INTERNET TECHNOLOGIES LAB REPORT

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CLASS: BCSE-IV
SECTION: A1

INDEX

ASSIGNMENT NUMBER: 1

PROBLEM STATEMENT:

Implement a TCP-based key-value store. The server implements the key-value store and clients make use of it. The server must accept clients’ connections and serve their requests for ‘get’ and ‘put’ key value pairs. All key-value pairs should be stored by the server only in memory. Keys and values are strings.

The client accepts a variable no of command line arguments where the first argument is the server hostname followed by port no. It should be followed by any sequence of “get <key>” and/or “put <key> <value>”.

```
./client 192.168.124.5 5555 put city Kolkata put country India get country get city get Institute
India
Kolkata
<blank>
```

The server should be running on a TCP port. The server should support multiple clients and maintain their key-value stores separately.

Implement authorization so that only few clients having the role “manager” can access other’s key-value stores. A user is assigned the “guest” role by default. The server can upgrade a “guest” user to a “manager” user.

CODE:

The assignment has been implemented in python3.6.

common.py stores the commonly used functions by server and client

```
import socket

portServer=12345

# Function to create a socket and bind it to a port
def createSocket(port):
        s=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
        s.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
        s.bind(('', port))
        return s

# Function to receive a connection
def allowConn(s):
        s.listen(5)
        c, addr=s.accept()
        return c, addr

# Function to create a socket and connect to it
def createConn(port,ip=''):
        sock=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
        sock.connect((ip,port))
        return sock

# Function to send a frame
def send_frame(frame, c):
        # Send the frame to the other process
        c.send(frame.encode())
```

client.py contains the client-side code

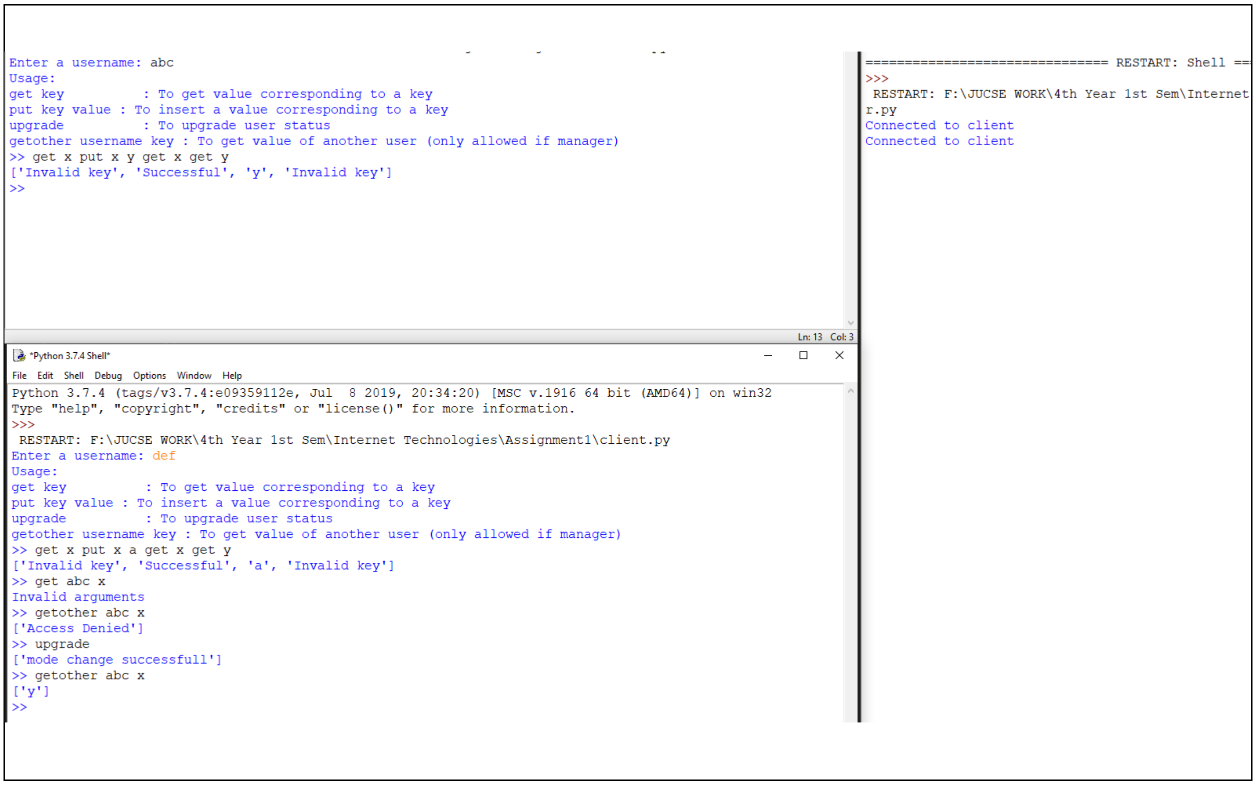
```
 import socket
import threading
import common as co
import pickle
import sys

# Function to return a dictionary based on the request
def parseArgs(args):
        req=[]
        i=0
        while i<(len(args)):

                if(args[i].lower()=='get'):
                        if(i==len(args)-1 or args[i+1].lower()=='put'): # Error
case
                                return 0,req
                        else:
                                req.append({'method':'get','key':args[i+1]})
                                i=i+1

                elif(args[i].lower()=='put'):
                        if(i==len(args)-2): # Error case
                                return 0,req
                        else:

        req.append({'method':'put','key':args[i+1],'value':args[i+2]})
                                i=i+2

                elif(args[i].lower()=='getother'):
                        if(i==len(args)-2): # Error case
                                return 0,req
                        else:

        req.append({'method':'getother','key':args[i+2],'username':args[i+1]})
                                i=i+2

                elif(args[i].lower()=='upgrade'):
                        req.append({'method':'upgrade'})
                else:
                        return 0,req
                i=i+1

        return 1,req

sockClient=co.createConn(port=int(sys.argv[2]),ip=sys.argv[1])

uname=input('Enter a username: ')
sockClient.sendall(uname.encode())

print('Usage:')
print('get key          : To get value corresponding to a key')
print('put key value : To insert a value corresponding to a key')
print('upgrade          : To upgrade user status')
print('getother username key : To get value of another user (only allowed if manager)')

while(True):
        # Take input
        request=input('>> ')
        if(request.lower()=='exit'):
                break
        retVal,req=parseArgs(request.split(' '))

        if(retVal==0):
                print('Invalid arguments')
                continue

        # print(req)

        req=pickle.dumps(req)
        # Send the dictionary through socket
        sockClient.sendall(req)

        # Wait for response
        response=sockClient.recv(1024)
        response=pickle.loads(response)

        print(response)
```

server.py contains the server-side code.

```
import socket
import threading
import common as co
import pickle

# Class to store key value for each client
class KeyValueClient:

        def __init__(self,username):
                self.valstore={}
                self.mode='guest'
                self.username=username

        def _change_mode(self):
                self.mode='admin'
        def _getValue(self,key):
                if(key not in self.valstore):
                        return 'Invalid key'
                return self.valstore[key]

        def _putValue(self,key,value):

                self.valstore[key]=value
                return 'Successful'

        # Function to take action on the requests
        def takeAction(self,req):

                res=[]

                for reqs in req:
                        if(reqs['method'].lower()=='get'):
                                res.append(self._getValue(reqs['key']))

                        elif(reqs['method'].lower()=='put'):

        res.append(self._putValue(reqs['key'],reqs['value']))

                        elif(reqs['method'].lower()=='upgrade'):
                                self._change_mode()
                                res.append('mode change successfull')

                        elif(reqs['method'].lower()=='getother'):
                                if(self.mode=='guest' and
self.username!=reqs['username']):
                                        res.append('Access Denied')
                                elif(self.username==reqs['username'] or
self.mode=='admin'):

                                        if(reqs['username'] in global_dict):

        res.append(global_dict[reqs['username']]._getValue(reqs['key']))
                                        else:
                                                res.append('Invalid username')

                return res

sockServer=co.createSocket(co.portServer)
global_dict={}
```

```
# Function to service a client
def serviceClient(client, clientAddr):

        while True:

                requestC=clientAddr.recv(1024) # Receive the request
dictionary
                requestC=pickle.loads(requestC)
                res=client.takeAction(requestC)
                res=pickle.dumps(res)
                clientAddr.sendall(res)

def allow_new_conn():

        while(True):
                # Wait for a connection
                sockServer.listen(10)
                cAddr, addrServer=sockServer.accept()
                print('Connected to client')
                # Fetch username
                uname=cAddr.recv(1024).decode()
                client=KeyValueClient(uname) # Create client by that username
                global_dict[uname]=client

                # Start a new thread for the sender
                sendThread=threading.Thread(target=serviceClient,
args=[client,cAddr])
                sendThread.start()

allow_new_conn()
```

OUTPUT:



```
Enter a username: abc
Usage:
get key          : To get value corresponding to a key
put key value : To insert a value corresponding to a key
upgrade          : To upgrade user status
getother username key : To get value of another user (only allowed if manager)
>> get x put x y get x get y
['Invalid key', 'Successful', 'y', 'Invalid key']
>>
```

```
============================== RESTART: Shell ==
>>>
 RESTART: F:\JUCSE WORK\4th Year 1st Sem\Internet
r.py
Connected to client
Connected to client
```

