Phase 2 :

Day 1 01-08-2022

9 days

SQL Self learning using MySQL Database -🡪

JDBC

Hibernate

JEE Servlet and JSP

Searching and Sorting technique without collection framework.

Searching : Searching is use to search a particular elements from array.

int num[]={4,1,6,9,6,7,3,2,5}

Linear Search : Linear search also known as orderly search or sequential search.

Adv

When a key element matches the first element in array. Then linear search algorithms is best case.

This search technique good for small to medium array.

In this technique array doesn’t need to be sorted.

Dis Adv

When a key element matches the last elements in the array or the key elements doesn’t matches any element then linear search algorithms is worst case.

Binary Search

Binary search is one of the fastest searching algorithms. It is used to find the location of an elements in an array. It works on the principle of divided and conquer rule or technique.

If we want to use binary search technique on array. The array must be sorted order we can’t use binary search on un sorted array.

Adv

For large list of array or elements.

Dis Adv

It work only on sorted array

It require more stack space.

1. 100

66

1 to 50 no need to check

50 to 100

50 to 75

62 to 75

Exponential Search The term exponential search or term mainly apply for infinite array elements. This technique apply as mathematically rising in powers.

0,2,4, 8,16,32

1,3,9,27, etc

This technique internally use binary search and binary search need elements in sorting order.

Linear search : small to medium array

Binary search : finite array large array

Exponential search : infinite array large array

Sorting technique

Sorting is use to sort the elements from an array may be ascending order or descending order.

Selection Sort : it is type of simplest sorting technique. In This algorithms it will first find the smallest elements in the array and swap it with the element in first position, then it will find the second smallest elements and swap it with the elements in second position and it will keep on doing this until entire array is sorted. If we are planning to do sorting in ascending order. If we are planning to do descending order then we have to check largest elements.

Adv : The main advantage of the selection sort is that it perform well on small array elements.

Div Adv : The primary disadvantage of the selection sort is its poor efficiency when dealing with huge list of elements.

It required extra variable to hold min or max value.

Bubble Sort : The bubble sort algorithms works by repeatedly swapping adjacent elements that are not in order until the whole list of items is in sequence.

Adv : It is easy to use. And no extra space or variable is required.

Div Adv : The primary disadvantage of the selection sort is its poor efficiency when dealing with huge list of elements.

Insertion Sort : the insertion sort sorts repeatedly scan the list of items, each time inserting the items or values in unordered sequence into its correct position.

In Insertion sort the dataset by transferring one element at a time to the partially sorted array.

Merge sort :merge sort use divide and conquer rules to the sorting. This sorting algorithms good for huge array data.

Day 2 02-08-2022

SQL using MySQL Database

show databases; this is use to display all database available in our login

create database javatraining; this command is use to create the database

use javatraining; this command is use to switch to new or existing database

database is collection of tables.

table -🡪 Employee

id name salary

Pk

create table employee(id int primary key, name varchar(10), salary float);

show tables; this command is use to display all table present in your database.

desc employee; this command is use to display the structure of table.

Insert

insert into employee values(1,’Raj’,12000);

insert into employee values(2,’Ravi’,15000);

insert into employee values(3,’Ramesh’,18000);

insert into employee values(4,’Raju’,20000);

select \* from employee

select \* from employee where id=1;

select \* from employee where name = ‘Ravi’;

select \* from employee where salary > 12000;

Delete

delete from employee

delete from employee where id =4;

delete from employee where name = ‘Ramesh’;

Update

Update employee set salary = 45000

Update employee set salary = 25000 where id=1;

JDBC : Java Database Connectivity : JDBC is a API which provide set of classes and interfaces which help to connect the any RDBMS (MySQL, Oracle, db2, SQL Server etc). Using JDBC we can store, retrieve, update and delete the record using java technologies.

Steps to connect the database ie MySQL using JDBC.

1. Impor the package : import java.sql.\*;
2. Load the Driver : Driver is a pre-defined class provided by vendor whose database we are going to connect. Which help to connect the database.

