.
2. Maintain the xml file
   1. Annotation
3. Configuration
4. Complexity
   1. To many ways to do same things.
5. RestController required external dependencies.
6. Creating projects

**Spring boot**

Spring boot is a spring module which provide RAD( Rapid Application Development)

Or

Spring boot makes is easy to create standalone alone production grade Spring base application that you can run.

Or

Spring boot is boot strap for the spring modules.

Spring boot = Spring all modules + Inbuilt http server tomcat or jetty – xml file + few annotation

Spring modules

Core, context, spring web, spring mvc, spring rest, spring dao, spring orm, spring aop, spring security etc….

Spring boot with Maven 🡪 pom.xml file is a part of maven

Spring boot with Gradle 🡪 no xml file.

**Spring boot component**

1. Spring boot starter
2. Spring boot AutoConfigurator
3. Spring boot cli
4. Spring boot Actuator

**Spring boot starter :** Spring boot starter components combines all related jar into single jar file so that we can add only one jar file dependencies to our application. Which help to add all related dependencies required for that modules.

Spring web starter

Spring jdb starter

Spring jpa starter

Spring testing starter

Spring security starter

Etc

Spring bean

Spring core

Spring DI

Spring context

Spring orm

Spring jdbc

Spring webmvc

Spring hibernate

Spring boot AutoConfigurator : The main responsibility of Spring boot AutoConfigurator is to reduce the Spring configuration details. With the help of this features no xml like beans.xml or dispatcher-servlet.xml (no need to configure DispatcherServlet in web.xml file) file but minimum annotation.

@SpringBootApplication = @Configuration + @ComponentScan + @EnableAutoConfiguration

In Spring boot we use two types of file to provide server details, database details etc.

File name must be

**application.properties**

**application.yml**

@RequestMapping(value = "product",method = RequestMethod.***GET***) // GET,POST,PUT,DELETE

@GetMapping(value = "info")

@PostMapping(value = "info")

@PutMapping(value = "info")

@DeleteMapping(value="info")

@SpringBootApplication // by default scan current package or sub package of current package.

**Top 5 people**

**Spring Data**

Spring ORM : It is use to integrate with existing ORM tools like JPA or Hibernate.

Spring Data module provided by Spring framework. Spring data abstraction for all DAO method logic. Spring Data base upon the Spring ORM(JPA) modules.

**Parent starter responsible is responsible to maintain the common version for all starter.**

**18-02-2021**

**Git distribution sub version control**

We can create the repository 2 ways

1. **git init**
2. **git clone url**

**git status**

**then create the file or folder**

**git status**

**add the file to staging area.**

**git add filename**

**git add .**

**To add the file in local repository**

**git commit –m “Message”**

**git brach : to check all branch details.**

**To create the branch**

**git branch branchname**

**to switch to march**

**git checkoub branchname**

**creating and moving to new branch**

**git checkout –b branchname**

**git branch -D anil**

**Branch task**

**ProjectName2Letter\_YourName2Letter\_Task2Letter**

**OS\_AK\_PRODUCT\_DISPLAY**

**How to push the local branch to remove branch**

git push -u origin HEAD

(last commit in current branch)

**A Person A\_create\_project**

**B Person(remote maintain by B remote repository**

**C Person main/master (readme)**

**D Person A\_create\_project –delete**

**A git clone url(main) -🡪 A\_Create\_Project(delete branch) –in main pull product but in branch**

**B git clone url(main) 🡪 project**

**Order but in branch**

**C git clone url (main)🡪 project**

**Customer but in branch**

**D git clone url(main)🡪 project**

**Login But in branch**

**Monolithic Service Vs Micro services**

**Monolithic Service: Rest full Service**

1. **Monolithic Service : It deploy large or enterprise application.**
2. **All modules we have to combine in single (war/ear) and deploy on single server with single database.**
3. **Login module, Application module, Customer module, Employee module, Order module etc**
4. **If any module is pending or error or issue with that modules, we have adding new features enhancement in any one of module.**