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 20:34:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
 RESTART: F:\JUCSE WORK\4th Year 1st Sem\Internet Technologies\Assignment1\client.py
Enter a username: def
Usage:
get key          : To get value corresponding to a key
put key value : To insert a value corresponding to a key
upgrade          : To upgrade user status
getother username key : To get value of another user (only allowed if manager)
>> get x put x a get x get y
['Invalid key', 'Successful', 'a', 'Invalid key']
>> get abc x
Invalid arguments
>> getother abc x
['Access Denied']
>> upgrade
['mode change successfull']
>> getother abc x
['y']
>>
```

On the left two clients are started and on the right the server. The program can handle multiple commands in a single line. The client registers with a username. Then client ‘abc’ asks for the key x. It is not present and hence the output ‘Invalid key’. Client ‘def’ asks for the key of ‘abc’ but at the beginning it is a guest so ‘Access Denied’. Later after ‘upgrade’ it can view.

ASSIGNMENT NUMBER: 2

PROBLEM STATEMENT:

Implement a key-value store using Websocket. The server implements the key-value store and clients make use of it. The server must accept clients' connections and serve their requests for 'get' and 'put' key value pairs. All key-value pairs should be stored by the server only in memory. Keys and values are strings as in Assignment 1. Implement authorization so that only few clients having the role "manager" can access other's key-value stores. A user is assigned the "guest" role by default. The server can upgrade a "guest" user to a "manager" user.

Submit a report on the comparative analysis of the two assignments especially when both roles of manager and guests are considered.

CODE:

The assignment has been implemented in python3.6.

client.py contains the client-side code

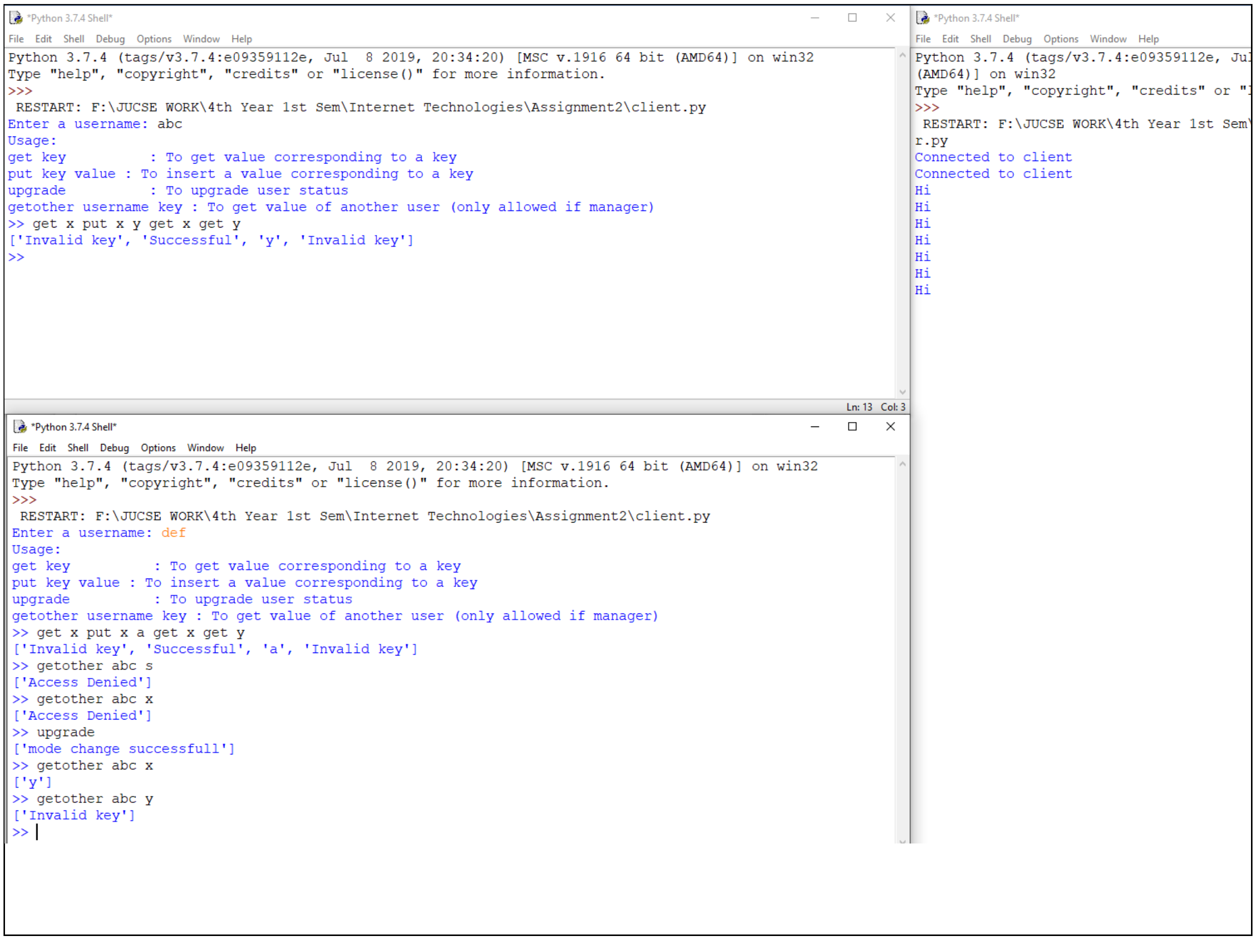
```
import asyncio
import websockets
import pickle
import sys

# Function to return a dictionary based on the request
def parseArgs(args):

        req=[]
        i=0
        while i<(len(args)):

                if(args[i].lower()=='get'):
                        if(i==len(args)-1 or args[i+1].lower()=='put'): # Error
case
                                return 0,req
                        else:
                                req.append({'method':'get','key':args[i+1]})
                                i=i+1

                elif(args[i].lower()=='put'):
                        if(i==len(args)-2): # Error case
                                return 0,req
                        else:

        req.append({'method':'put','key':args[i+1],'value':args[i+2]})
                                i=i+2

                elif(args[i].lower()=='getother'):
                        if(i==len(args)-2): # Error case
                                return 0,req
                        else:

        req.append({'method':'getother','key':args[i+2],'username':args[i+1]})
                                i=i+2

                elif(args[i].lower()=='upgrade'):
                        req.append({'method':'upgrade'})
                else:
                        return 0,req
                i=i+1

        return 1,req


async def clientRun():
        ws_url='ws://'+sys.argv[1]+':'+str(sys.argv[2])
        # async with websockets.connect(ws_url) as sockClient:
        sockClient=await websockets.connect(ws_url)
        # Accept username
        uname=input('Enter a username: ')
        await sockClient.send(uname)

        print('Usage:')
        print('get key          : To get value corresponding to a key')
        print('put key value : To insert a value corresponding to a key')
        print('upgrade          : To upgrade user status')
        print('getother username key : To get value of another user (only
allowed if manager)')

        while(True):
                # Take input
                request=input('>> ')
                if(request.lower()=='exit'):
                        break
                retVal,req=parseArgs(request.split(' '))

                if(retVal==0):
                        print('Invalid arguments')
                        continue

                # print(req)

                req=pickle.dumps(req)
                # Send the dictionary through socket
                await sockClient.send(req)

                # Wait for response
                try:
                        response=await sockClient.recv()
                except:
                        # Reconnect
                        print('Reconnecting...')
                        sockClient=await websockets.connect(ws_url)
                        # response=await sockClient.recv()

                response=pickle.loads(response)

                print(response)

asyncio.get_event_loop().run_until_complete(clientRun())
```

server.py contains the server-side code.

```
import asyncio
import websockets

import socket
import threading
import pickle

# Class to store key value for each client
class KeyValueClient:

        def __init__(self,username):
                self.valstore={}
                self.mode='guest'
                self.username=username

        def _change_mode(self):
                self.mode='admin'

        def _getValue(self,key):
                if(key not in self.valstore):
                        return 'Invalid key'
                return self.valstore[key]

        def _putValue(self,key,value):

                self.valstore[key]=value
                return 'Successful'

        # Function to take action on the requests
        def takeAction(self,req):

                res=[]

                for reqs in req:
                        if(reqs['method'].lower()=='get'):
                                res.append(self._getValue(reqs['key']))

                        elif(reqs['method'].lower()=='put'):

        res.append(self._putValue(reqs['key'],reqs['value']))

                        elif(reqs['method'].lower()=='upgrade'):
                                self._change_mode()
                                res.append('mode change successfull')

                        elif(reqs['method'].lower()=='getother'):
                                if(self.mode=='guest' and
self.username!=reqs['username']):
                                        res.append('Access Denied')
                                elif(self.username==reqs['username'] or
self.mode=='admin'):

                                        if(reqs['username'] in global_dict):

        res.append(global_dict[reqs['username']]._getValue(reqs['key']))
                                        else:
                                                res.append('Invalid username')

                return res

global_dict={}

# Function to service a client
async def serviceClient(clientAddr,path):

        print('Connected to client')
        # Fetch username
        uname=await clientAddr.recv()
        client=KeyValueClient(uname) # Create client by that username
        global_dict[uname]=client

        while True:

                requestC=await clientAddr.recv() # Receive the request
dictionary
                requestC=pickle.loads(requestC)
                res=client.takeAction(requestC)
                res=pickle.dumps(res)
                print('Hi')
                await clientAddr.send(res)
```

```
start_server = websockets.server.serve(serviceClient, '', 8765,
ping_timeout=100000, ping_interval=100000)
asyncio.get_event_loop().run_until_complete(start_server)
asyncio.get_event_loop().run_forever()
```

OUTPUT:



```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 20:34:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
 RESTART: F:\JUCSE WORK\4th Year 1st Sem\Internet Technologies\Assignment2\client.py
Enter a username: abc
Usage:
get key           : To get value corresponding to a key
put key value : To insert a value corresponding to a key
upgrade           : To upgrade user status
getother username key : To get value of another user (only allowed if manager)
>> get x put x y get x get y
['Invalid key', 'Successful', 'y', 'Invalid key']
>>
```

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 20:34:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
 RESTART: F:\JUCSE WORK\4th Year 1st Sem\Internet Technologies\Assignment2\client.py
Enter a username: def
Usage:
get key           : To get value corresponding to a key
put key value : To insert a value corresponding to a key
upgrade           : To upgrade user status
getother username key : To get value of another user (only allowed if manager)
>> get x put x a get x get y
['Invalid key', 'Successful', 'a', 'Invalid key']
>> getother abc s
['Access Denied']
>> getother abc x
['Access Denied']
>> upgrade
['mode change successfull']
>> getother abc x
['y']
>> getother abc y
['Invalid key']
>> 
```