4 types of driver

1. Type 1 driver or jdbc odbc bridge driver
2. Type 2 driver or jdbc native driver
3. Type 3 driver or jdbc net protocol driver
4. Type 4 driver or jdbc pure driver or jdbc thin driver

From java8 onward type 1 driver removed.

Type4 driver. This driver vendor provide use in the form of jar file. That jar file contains set of classes and interfaces which help connect the database.

Class.forName(“driverName”);

Java provided pre-defined class and name of class itself is Class and it belong to lang package. Which contains forName static method.

JDBC throw checked exception so we have to write throws or try-catch block mandatory.

1. Establish the connection :

Connection con = DriverManager.getConnection(“”,””,””);

1st parameter url

2nd parameter username

3rd parameter password

Types of Statement

1. Statement : Statement is a interface which provide set of methods which help to do the operation on table like insert, delete, update and retrieve.

Syntax to create the reference of Statement.

Statement stmt = con.createStatement();

DML Operation

1. Insert/ delete / update

int res = stmt.executeUpdate(“insert query”);

executeUpdate() method return type is int if record insert it will return > 0.

1. Retrieve query

ResultSet rs = stmt.executeQuery(“select \* from employee”);

while(rs.next()) {

//System.out.println(“id is ”+rs.getInt(1)+” Name is ”+rs.getString(2)+” Salary ”+rs.getFloat(3));

System.out.println(“id is ”+rs.getInt(“id”)+” Name is ”+rs.getString(“name”)+” Salary ”+rs.getFloat(“salary”));

}

1. PreparedStatement : PreparedStatement is a also type of interface which provide set of methods which help to do the operation on table like insert, delete, update and retrieve.

Difference between Statement and PreparedStatement.

In Statement if we execute same query again and again then query will compile in java side and execute in database side n number of times.

In PreparedStatement if we execute same query again and again then it will compile only one time in java side and execute n number of times.

In PreparedStatement it also known as pre-complied query.

So performance wise PreparedStatement is faster than Statement.

PreparedStatement support parameterized query concept which help to pass dynamic value which not possible in Statement.

Day 3

03-08-2022

Java

J2SE J2EE J2ME

JavaSE JavaEE JavaME

JSE JEE JME

Java Standard edition Java Enterprise Edition Java Micro edition

Core Java

With help of core of JSE we can develop standalone or desktop application. Means this application running on only one machine.

AWT and Swing -🡪 which help to create the GUI application

Using JDBC

MySQL /Oracle

JEE : Java Enterprise Edition or J2EE or JavaEE :

With help of JEE we can create web application.

http://[www.google.com](http://www.google.com) -🡪 URL (Uniform resource locator)

http -🡪 hyper text transfer protocol : set of rules which help to communicate more than one machine

www -🡪 word wide web

google 🡪 domain

com 🡪 commercial

req(http/https)

--------------------------------------------------------------------🡪

Client Server

🡨------------------------------------------------------------------------

Res(http/https)

HTML/hTML5

CSS/CSS3

JS (JavaScript )

JEE

Servlet, JSP (Java Server Page)

EJB (Enterprise Java Bean)

Asp.net

Php

Python

Node JS

JEE : Servlet, JSP and EJB

To run servlet, jsp and ejb program we require server.

Application point of view

Server are divided into two types

1. Web server
2. Application server

Servlet, JSP and EJB doesn’t contains main method. Server contains container. Container is a part of server which is also known as engine. Container is responsible to execute the servlet, jsp and ejb application like load the class, create object, call the life cycle method and destroy the object.

If server is type of web server it contains only one type of container ie Web Container. Web container is responsible to execute servlet and jsp program.

If server is type of application server it contains different types of container like web container, ejb container, jms container etc. web container part of application server responsible to execute servlet and jsp program. EJB container is responsible to execute ejb program.

Web server are light weighted compare to application server.

Application server provide extra features like connection pooling, thread management, resource management, security etc.

Web Server : Tomcat (Apache company)

Application Server : Web Logic or JBoss are application server.

Servlet : Servlet is a normal Java Program which help to create dynamic web page on server side.

servlet : server is a package which provide set of classes and interfaces.

import javax.servlet.\*;

Servlet : Servlet is a interface which contains abstract methods. This interface contains totally five methods.

init

service

destroy

getServletInfo

getServletConfig

import javax.servlet.Servet;

starting three methods is known as life cycle method ie init, service and destroy

1st approach

class Demo implements Servlet {

we have to override all five method mandatory.