**Micro Service**

1. **It help deploy all modules rapidly**
2. **Modules are loosely coupled**
3. **Modules running on different port number using different language with different database.**
4. **All Project work independently using different language. To do testing, debugging or error very easily.**
5. **If we want to change any services may be in different language spring boot to python or node js.**

**When multiple micro services are deployed (run) on different machine with different port number. Those services will have idea of their respective database and these services can communicate through HTTP Rest Call with port number.**

**Each database is provide to the micro services. One micro services can’t call another micro service or databases.**

**Spring framework provide two type of project to achieve micro services using Spring framework.**

1. **Spring boot : it is use to quickly created production grade spring application.**
2. **Spring cloud : It simplifies operating and deploying n number micro services to private or public cloud. It wraps several popular cloud management micro services framework and simplifies the use and deployment of the technologies.**

**Spring cloud micro services components.**

1. **Eureka Server : It is open source server provided Spring cloud which help to deploy more than one spring micro services. We will use Netflix Eureka Server to deploy all n number of micro services.**
2. **Ribbon : To distribute the load of multiple instance of same micro service. Using LoadBalancer and FeignClient (These API help use to call the micro services).**

eureka.client.register-with-eureka=false

eureka.client.fetch-registry=false

**By default eureka server itself also consider as micro service So we have display these in eureka server.**

**Whenever we create more than one micro service to deploy in Eureka server all client search eureka server in default port number 8761**

Starter 🡪 web, jdbc, jpa, devtool, mysql connector , eurekaclient

Account : accno,name,amount –table 3 records : insert into database.

AccountService -🡪 projectname

Account

AccountController : pathVariable passAccountNumber,

If number if valid display balance else a

Account didn’t find.

AccountService

AccountDao : JPAPepository

application.properties

6 details

9393

Database details

**22-02-2021**

In Spring Micro Service we can call other service using 2 ways

1. Using RestTemplate API with the help of LoadBalanced annotation
2. Using FeignClient API

Database **paytmdb**

Paytm table

Pk

**emailId Accno**

**mydb database**

**Account table**

**Accno name amount**

**Paytm database**

**Paytm**

**EmailId accno**

**RestTemplate** : It is a API provide by Spring boot or Spring Rest which help to call any rest service running using same language or different language / using same server or different server.

**Feign Client :** Feign Client API Provided by Spring framework which help to call the Rest Service. Feign allow you to abstract the mechanism of calling Rest Service. Feign client is discovery – aware spring RestTemplate with LoadBalanced. In Feign Client to call the Service we are not using the Physical IP Address of the Rest Service.

Points

1. URL or URI are not hardcoded.
2. We can use Eureka Client Id (Service names to call the Service).
3. Feign handled the actual code.
4. Feign integrate with Ribbon and Eureka Server with RestTemplate automatically.
5. Feign Client easy way to call the Rest Service in spring boot.

**Difference between RestTemplate Vs FeignClient**

1. RestTemplate is synchronous call.
2. RestTemplate Using URL we pass data to another service.
3. It is not secure.
4. Testing for RestTemplate complex.
5. In RestTemplate we can communicate between service or micro service using physical or logical IP address.
6. FeignClient synchronous and asynchronous communication.
7. In FeignClient we are not using any URL or URI we just call method which behave as FeignClient Interface abstract methods.
8. It is more secure
9. Testing for FeignClient easy.
10. In FeignClient we can communication all micro services without URL or URI.

**Swagger:** Swagger is use to create the documentation for the Rest API.

Swagger allow you to describe the structure for your Rest API

1. What are all the operation : Get, Post, Put, Delete etc.
2. What type of parameter we have to pass and what type of value we get.

Swagger documentation provide all resources details, EmployeeController, CustomerController, OrderController. Every Resource contains more than one operation with pre-defined methods get, post, put and delete. The operations takes parameter as query param or path param or through body part as ReqeustBody with plugin.