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Ju
(AMD64)] on win32
Type "help", "copyright", "credits" or "
>>>
 RESTART: F:\JUCSE WORK\4th Year 1st Sem\
r.py
Connected to client
Connected to client
Hi
Hi
Hi
Hi
Hi
Hi
Hi
```

On the left two clients are started and on the right the server. The program can handle multiple commands in a single line. The client registers with a username. Then client ‘abc’ asks for the key x. It is not present and hence the output ‘Invalid key’. Client ‘def’ asks for the key of ‘abc’ but at the beginning it is a guest so ‘Access Denied’. Later after ‘upgrade’ it can view.

COMPARATIVE ANALYSIS:

TCP Socket	Websocket
For a non-blocking TCP socket it will send data if the size of the data is less than the buffer size. If it is blocking it will wait for the buffer to be full and then send the data. Larger data may be fragmented and transmitted	Websocket can only send data if the data size is less than the buffer size. Websockets do not fragment data.
TCP sockets are half duplex i.e. while it receives data from a host it cannot simultaneously send data to the host.	Websockets are full duplex connections which allow simultaneous sending and receiving of data
In terms of the coding for interaction with multiple clients using TCP sockets threads needs to be manually created.	Threads need not be manually created and are handled by the library.

ASSIGNMENT NUMBER: 3

PROBLEM STATEMENT:

Write a multi-client chat application consisting of both client and server programs. In this chat application simultaneously, several clients can communicate with each other. For this you need a single server program that clients connect to. The client programs send the chat text or image (input) to the server and then the server distributes that message (text or image) to all the other clients. Each client then displays the message sent to it by the server. The server should be able to handle several clients concurrently. It should work fine as clients come and go.

Develop the application using a framework based on Node.JS. How are messages handled concurrently?

Which web application framework(s) did you follow?

Prepare a detailed report of the experiments you have done, and your observations on performance of the system.

CODE:

index.html

This is the home page of the app.

```
<!DOCTYPE html>
<html>
<head>
        <title>Chat App</title>


        <style>

                body{
                        background-color: #f8f8f8
                }

                #container{
                        width:700px;
                        margin:0 auto;
                }

                #chatWindow{
                        height:500px;
                        overflow-y: auto;
                }

                #mainWrapper{
                        display:none;
                }

                #chatWrapper{
                        float:left;
                        border:1px #ddd solid;
                        border-radius:10px;
                        background:#f6f6f6;
                        padding:20px;

                }

                #messageOther{
                        border:1px #ddd solid;
                        border-radius:10px;
                        background: #ADFF2F;
                }
                #messageMy{
                        border:1px #ddd solid;
                        border-radius:10px;
                        background: #32CD32;
                }

                #userWrapper{
                        float:left;
                        border:1px #ddd solid;
                        border-radius:10px;
                        background: #f6f6f6;
                        padding:10px;

                        margin-left:20px;
                        width:150px;
                        max-height:200px;
                }

                #namesWrapper{
                        float:left;
                        border:1px #ddd solid;
                        border-radius:10px;
                        background: #f6f6f6;
                        padding:10px;
                        margin-left:30px;
                        /*display:none;*/
                }

                input{
                        height:30px;
                }

        </style>



</head>
<body>

        <div id="container">
                <div id="namesWrapper">
                        <p>Create Username</p>
                        <div id="error"></div>
                        <form id="usernameForm">
```

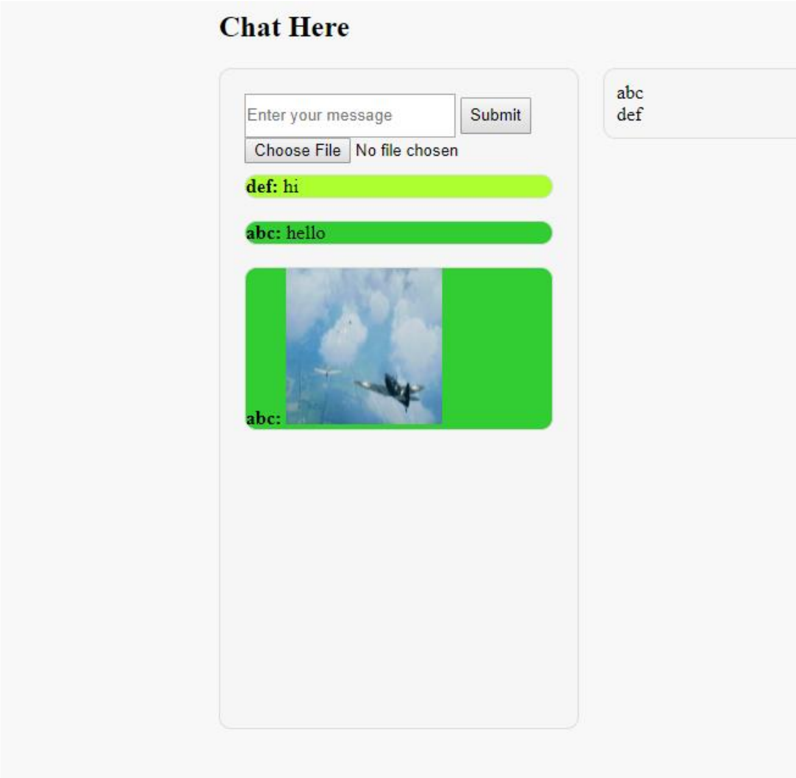
```
                                <input type="text" id="username" size="35">
                                <input type="submit" value="Submit">
                        </form>
                </div>

                <div id="mainWrapper">
                        <h2>Chat Here</h2>
                        <div id="chatWrapper">
                                <div id="chatWindow">
                                        <form id="messageForm">
                                                <input type="text" id="message"
placeholder="Enter your message">
                                                <input type="submit"
value="Submit"> <br>
                                                <input type="file"
id="fileimage" accept="image/png" name="photo" value="upload">
                                        </form>
                                </div>
                        </div>

                        <div id="userWrapper">
                                <div id="users"></div>
                        </div>

                </div>

        </div>

        <script src="http://code.jquery.com/jquery-latest.min.js"></script>
        <script src="/socket.io/socket.io.js"></script>


        <script>


                $(function(){
                        var socket=io.connect();

                        var $messageForm=$('#messageForm');
                        var $message=$('#message');
                        var $chat=$('#chatWindow');

                        var $usernameForm=$("#usernameForm");
                        var $users=$("#users");
                        var $username=$("#username");
                        var $error=$("#error");
                        var uname='';

                        $usernameForm.submit(function(e){
                                e.preventDefault();

                                socket.emit('new
user',$username.val(),function(data){
                                        if(data){
                                                $("#namesWrapper").hide();
                                                $("#mainWrapper").show();
                                                uname=$username.val();
                                        }
                                        else{
                                                $error.html("Username is taken")
                                        }
                                });

                        });

                        socket.on('usernames',function(data){
                                var html="";

                                for(i=0;i<data.length;i++)
                                {
                                        html+=data[i]+'</br>';
                                }
                                $users.html(html);
                        });

                        $("#fileimage").click(function(){
                                //Create an instance of FileReader
                                const fileReader = new FileReader();
                                var fname=''
                                //Start reading the file
                                fileReader.onload=function(){

        fname=document.getElementById("fileimage").files[0];
                                        console.log(fname);

                    var dataURL = fileReader.result;
                    $(function() {
                        socket.emit('img message',{'image':dataURL});
                        $("#fileimage").val("");
                        return false;
                    });
                };

        fileReader.readAsDataURL(document.getElementById("fileimage").files[0]
);

                        });

                        $messageForm.submit(function(e){
                                e.preventDefault();

                                socket.emit('send message',$message.val());
                                $message.val('');
                        });

                        socket.on('new message',function(data){

                                //Create a div for messages
                                console.log(uname);
                                if(data.user==uname)
                                {
                                        mess="<div
id='messageMy'><strong>"+data.user+":</strong> "+data.msg+"</div><br>";
                                }
                                else
                                {
                                        mess="<div
id='messageOther'><strong>"+data.user+":</strong> "+data.msg+"</div><br>";
                                }

                                $chat.append(mess);
                        });

                        socket.on('imageConversionByServer', function(data){
                                console.log(data);
                                if(data.user==uname)
                                {
                                        mess="<div
id='messageMy'><strong>"+data.user+":</strong> <img src=\""+data.img+"\"
style=\"width:128px;height:128px;\"/>"+"</div><br>";
                                }
                                else
                                {
                                        mess="<div
id='messageOther'><strong>"+data.user+":</strong> <img src=\""+data.img+"\"
style=\"width:128px;height:128px;\"/>"+"</div><br>";
                                }
                                $chat.append(mess);

                        });

                });

        </script>

</body>
</html>
```

server.js

This is the code for the server written in node.js

```
var express=require('express'),
        app=express(),
        server=require('http').createServer(app),
        io=require('socket.io').listen(server);
        usernames=[];
var fs=require('fs');

server.listen(process.env.PORT || 3000)
console.log('Server running');


app.get('/', function(req,res){
        res.sendFile(__dirname+"/index.html");
});


io.sockets.on('connection',function(socket)
{
        console.log('Socket connected');

        socket.on('new user',function(data, callback){
                if(usernames.indexOf(data)!=-1){
                        callback(false);
                }
                else
                {
                        callback(true);
                        socket.username=data;
                        usernames.push(socket.username);
                        updateUserNames();

                }
        });

        function updateUserNames(){
                io.sockets.emit('usernames',usernames);
        }

        //Send message
        socket.on('send message', function(data){
                io.sockets.emit('new
message',{'msg':data,'user':socket.username});
        });

        socket.on('img message', function(msg){

                console.log(msg)
                var base64data =
msg.image.replace(/^data:image\/png;base64,/,"");
                fs.writeFile('image.png', base64data, 'base64', (err) =>{
                        if (err) throw err;
                        console.log("The file has been saved");
                        fs.readFile(__dirname+'/image.png', function(err,
data){
                                console.log("sending");
                            io.sockets.emit('imageConversionByServer', {user :
socket.username, img : "data:image/png;base64,"+ data.toString("base64")});
                        });
                });