}

GenericServlet : it is a type of abstract class which internally implements Servlet interface. This class provided body for all methods except service method.

2nd approach

class Demo extends GenericServlet {

here mandatory we have to override service.

}

HttpServlet : it is a type of abstract class which internally extends GenericServlet. This class provided body for service method also. It provide extra methods in the form of doXXX like doGet, doPost etc.

3rd approach

class Demo extends HttpServlet {

service() or doGet() or doPost()

}

doGet and doPost are not life cycle method they internally call service method only. They wrap service method.

<http://localhost:8080/SimpleServletApp/>

<http://localhost:8080/SimpleServletApp/Demo>

by default tomcat port number is 8080.

By default every html form method consider as get. By default every form it will call doGet() method of Servlet. If method is get it will send the data through url using technique as URL rewriting.

URL?key=value if we pass one information

URL?key=value&key=value&key=value if we pass more than one information.

Get method is not secure.

We can send maximum 255 character data through get method.

If we want secure then we have to use method = post in form. If method is post it will call doPost method of servlet. When method is post it will send the data through request body part. Which we can’t see and we can send more than 255 character data.

04-08-2022

RequestDispatcher : it is an interface which provide set of methods which help to navigate from one page to another page base upon condition.

We can move from one page(Servlet/JSP) to another page(Servlet/JSP/HTML).

Syntax

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

Target page

1. Servlet : Then path must be target page servlet URL-mapping or URL-Pattern.
2. HTML/JSP : then path must be pageName.html or pageName.jsp

rd1.include(request,response); Source page + Target page combine as a one page

or

rd1.forward(request,response); we can see only target page output.

forward(request,response) Vs sendRedirect();

1. Forward method is belong to request object and sendRedirect method belong to response object.
2. Using forward if we move to next page it doesn’t destroy old request.
3. Using sendRedirect if we move to next page it will generate new request.
4. Using forward we can move within a application but using sendRedirect we can move from one application to another application.
5. Command between two we can see output of target page.

Forward

<http://localhost:8080/ServletWithJdbc/LoginController?emailid=raj%40gmail.com&password=123>

sendRedirect

<http://localhost:8080/ServletWithJdbc/Home>

Servlet Life cycle :

When client send first request to servlet program using url pattern present in web.xml file.

<servlet>

<description></description>

<display-name>LoginController</display-name>

<servlet-name>A</servlet-name>

<servlet-class>com.LoginController</servlet-class>

</servlet>

<servlet-mapping>

<servlet-name>A</servlet-name>

<url-pattern>/Abc</url-pattern>

</servlet-mapping>

Client send request using url pattern

<http://localhost:8080/projectName/urlpattern>. Web container check the url pattern in web.xml file if url pattern get match then it will check servlet-name part of servlet-name part of servlet-mapping tag with servlet tag.

Then web container load the servlet class. After class loaded successfully it will call init() method. This method call only once to do any initialization. After init it will call service method. This method contains two parameter HttpServletRequest and HttpServletReponse interface reference. Request is use to take any request from a client and response is use to response back to client. This method call again and again whenever client send the same request or refresh the page. After application close at last destroy method get called.

Session Tracking : Collection of http request and response within a particular period of time is known as session. By default http is stateless protocol. Using some technique we have to handle to session.

1. Cookies : it is a small text file created by server when client send first request to server. This file contains lot of information with sessionId (unique id for each client). This file stored in client.

machine. Client can be disable cookies option in browser. Client can play with cookies file. Cookies is not a secure.

1. URL Re-writing technique : if cookies disable on client machine. Server side technologies send the session id through URL. Using URL – writing technique.

URL?sessionID=&&&asfasfas9877334asfafsd. This technique is good if cookies option is disable in client machine. But this technique we can use with only get method not with post method.

1. HttpSession : HttpSession is pre-defined interface which provide set of methods which help to keep track about the session.

Syntax to create the HttpSession interface reference.

HttpSession hs = request.getSesssion();

1. SSL : secure socket layer : <https://www.google.com>

1st Req ----------------------🡪

2nd Req -----------------🡪 + session Id

3rd REq------------🡪

Client Server

🡨----------1st res + Cookies file

🡨---------2nd Res

🡨---------3rd res

05-08-2022

Object or property or variable scope : using object scope we can share the value between two pages ie servlet to servlet/jsp. Generally we doesn’t create object of servlet and jsp. If Servlet or JSP contains any variable of type int, float, char, string or user-defined object. The scope of value within that page ie servlet or jsp. If we want to access those property in another page we have to take the help of object scope.

Servlet Servlet

Demo1 Demo2

int a=10;

String name =”Ravi”; pw.println(a)

request.setAttribute(“obj”,a); request.getAttribte(“obj”);

1. Page scope or servlet scope or jsp scope : if variable is a part of jsp or servlet it may be instance variable or local variable by default it is consider as page scope. We can access that variable within that page only.
2. Request scope :

request.setAttribute(“key”,value); key must be string and value may be any type.

request.getAttribute(“key”); using this method we can get the value.

request.removeAttribute(“key”); remove the value from request scope.

While moving from one page to another page if request get destroy. Those value which present in request scope also get destroy.

1. Session scope :

HttpSession hs = request.getSession();

hs.setAttribute(“key”,value);

hs.getAttribute(“key”);

hs.removeAttribute(“key”);

we can get the value from session scope doesn’t matter old request or new request. This value get destroy only if we close the application or if we call hs.invalidate() method.

HttpSession hs = request.getSession(**false**);

If request carry same old session then it take the same session object. if session get destroy it doesn’t create the session. It will throw null pointer exception.

HttpSession hs = request.getSession(**true**);

If request carry same old session then it take the same session object. else it will create new session object.

DAO layer : Data Access Object: In this layer we have convert Java object into sql format and vice-versa.

JDBC doesn’t allow to store the java object we have to convert.

JDBC throw checked exception. Those checked exception on database dependent.

JDBC doesn’t support is a and has a relationship.

To overcome this problem ORM (Object Relation Mapping).

Hibernate : ORM : Object Relation Mapping :

According to ORM for database table we have to create JavaBean class mandatory. In JDBC optional.

Object Relation

@Entity

class Employee { EMPLOYEE

@Id

id,name,salary ID,Name,Salary

}

Mapping

Id—ID PK

Name-NAME

Salary-SALARY

We were doing this mapping using

XML file

Using annotation

Database Details

1. Using XML file
2. Using properties file
3. Using java classes

Hibernate is a third party framework which provide ORM features.

It provided lot api which help to do ORM concept.

Maven and Gradle : These two build tools we use while developing the java application.

Build tool : Build tool is responsible to compile the program, run the program, create jar, war or ear file, download the dependencies or external jar file, creating the documentation etc.

Hibernate with Maven tools.

Pom.xml (project object model) This file hold complete project details.

We have to write JDBC code or Hibernate code in DAO layer (Data Access Object) This class contains pure database logic.

Throw JDBC all DML Operation by default auto commit.

Through Hibernate all DML Operation by default it doesn’t auto commit.

In Hibernate we have to use mandatory Transaction concept.

Create table product table

Pid, pname, price with pid is PK

In Java Project

Index.html

With format with pid,pname and price as text field and action must be servlet url pattern ie ProductController.

com.bean package create Product.java class

With pid, pname, price as private variable and setter/getter methods and toString method

On class @Entity and on pid variable @Id

com.controller

ProductController -🡪 Servlet class

doPost

Create PrintWriter clas object. receive pid, pname and price

int pid = Integer.parseInt(request.getParameter(“pid”));

String pname = request.getParamete(“pname”);

float price = Float.parseFloat(request.getParameter(“price”));

create Java class or entity class object

set the value

create Service class object and pass the object to service layer.

Create RequestDispather reference and display the result and include same index.html page once again.

com.service

ProductService

Which contains service method if you want to any condition like price must be > 100. And then pass the value to Dao layer. Base upon result return success or failure

ProductDao

Which contains Dao method

First create Configuration class object, load hibernate.cfg.xml file , create SessionFactory reference, create session reference, create Transaction reference and save the object.