        });

        socket.on('disconnect', function(data){
                if(!socket.username){
                        return;
                }

                usernames.splice(usernames.indexOf(socket.username),1);
                updateUserNames();
        })
});
```

OUTPUT:



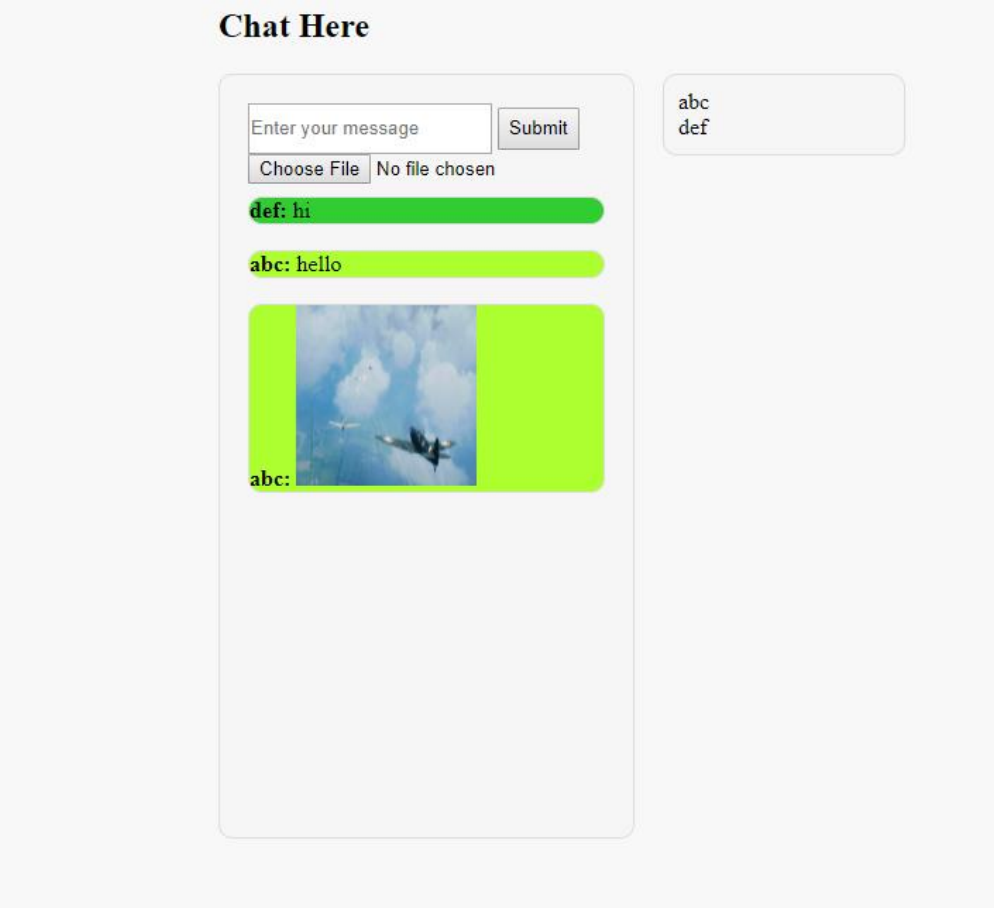
abc
def

def: hi

abc: hello

abc:

Fig. 1 abc’s chat



def: hi

abc: hello

abc:

abc
def

Fig. 2 def's chat

DISCUSSIONS:

1. Frameworks used in this assignment are Node.js, and express.
2. The concurrency is handled by Node.js as it works asynchronously it can automatically handle new users by creating a separate thread for each of them.
3. The overall performance of the application is quite good as it can send files and text pretty quickly over the network.

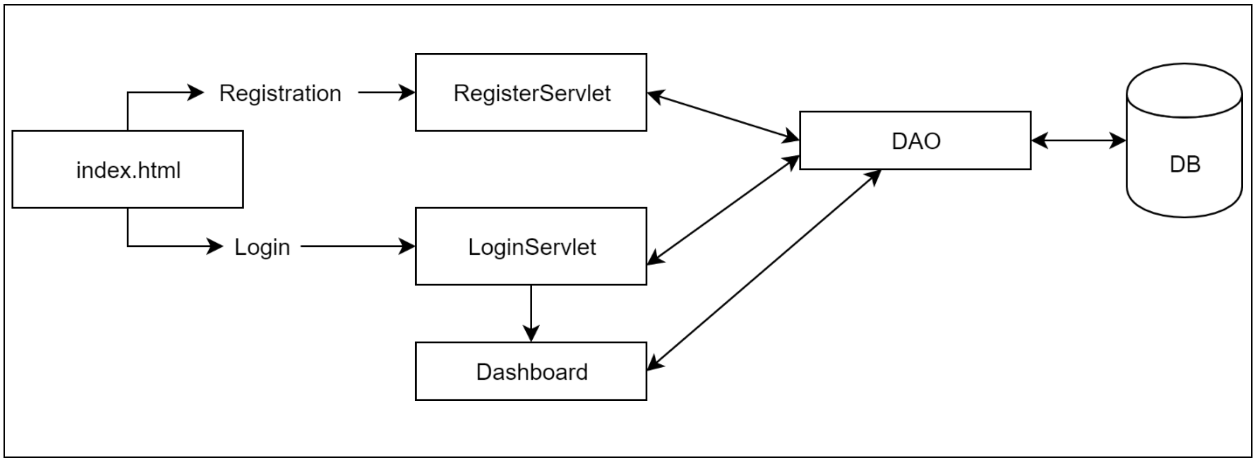
ASSIGNMENT NUMBER: 4

PROBLEM STATEMENT:

Design an online apparel store using servlets and jsps. The store keeps records for its items in a database where some items may be discounted and some other items should be displayed as "new arrivals". A user may search for a specific item. By default, when a user signs in, based on his/her profile (male/female etc.), show him/her preferred set of clothing. Users will be divided into two groups: some users looking for discounted items mainly, some others looking for new arrivals. So, depending on their preference already set in the database, the order of the displayed list would vary. By default, discounted items will be displayed first.

You may apply the concept of "dependency injection" here. Dependency injection (DI) is a technique where one object supplies the dependencies of another object. Basically you have an interface and a number of java beans implementing them. You may use SessionListener or ServletContextListener. The major benefit of DI is loose coupling and ease of use. DI makes classes more cohesive because they have fewer responsibilities.

FLOW DIAGRAM:



CODE:

index.html

This is the homepage where the login and registration forms are present.

```
<!DOCTYPE html>
<html>
<head>
        <meta charset="ISO-8859-1">
        <title>Login</title>

        <style type="text/css">

                body{
                        background-color: #a2a2a2;
                }

                #login-page{
                        width:360px;
                        padding:10% 0 0;
                        margin:auto;
                }

                #formAll{
                        position: relative;
                        z-index: 100;
                        background: #ffffff;
                        max-width: 360px;
                        margin: 0 auto 100px;
                        padding: 45px;
                        text-align: center;
                }

                select, input{
                        font-family: "Times New Roman", serif;
                        outline:1;
                        background: #f2f2f2;
                        width: 100%;
                        border: 0;
                        margin: 0 0 15px;
                        padding: 15px;
                        box-sizing: border-box;
                        font-size: 14p;
                }
                #submit{
                        text-transform: uppercase;
                        padding: 15px;
                        color: #FFFFFF;
                        background: #000000;
                        cursor: pointer;
                }

                .register-Form{
                        display: none;
                }

                .forgot-pass-form{
                        display: none;
                }

                #duplicateUname{
                        display:none;
                        color: red;

                }

        </style>

        <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js">
        </script>




</head>


<body>

        <div id="login-page">
                <div id="form">
                        <form id="loginform formAll" class="loginform"
action="login" method="post">
                                <input type="text" name="username" required=""
placeholder="Enter your Username"><br>
                                <input type="password" name="password"
required="" placeholder="Enter your password"><br>
```

```
                                <input type="submit" id="submit" name="submit"
value="Login">
                                <p class="notReg"> Not registered? <a
class="reg-here" href="#">Register Here </a></p>
                                <p class="notReg"> Forgot password? <a
class="forgot-pass" href="#">Click here </a></p>
                        </form>

                        <form id="reg formAll" class="register-Form"
action="register" method="post">
                                <input type="text" name="name" required=""
placeholder="Enter your name"><br>

                                <select id="gender" name="gender" required="">
                                  <option value="" disabled selected>Select
your gender</option>
                                  <option value="male">Male</option>
                                  <option value="female">Female</option>
                                </select><br>

                                <select id="producttype" name="prodtype">
                                  <option value="" disabled selected>Select
your product category</option>
                                  <option value="discount">Discounted
Items</option>
                                  <option value="newarr">New Arrivals</option>
                                </select><br>

                                <div id="duplicateUname">Sorry, this username
is already taken</div>

                                <input type="text" name="username"
placeholder="Enter your Username"><br>
                                <input type="password" name="password"
placeholder="Enter your password"><br>

                                <input type="submit" id="submit" name="submit"
value="Register">
                                <p class="alreadyReg"> Already registered? <a
class="login-here" href="#">Login Here </a></p>
                        </form>

                        <form id="forgot formAll" class="forgot-pass-form"
action="forgot" method="post">
```

```
                                <input type="text" name="username"
placeholder="Enter your username">
                                <input type="password" name="password"
placeholder="Enter new password">
                                <input type="submit" name="submit" id="submit"
value="Change Password">
                        </form>

                </div>
        </div>

</body>

<script type="text/javascript">
                $(document).ready(function(){
                        $('.reg-here').click(function(){
                                $('.loginform').hide();
                                $('.forgot-pass-form').hide();
                                $('.register-Form').show();
                        });

                        $('.forgot-pass').click(function(){
                                $('.loginform').hide();
                                $('.forgot-pass-form').show();
                                $('.register-Form').hide();
                        })

                        $('.login-here').click(function(){
                                $('.loginform').show();
                                $('.forgot-pass-form').hide();
                                $('.register-Form').hide();
                        });
                });