If stored return 1 or in catch block return 0

08-08-2022

<input type=”text” name=”pname” required/> doing validation using HTML5 features.

create table product(pid int primary key,pname varchar(10), price float);

retrieve all data from database using Hibernate

Hibernate provided their own query ie HQL (Hibernate Query language)

SQL : Structured Query language

1. SQL is database dependent query language.
2. SQL retrieve output in the form query.

select \* from product here product is table name and sql is not case sensitive. \* retrieve all columns from a table.

Select \* from product where pid = 100; pi is column name

Select \* from product where pname = “Tv”; pname column name

Select \* from product where price > 25000 price name

HQL: Hibernate Query language

1. HQL is database independent query language.
2. HQL retrieve object rather than query.

Select p from Product p; here Product is entity class name and case sensitive and p is object. p means o­bject retrieve all property from a entity class

Select p from Product p where p.pid = 100; p is object and pid is variable name part of entity class

Select p from Product p where p.pname = “Tv”;

Select p from Product p where p.price > 25000;

Select obj from Product obj where obj.price = 20000;

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SQL

Select pid from product ; retrieve only one column

Select pname from product

Select pname,price from product retrieve more than one columns but not all columns

HQL

Select p.pid from Product p; retrieve only one property

Select p.pname from Product p;

Select p.name,p.price from Product p retrieve partial object

Hibernate Relationship

JSP : Java Server Pages : JSP is a tag base scripting language which help to create the dynamic web page on server side.

Limitation of Servlet

1. Servlet is normal java program if we do any changes in servlet we have re-compile and re-deploy that application once again.
2. If we want to write any html code (presentation logic) we have to write inside pw.println(“”); it is consider as string. Html code embedded inside servlet program.
3. Servlet is complex if we want to display welcome message through servlet program we have to create normal java class and that class must be implements or extends type of servlet. Then we have to override predefined method like doGet or doPost. Then we have to create the PrintWriter class object. then we have to provide servlet program details in web.xml or we can use annotation.

JSP Tags

1. Scripting tag
   1. Scriplet

<%

Java coding or the code which we write inside doPost or doGet we can write here

%>

* 1. declarative tag : <%! Variable declaration; %>
  2. expression tag <%= expression %>
  3. JSP comments tag

<%-- --%>

1. Implicit object : JSP Provided lot of pre-defined object and those object is known as implicit object means we no need to create the object.
   1. out : out is equal to PrintWriter class object. in JSP we no need to create this object.

In Servlet we are creating PrintWriter abc = response.getWriter(); In JSP we no need to create the PrintWriter class object that object container provided for us. We can’t change the name.

System.out.println(“Welcome to JSP”); it will display on console

out.println(“Welcome to JSP”); it will display on browser

* 1. request : request is a equal to HttpServletRequest object.
  2. response : response is equal to HttpServletReponse object
  3. session : session is equal to HttpSession reference in servlet. (HttpSession hs = request.getSession() );

1. Jsp action tag : it provided lot of tags which help to move from one page to another page using tags
   1. Jsp include
   2. Jsp forward
2. JSTL(JSP Standard Tag Library)
3. Jsp directive tags
   1. Jsp page directive tag
   2. Jsp include directive tag
   3. Jsp taglib directive tag

Index.jsp

form with action as addProject.jsp

pid,pname, price, url -🡪

addProduct.jsp

using declarative tag declare four variable pid,pname,price and url.

In scriptlet tag receive the value

pid = Integer.parseInt(request.getParameter(“pid”));

pname

price

url

in JSP Page create the Product class object please import using page directive tag.

Then set pid,pname,price and url.

Then create ArrayLilst and LinkedList object and store the product object.

create JavaBean class as Product with setter and getter methods.

Limitation of JSP

1. JSP is a type of servlet only. When we run the JSP program internally it will convert to servlet program. That phase is known as page translation phase. Performance wise jsp is slower than servlet.
2. JSP not a secure. If we write any business logic like checking username and password manually or using jdbc or hibernate. Client can see that code.
3. In JSP we can’t do re-usability set of code because in jsp we can’t write method or function. We can include or forward whole jsp page but not part of the page.