</script>

</html>
```

dashboard.jsp

This is the page which will be displayed after the user logs in.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>

<%@page import="java.sql.ResultSet"%>
<%@page import="com.shopping.DAO"%>
<%@page import="com.shopping.User"%>

<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Dashboard</title>

<style type="text/css">
        ul {
                list-style-type: none;
                margin: 0;
                padding: 2px;
                overflow: hidden;
                background-color: #333;
                height: 40px;
        }

        li {
                padding:1px;
                float: left;
                color: #ffffff;
                font-size: 20px;
                text-align: center;
        }

        .cards{
                width:12%;
                display: inline-block;
                margin:40px;
                box-shadow:2px 2px 10px black;
        }

        .image img{
                width:100%;
        }

        .title{
                text-align: center;
        }

        .price{
                text-align: center;
                font-size: 20px;
                padding:4px;
        }

        .gender{
                text-align: center;
                color:#a0a0a0;
                font-size: 16px;
                padding:4px;
        }

        .origPrice{
                text-align: center;
                font-size: 16px;
                padding:4px;
                text-decoration: line-through;
                color: grey;
        }

        .nameDisp{
                float: right;
        }

        .logout a{
                color:white;
        }


        .ribbon {
          position: relative;
          left: -5px; top: -5px;
          z-index: 1;
          overflow: hidden;
          width: 75px; height: 75px;
          text-align: right;
        }
        .ribbon span {
          font-size: 10px;
          font-weight: bold;
          color: #FFF;
          text-transform: uppercase;
          text-align: center;
          line-height: 20px;
          transform: rotate(-45deg);
          -webkit-transform: rotate(-45deg);
          width: 100px;
          display: block;
          background: #79A70A;
          background: linear-gradient(#F70505 0%, #8F0808 100%);
          box-shadow: 0 3px 10px -5px rgba(0, 0, 0, 1);
          position: absolute;
          top: 19px; left: -21px;
        }
        .ribbon span::before {
          content: "";
          position: absolute; left: 0px; top: 100%;
          z-index: -1;
          display: block;
          border-left: 3px solid #8F0808;
          border-right: 3px solid transparent;
          border-bottom: 3px solid transparent;
          border-top: 3px solid #8F0808;
        }
        .ribbon span::after {
          content: "";
          position: absolute; right: 0px; top: 100%;
          z-index: -1;
          display: block;
          border-left: 3px solid transparent;
          border-right: 3px solid #8F0808;
          border-bottom: 3px solid transparent;
          border-top: 3px solid #8F0808;
        }

        .images img{
                width:100%;
        }

        .error{
                font-size: 20px;
                text-align: center;
        }

        .search-bar{
                justify-content: center;
                align-items: center;
        }

        .search-field{
                margin: auto;
                height: 30px;
                width: 50%;
                padding: 10px;
                border-radius: 40px;
        }

        .search-btn{
                height: 40px;
                width: 10%;
                padding: 10px;
                border-radius: 40px;
                background-color: grey;
                color: white;
                text-align: center;
        }

        .search-btn:hover{
                background-color: black;
                cursor: pointer;
        }

</style>


</head>
<body>

        <%
                response.setHeader("Cache-Control","no-cache, no-store, must-revalidate");
                System.out.println((User)session.getAttribute("user"));
                //Session check
                if((User)session.getAttribute("user")==null)
                {
                        System.out.println("Hi");
                        response.sendRedirect("index.html");
                        return;
                }
        %>

        <ul>
                <li class="logout"><a
href="<%=request.getContextPath()%>/logout">Logout</a></li>
                <li class="nameDisp">Hi,
<%=((User)(session.getAttribute("user"))).getName()%></li>
        </ul>
        <br><br>
        <!-- Now fetch the data -->

        <div class="main">

                <div class="search-bar">
                        <form method="post">
                                <input type="text" class="search-field"
name="search" required="" placeholder="Search...">
                                <input type="submit" class="search-btn"
name="submit" value="search">
                        </form>
                </div>

        <%

                DAO dao=(DAO)session.getAttribute("dao");
                ResultSet rs;
                if(request.getParameter("submit")!=null)
                        rs=dao.getItemsByName(request.getParameter("search"));
                else
                        rs=dao.getItems((User)session.getAttribute("user"));

                if(rs==null)
                {%>
                        <div class="error">
                                Sorry!! No Items match your search
                        </div>
                <%}

                else
                do
                {
                        System.out.println(rs);
                        {%>
                        <div class="cards">

        <%if(rs.getString("itemtype").equals("newarr")){ %>

                                <div class="ribbon"><span>NEW</span></div>
                                <%} %>

                                <div class="images">
                                        <img
src="<%="/ShoppingApp/images/"+rs.getString("name")+".png" %>"/>
                                </div>

                                <div class="title">
                                        <h3><%=rs.getString("name")%></h3>
                                </div>
                                <div class="gender">
                                        Gender: <%=rs.getString("gender")%>
                                </div>

        <%if(rs.getString("itemtype").equals("discount"))
                                        {%>
                                        <div class="origPrice">
                                                Price: Rs.
<%=rs.getString("price")%>
                                        </div>
                                <%} %>

                                <div class="price">
                                        Price: Rs.
                                        <%
                                        int
disc=Integer.parseInt(rs.getString("discount"));
                                        int
orig=Integer.parseInt(rs.getString("price"));
                                        int newprice=orig-
(int)(orig*disc/100.0);
                                        out.print(newprice);
                                        %>
                                </div>

                        </div>

                <%}
                }
                while(rs.next());
        %>

        </div>

</body>
</html>
```

User.java

The class which describes a user. It stores the user details in it.

```
package com.shopping;

public class User {
        private String name,uname,gender,choice,password;

        public User(String name,String uname,String gender,String choice,
String password)
        {
                this.name=name;
                this.uname=uname;
                this.gender=gender;
                this.choice=choice;
                this.password=password;
        }

        public String getName() {
                return name;
        }

        public String getUname() {
                return uname;
        }

        public String getGender() {
                return gender;
        }

        public String getChoice() {
                return choice;
        }

        public String getPassword() {
                return password;
        }
}
```

RegisterServlet.java

This is the servlet responsible for registering an User in the database.

```java
package com.shopping;

import java.io.IOException;
import java.io.PrintWriter;
import java.sql.ResultSet;
import java.sql.SQLException;

import javax.servlet.RequestDispatcher;
import javax.servlet.ServletConfig;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 * Servlet implementation class RegisterServlet
 */
@WebServlet(name = "register", urlPatterns = { "/register" })
public class RegisterServlet extends HttpServlet {
        private static final long serialVersionUID = 1L;

        private String dburl,dbuname,dbpass;

    /**
     * @see HttpServlet#HttpServlet()
     */
    public RegisterServlet() {
        super();
        // TODO Auto-generated constructor stub
    }

        /**
         * @see Servlet#init(ServletConfig)
         */
        public void init(ServletConfig config) throws ServletException {
                // TODO Auto-generated method stub
                super.init(config);
                dburl=getServletContext().getInitParameter("dburl");
        dbuname=getServletContext().getInitParameter("dbuname");
        dbpass=getServletContext().getInitParameter("dbpass");

        System.out.println(dburl);
        }



        /**
         * @see HttpServlet#doPost(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                String name=request.getParameter("name");
                String gender=request.getParameter("gender");
                String prodtype=request.getParameter("prodtype");
                String uname=request.getParameter("username");
                String password=request.getParameter("password");

                DAO dao=new DAO(dburl,dbuname,dbpass);

                User u=new User(name,uname,gender,prodtype,password);
                PrintWriter out = response.getWriter();
                try {
                        if(dao.checkUname(uname))
                        {
                                out.println("<script type='text/javascript'>");
//
        out.println("document.getElementById('duplicateUname').show()");
                                out.println("alert('Duplicate Username');");
                                out.println("</script>");

                                RequestDispatcher
rd=request.getRequestDispatcher("index.html");
                        rd.include(request, response);

                        return;
                        }
                }
                catch (Exception e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }
                try{
                        dao.register(u);
                }
                catch(Exception e)
                {
                        e.printStackTrace();
                }
                response.sendRedirect("index.html");

        }

}
```

LoginServlet.java

This servlet takes the username and password, checks whether it exists in the database and accordingly allows the user to log in or displays an error message for wrong credentials.

```
package com.shopping;

import java.io.IOException;
import java.io.PrintWriter;
import java.sql.ResultSet;
import java.sql.SQLException;

import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

/**
 * Servlet implementation class LoginServlet
 */
@WebServlet(name = "login", urlPatterns = { "/login" })
public class LoginServlet extends HttpServlet {
        private static final long serialVersionUID = 1L;

        private String dburl,dbuname,dbpass;

    /**
```

```
     * @see HttpServlet#HttpServlet()
     */
    public LoginServlet() {
        super();
        // TODO Auto-generated constructor stub
    }

    public void init()
    {
        dburl=getServletContext().getInitParameter("dburl");
        dbuname=getServletContext().getInitParameter("dbuname");
        dbpass=getServletContext().getInitParameter("dbpass");
    }

        /**
         * @see HttpServlet#doPost(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                String uname=request.getParameter("username");
                String password=request.getParameter("password");
                PrintWriter out = response.getWriter();
                DAO dao=new DAO(dburl,dbuname,dbpass);
                ResultSet rs=null;
                try
                {
                        rs = dao.loginCheck(uname, password);
                }
                catch (ClassNotFoundException | SQLException e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }

                if(rs!=null)
                {
                        User u=null;
                        //Set the session
                        try
                        {
                                u = new User(rs.getString("name"),
rs.getString("uname"), rs.getString("gender"), rs.getString("choice"),
rs.getString("password"));
                        }
```

```
            catch (SQLException e)
            {
                // TODO Auto-generated catch block
                e.printStackTrace();
            }
            HttpSession session=request.getSession();
            session.setAttribute("user", u);
            session.setAttribute("dao", dao);

            //Then redirect to dashboard
            response.sendRedirect("dashboard.jsp");
        }
        else
        {
            out.println("<script type='text/javascript'>");
//
    out.println("document.getElementById('duplicateUname').show()");
            out.println("alert('Wrong Login Credentials');");
            out.println("</script>");

            RequestDispatcher
rd=request.getRequestDispatcher("index.html");
        rd.include(request, response);

        return;
        }
    }

}
```