<%

%>

<%

%>

MVC : Model View Controller

View -🡪 Look and feel or Presentation logic , HTML(static page) or JSP(dynamic page).

Controller -🡪 Servlet : it will retrieve the input value from jsp or html page and pass this value to service layer through JavaBean object.

If we write any business logic or database logic using jdbc or hibernate in doGet or doPost that logic become local to that servlet program.

Model :

JavaBean class this class is use to pass the set of value from controller to service and service to dao and vice-versa.

Service class : This class write pure business logic before calling dao method or after calling dao method or more than one dao method.

Dao class using jdbc or hibernate : pure database logic using jdbc or using Hibernate to store, retrieve using different way, update and delete.

10-08-2022

Hibernate Relationship

Is a relationship : Inheritance

Has a relationship : inside one class we are creating another class object.

Has a relationship

Class contains complex property

Primitive property : int, float, string which hold only one value

It contains array property : of type int, float, string

Complex property : Address, SkillSet object

List complex property : List or Set or Map of Address or Skill etc.

Student

Sid SName Age

1 Raj 21

2 Ravi 23

Tech

TId Sid TechName

0 1 Java

1 1 Python

2 1 C

0 2 HTML

In database we can create totally four types of relationship

1. One to many : Trainer to Student (PF to FK)
2. Many to one : Employees to Department or Project (FK –PK)
3. One to one : Person – Pancard (PK – PK or PK-FK)
4. Many to many : Students SkillSet

One to many and Many to One (many to many)

Trainer

TId

TName one trainer can handle more than one student

One trainer can take only one course

Student

SId

SName

Age one student can do more than one course

Course

Cid

CName

Fees

Trainer to Course 🡪 One to One

Trainer to Student 🡪 One to many

Student to Course 🡪 One to many

One to many with trainer and student table

create table trainer(tid int primary key,tname varchar(10), tech varchar(20));

insert into trainer values(1,'Raj','Java');

create table student(sid int primary key,sname varchar(10), age int, tsid int, foreign key(tsid) references trainer(tid));

insert into student values(100,'Seeta',21,1);

insert into student values(103,'Keeta',24,null);

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1st Project

Class

cid PK

Section/Standard /etc

Subject

Subid PK

SName

Teacher

Tid PK

TName

Student

Sid PK

SName

Age

Subject to Class 🡪 One to One relationship / one to many

Teacher to Student 🡪 One to Many relationship

Teacher to Subject (One – to – One)

Teacher to Subject (one – to – many)

Teacher to class (One to Many)

Each student must be assigned to a single class.

A teacher can be assigned to different classes for different subjects.

Four hyperlink to Add Subject, Add Student, Add Class and Add Teacher

Assign teacher to class : take teacher id and class id

Assign student to class : take student id and class id

Assign Subject to teacher : take subject id and teacher id

View Subject Details with teacher details

View class details with teacher details

View student details with class details.

View -🡪HTML and JSP

Controller -🡪 Servlet

Model -🡪 JavaBean class Subject, Teacher, Student and Class

Service classes

Dao classes

SubjectDao

Add

Assign

TeacherDao

Add

Assign

StudentDao

Add

Assign

ClassDao

Add

Assign

Flyway :

Airlines Table

FNO

FName

AGT110 Indigo

Places Table

SrNo

Source

Destination

111 Bangalore Delhi

FlightWithPlace (Any Table Name)

Id auto increment –PK

FNo

Date

SrNo

Price

NumberOfTicket

1 AFT110 11-08-2022 111 5000 50

Booking 🡪 Table

Bid PK

PersonName

TravelDate

FNO FK

SrNo FK

NumberOfPerson

TotalAmount

Customer

Login table : name, password ([admin@gmail.com](mailto:admin@gmail.com), admin@123)

Hyperlink

Change password

Old password

New password

Change submit

JSTL : JSP Standard Tag Library

MVC :

Relationship : Trainer ----Students : one to many relationship

Servlet, JSP with JSTL and Hibernate

In JSTL we use small language ie EL (Expression Language).