LogoutServlet.java

This servlet is responsible for logging out a user. It mainly invalidates the session variable thus logging the user out.

```
package com.shopping;

import java.io.IOException;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;
```

```java
/**
 * Servlet implementation class LogoutServlet
 */
@WebServlet(name = "logout", urlPatterns = { "/logout" })
public class LogoutServlet extends HttpServlet {
        private static final long serialVersionUID = 1L;

    /**
     * @see HttpServlet#HttpServlet()
     */
    public LogoutServlet() {
        super();
        // TODO Auto-generated constructor stub
    }

        /**
         * @see HttpServlet#doGet(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub

                // Empty the session variable and redirect
                HttpSession session=request.getSession();
                session.removeAttribute("user");
                session.removeAttribute("dao");
                session.invalidate();
                response.sendRedirect("index.html");
        }

}
```

ForgotPassServlet.java

This servlet resets the password for a user.

```java
package com.shopping;

import java.io.IOException;
import java.io.PrintWriter;

import javax.servlet.RequestDispatcher;
import javax.servlet.ServletConfig;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 * Servlet implementation class ForgotPassServlet
 */
@WebServlet(name = "forgot", urlPatterns = { "/forgot" })
public class ForgotPassServlet extends HttpServlet {
        private static final long serialVersionUID = 1L;
        private String dburl,dbuname,dbpass;
    /**
     * @see HttpServlet#HttpServlet()
     */
    public ForgotPassServlet() {
        super();
        // TODO Auto-generated constructor stub
    }


        /**
         * @see Servlet#init(ServletConfig)
         */
        public void init(ServletConfig config) throws ServletException {
                // TODO Auto-generated method stub
                super.init(config);
                dburl=getServletContext().getInitParameter("dburl");
        dbuname=getServletContext().getInitParameter("dbuname");
        dbpass=getServletContext().getInitParameter("dbpass");

        System.out.println(dburl);
        }

        /**
         * @see HttpServlet#doPost(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                String uname=request.getParameter("username");
                String password=request.getParameter("password");

                DAO dao=new DAO(dburl,dbuname,dbpass);
                PrintWriter out = response.getWriter();
                //Check if username in database
                try {
                        if(dao.checkUname(uname))
                        {
                                dao.updatePass(uname, password);
                                response.sendRedirect("index.html");
                        }
                        else
                        {
                                out.println("<script type='text/javascript'>");
                                out.println("alert('Sorry!! Not a registered
user');");
                                out.println("</script>");

                                RequestDispatcher
rd=request.getRequestDispatcher("index.html");
                        rd.include(request, response);

                        return;
                        }
                }
                catch (Exception e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }

        }

}
```

DAO.java

This Java bean is responsible for interacting with the database. It takes care of all database operations- connecting with the database, querying the database and returning the required data to the servlets.

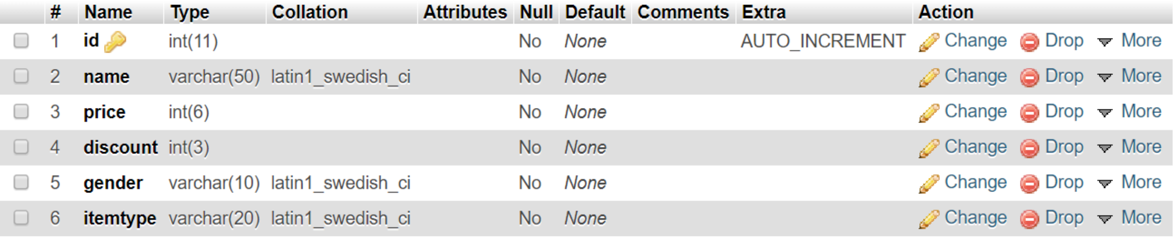
```
package com.shopping;

import java.sql.*;

public class DAO {

        private Connection con;
        private Statement stmt;
        private String url,uname,password;

        public DAO(String url, String uname, String password)
        {
                this.url=url;
                this.uname=uname;
                this.password=password;
        }

        //Function to establish the connection
        private void setConnection() throws ClassNotFoundException,
SQLException
        {
                Class.forName("com.mysql.jdbc.Driver");
                con=DriverManager.getConnection(url,uname,password);
                stmt=con.createStatement();
        }

        //Function to close the connection
        private void closeConn() throws SQLException
        {
                con.close();
        }

        //Function for login
        public ResultSet loginCheck(String username, String password) throws
ClassNotFoundException, SQLException
        {
                setConnection();
                String query="select * from logininfo where
uname=\'"+username+"' and password=\'"+password+"'";
                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs; //Means username password exists
                }
                closeConn();
                return null;
        }

        //Function for checking duplicate username
        public boolean checkUname(String username) throws
ClassNotFoundException, SQLException
```

```
        {
                setConnection();
                String query="select * from logininfo where 
uname=\'"+username+"'";
                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return true; //Means username password exists
                }
                closeConn();
                return false;
        }

        //Function for registering
        public void register(User u) throws ClassNotFoundException, 
SQLException
        {
                setConnection();
                String query="insert into logininfo 
values('"+u.getName()+"','"+u.getGender()+"','"+u.getUname()+"','"+u.getPassw
ord()+"','"+u.getChoice()+"')";
                int res=stmt.executeUpdate(query);
                closeConn();

        }

        //Function for fetching data from items table
        public ResultSet getItems(User u) throws ClassNotFoundException, 
SQLException
        {
                setConnection();
                String query="select * from items where 
gender='"+u.getGender()+"'";

                if(u.getChoice().equals("newarr"))
                        query+=" order by itemtype desc";
                else
                        query+=" order by itemtype asc, discount desc";

                System.out.println(query);
                ResultSet rs=stmt.executeQuery(query);

//              while(rs.next())
//                      System.out.println(rs.getString("name"));
//
//              System.out.println(rs);
                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for fetching data from items table
                public ResultSet getItemsByName(String name) throws
ClassNotFoundException, SQLException
                {
                        setConnection();
                        String query="select * from items where
name='"+name+"'";

                        System.out.println(query);
                        ResultSet rs=stmt.executeQuery(query);

//                      while(rs.next())
//                              System.out.println(rs.getString("name"));
//
//                      System.out.println(rs);
                        if(rs.next())
                        {
                                return rs;
                        }
                        closeConn();
                        return null;
                }

        public void updatePass(String username, String pass) throws
ClassNotFoundException, SQLException
        {
                setConnection();
                String query="update logininfo set password='"+pass+"' where
uname='"+username+"'";
                int res=stmt.executeUpdate(query);
                closeConn();
        }

}
```

Deployment Descriptor: web.xml

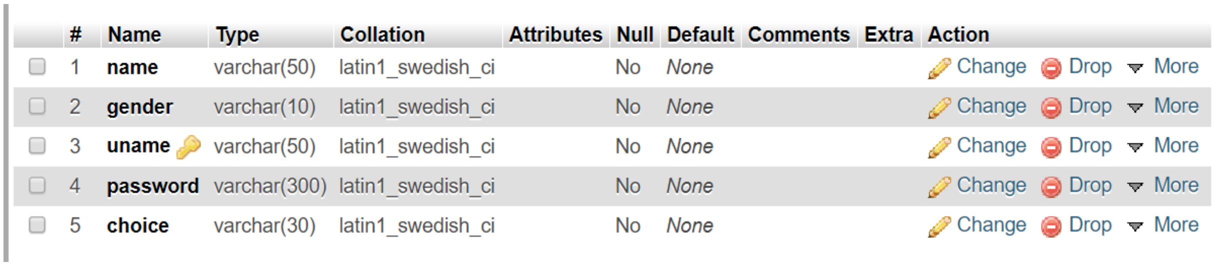
```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://xmlns.jcp.org/xml/ns/javaee"
xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee
http://xmlns.jcp.org/xml/ns/javaee/web-app_3_1.xsd" id="WebApp_ID"
version="3.1">
  <display-name>ShoppingApp</display-name>
  <context-param>
    <param-name>dburl</param-name>
    <param-value>jdbc:mysql://localhost:3306/shopping</param-value>
  </context-param>
  <context-param>
    <param-name>dbuname</param-name>
    <param-value>root</param-value>
  </context-param>
  <context-param>
    <param-name>dbpass</param-name>
    <param-value></param-value>
  </context-param>
</web-app>
```

DATABASE SCHEMA:



	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**id**	int(11)			No	*None*		AUTO_INCREMENT	Change Drop More
□	2	**name**	varchar(50)	latin1_swedish_ci		No	*None*			Change Drop More
□	3	**price**	int(6)			No	*None*			Change Drop More
□	4	**discount**	int(3)			No	*None*			Change Drop More
□	5	**gender**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop More
□	6	**itemtype**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop More

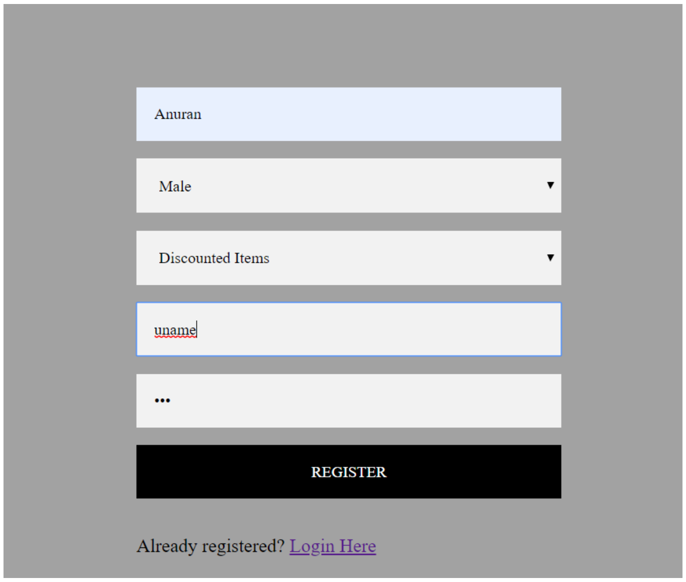
items Table



	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**name**	varchar(50)	latin1_swedish_ci		No	*None*			Change Drop More
□	2	**gender**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop More
□	3	**uname** 🔑	varchar(50)	latin1_swedish_ci		No	*None*			Change Drop More
□	4	**password**	varchar(300)	latin1_swedish_ci		No	*None*			Change Drop More
□	5	**choice**	varchar(30)	latin1_swedish_ci		No	*None*			Change Drop More

logininfo Table

OUTPUT:



Anuran

Male ▾

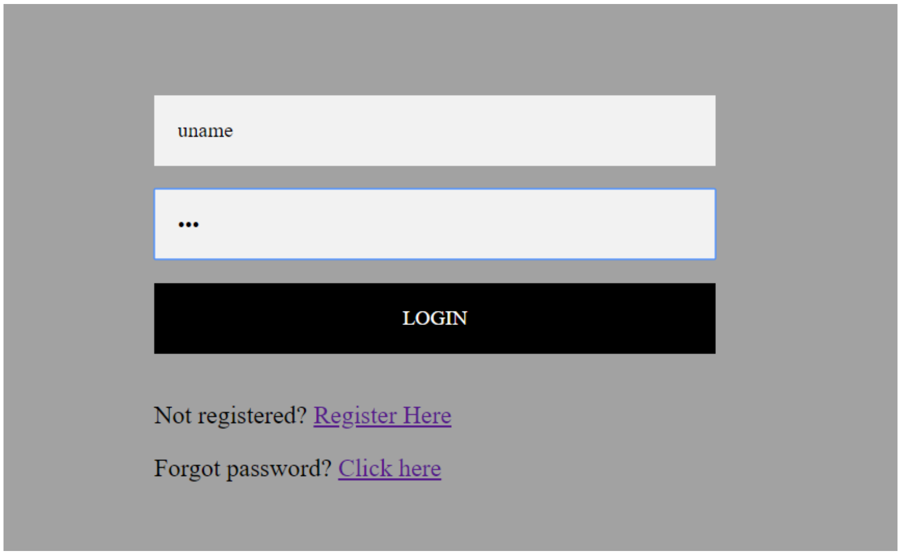
Discounted Items ▾

uname

•••

Already registered? Login Here

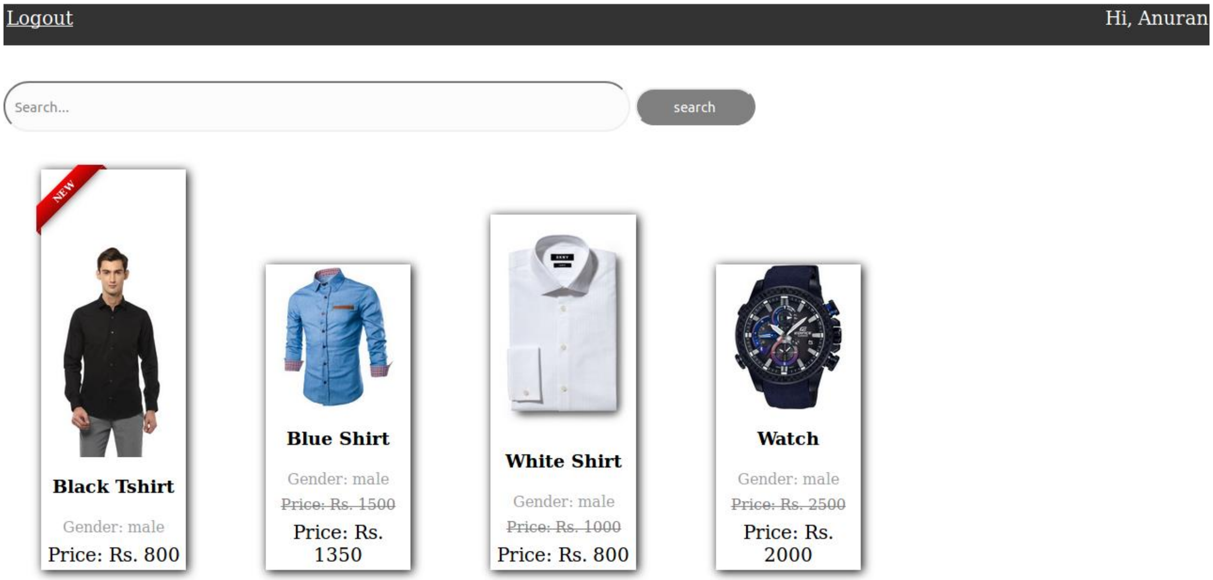
Fig. 1 User Registration process



Not registered? Register Here

Forgot password? Click here

Fig. 2 User Login process



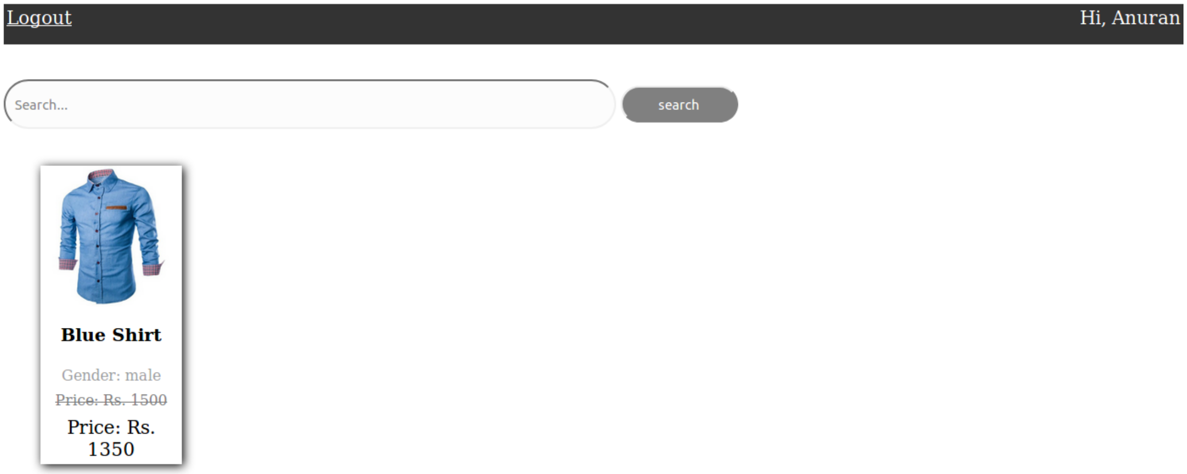
Black Tshirt
Gender: male
Price: Rs. 800

Blue Shirt
Gender: male
~~Price: Rs. 1500~~
Price: Rs. 1350

White Shirt
Gender: male
~~Price: Rs. 1000~~
Price: Rs. 800

Watch
Gender: male
~~Price: Rs. 2500~~
Price: Rs. 2000

Fig. 3 Dashboard After Login



Blue Shirt

Gender: male

~~Price: Rs. 1500~~

Price: Rs. 1350

Fig. 4 After Searching Blue Shirt

ASSIGNMENT NUMBER: 5

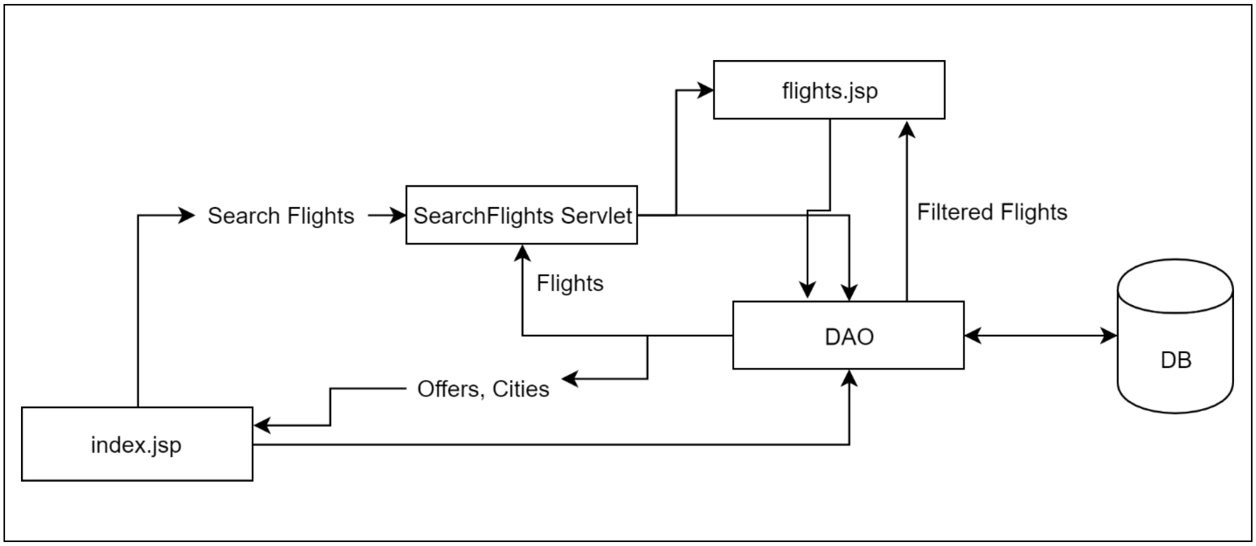
PROBLEM STATEMENT:

Implement a web application for “Travel Thru Air” using servlets to support the following two use cases

1. A list of current special deals must appear on the home page. Each special deal must display the departure city, the arrival city, and the cost. These special deals are set up by the marketing department and change during the day, so it can’t be static. Special deals are only good for a limited amount of time. 2. A user may search for flights, given a departure city, time and an arrival city. The results must display the departure city, the arrival city, the total cost, and how many legs the flight will have.

State and explain why and where you have used design patterns.

FLOW DIAGRAM:



CODE:

index.jsp

This is the homepage where the user can search for flights and the special deals are shown.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
        pageEncoding="ISO-8859-1"%>

<%@ page import="java.sql.*" %>
<%@ page import="travel.DAO" %>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<link rel="stylesheet" href="style.css">
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">

<!-- Latest compiled and minified CSS -->
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css">


<!-- jQuery library -->
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>

<!-- Latest compiled JavaScript -->
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script>


<style>
        .title-bar{
        width: 100%;
        color: white;
        padding: 10px;
        font-family: serif;
        font-size: 100px;
        text-align: center;
        background-color: #1abc9c;
        }
        .error{
                text-align: center;
                font-size: 30px;
                font-family: serif;
        }

        .travel-form{
                margin: auto;
                align-content: center;
                display: block;
                text-align: center;
                background-color: #DBDADA;
                padding: 20px;
        }

        .travel-form form{
                display: inline-block;
        }

        .travel-form select, input{
                height: 60px;
                width: 300px;
        }

        .search{
                background-color: #000faa;
                color: white;
                font-style: strong;
                font-size: large;
                font-weight: 300;
                font-family: monospace;
                border-radius: 100px;
                border: solid;
                background-image: linear-gradient(to bottom right, #6666ff,
#9999ff, #0066ff);
        }

        .special-deals{
                width: 100%;
                padding: 10px;
                font-family: serif;
                font-size: 50px;
                text-align: center;
                color: white;
                font-family: cursive;
                background-image: linear-gradient(to bottom right, #0636ff,
#0699ff, #f016ff);
        }

        .offer{
                width: 100%;
                color: white;
                padding: 10px;
                text-align: center;
                background-color: #1abc9c;
                background-image: radial-gradient(red, yellow);
        }

        .normal-text{
                font-size: 25px;
                font-family: serif;
        }

        .discount{
                font-size: 70px;

        }

        .source{
                font-size: 60px;
        }

        /* Hide the images by default */
        .slide {
          display: none;
        }

        /* Next & previous buttons */
        .prev, .next {
          cursor: pointer;
          position: absolute;
          top: 50%;
          width: auto;
          margin-top: -75px;
          padding: 16px;
          color: white;
          font-weight: bold;
          font-size: 18px;
          transition: 0.6s ease;
          border-radius: 0 3px 3px 0;
          user-select: none;
        }

        /* Position the "next button" to the right */
        .next {
          right: 0;
          border-radius: 3px 0 0 3px;
        }

        /* On hover, add a black background color with a little bit see-
through */
        .prev:hover, .next:hover {
          background-color: rgba(0,0,0,0.8);
        }



</style>

<script type="text/javascript">
        function timeDiff(target) {
                function z(n) {return (n<10? '0' : '') + n;}
                var timeDiff = target - (new Date());
                var hours    = timeDiff / 3.6e6 | 0;
                var minutes  = timeDiff % 3.6e6 / 6e4 | 0;
                var seconds  = timeDiff % 6e4 / 1e3 | 0;
                if (hours<0 || minutes<0 || seconds<0) {
                  document.getElementById('divBody').style.display='none';
                  document.getElementById('divExpired').style.display='';
                  return '<b>EXPIRED</b>';
                  }
                else {
                  return '<b>' + z(hours) + '</b> h <b>' + z(minutes) + '</b>
m <b>' + z(seconds) + '</b> s';
                  }
                }

        var addFunctionOnWindowLoad = function(callback){
          if(window.addEventListener){
                  window.addEventListener('load',callback,false);
          }else{
                  window.attachEvent('onload',callback);
          }
        }
```

```
</script>



<title>Home</title>
</head>
<body>

<!-- Title bar -->
<div class="title-bar">
        <h1> TravelThruAir </h1>
</div>


<%
        String url,user,pass;
        url="jdbc:mysql://localhost:3306/travel";
        System.out.println(url);
        user="root";
        pass="";

        DAO dao=new DAO(url,user,pass);
        ResultSet rs;
        rs=dao.getCities();
%>


<!-- Form -->
<div class="travel-form">
        <form action="search" id="travel-form" method="post">
                <select class="src" id="src" name="src">
                        <%
                                do
                                {%>
                                        <option
value="<%=rs.getString("code")%>"><%=rs.getString("code")%>-
<%=rs.getString("city")%> </option>
                                <%}
                                while(rs.next());
                                rs=dao.getCities();
                        %>
                </select>

                <select class="dest" id="dest" name="dest">
                        <%
```

```
                                do
                                {%>
                                        <option
value="<%=rs.getString("code")%>"><%=rs.getString("code")%>-
<%=rs.getString("city")%> </option>
                                <%}
                                while(rs.next());
                        %>
                </select>

                <input type="date" id="date" name="date" required="">
                <input class="search" type="button" value="SEARCH"
onclick="validate_and_submit()">

        </form>
</div>

<div class="special-deals">
        SPECIAL DEALS
</div>


<!-- Offers -->
<div class="offers-container">
        <%
                rs=dao.getOffers();
                if(rs==null)
                {%>
                        <div class="error">No offers right now</div>
                <% }
                else
                {
                        do
                        {%>
                                <div class="offer slide">
                                        <!-- START TIME:
<%=rs.getString("start_time") %>
                                        END TIME: <%=rs.getString("end_time")
%> -->
                                        <div class="normal-text">Flat</div>
                                        <div
class="discount"><strong><%=rs.getString("discount") %>%</strong> off</div>
                                        <div class="normal-text">on
flights</div>
```

```
                                      <div
class="source"><strong><%=rs.getString("src") %> </strong> <span style='font-
size:75px;'>&#8594;</span> <strong><%=rs.getString("dest") %> </strong></div>
                                      <div class="normal-text"><div
id="countdown<%=rs.getString("id")%>"></div>

                                              <script language="javaScript">
                                                function
doCountDown<%=rs.getString("id")%>(target) {

        document.getElementById('countdown<%=rs.getString("id")%>').innerHTML
= '<span style=\"color:white\"><b>EXPIRES IN</b></span>: ' +
timeDiff(target);
                                                      var lag = 1020 - (new
Date() % 100);

        setTimeout(function(){doCountDown<%=rs.getString("id")%>(target);},
lag);
                                                      }
                                                var x<%=rs.getString("id")%> =
function doStart<%=rs.getString("id")%>() {
                                                      //Insert Expiration Date
from mySQL into t var
                                                      var
t="<%=rs.getString("end_time")%>".split(/[- :]/);

        doCountDown<%=rs.getString("id")%>(new Date(t[0],t[1]-
1,t[2],t[3],t[4],t[5]));
                                                }

addFunctionOnWindowLoad(x<%=rs.getString("id")%>);

                                              </script>
                                      </div>
                               </div>

                               <!-- Next and previous buttons -->
                               <a class="prev" onclick="plusSlides(-
1)">&#10094;</a>
                               <a class="next"
onclick="plusSlides(1)">&#10095;</a>
                       <%}
                       while(rs.next());
               }
        %>
```

```
</div>

</body>

<script type="text/javascript">
        var today = new Date().toISOString().split('T')[0];
        document.getElementsByName("date")[0].setAttribute('min', today);


        //Script for slideshow
        var slideIndex = 1;
        showSlides(slideIndex);
        showSlidesAuto();

        // Next/previous controls
        function plusSlides(n) {
          showSlides(slideIndex += n);
        }

        // Thumbnail image controls
        function currentSlide(n) {
          showSlides(slideIndex = n);
        }

        function showSlides(n) {
          var i;
          var slides = document.getElementsByClassName("slide");
          console.log(slides.length);
          if (n > slides.length) {slideIndex = 1}
          if (n < 1) {slideIndex = slides.length}
          for (i = 0; i < slides.length; i++) {
                  slides[i].style.display = "none";
          }
          slides[slideIndex-1].style.display = "block";
        }

        function showSlidesAuto() {
          var i;
          var slides = document.getElementsByClassName("slide");
          for (i = 0; i < slides.length; i++) {
            slides[i].style.display = "none";
          }
          slideIndex++;
          if (slideIndex > slides.length) {slideIndex = 1}
          slides[slideIndex-1].style.display = "block";
          setTimeout(showSlidesAuto, 5000); // Change image every 2 seconds
        }

        function validate_and_submit(){
                var src=document.getElementById("src").value;
                var dest=document.getElementById("dest").value;
                if(src===dest)
                {
                        //Error
                        alert("Source and destination city cannot be same");
                }
                else
                        document.getElementById("travel-form").submit();
        }


</script>

</html>
```

flights.jsp

This is the page which will show the list of all flights depending on the source destination and the date chosen. It also shows any available discount on flights being shown. The flights can also be filtered by company or Non-stop or more stops.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<%@ page import="java.sql.*" %>
<%@ page import="travel.DAO" %>

<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">

<!-- Latest compiled and minified CSS -->
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css">

<!-- jQuery library -->
```

```
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>

<!-- Latest compiled JavaScript -->
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script>


<style>

        .flight{
                width: 100%;
                text-align: center;
                margin: 20px;
                padding: 5px;

                border: solid;
        }

        table{
                width: 100%;
        }

        th {
                background-color: #4CAF50;
                color: white;
                font-size: 15px;
        }
        th, td {
          padding: 15px;
          text-align: center;
          border-bottom: 1px solid #ddd;
        }
        tr:nth-child(even) {background-color: #f2f2f2;}

        .company{
                font-size: 20px;
                font-family: serif;
        }

        .stops{
                font-size: 20px;
                font-family: serif;
        }

        .time{
                font-size: 25px;
                font-family: sans-serif;
                font-weight: 100;
        }
        .city{
                font-size: 20px;
                font-family: serif;
        }

        .actual-price{
                font-size: 27px;
                font-family: sans-serif;
        }

        .actual-price-discount{
                font-size: 23px;
                font-family: sans-serif;
                text-decoration: line-through;
                color: grey;
        }

        .price-discount{
                color: green;
                font-size: 25px;
        }

        .num-stops{
                color:blue;
        }

        .error{
                text-align: center;
                font-size: 30px;
                font-family: serif;
        }

        .duration{
                font-size: 27px;
                font-family: sans-serif;
        }

        .stop-list{
                color: grey;
        }

        .travel-form{
                margin: auto;
                align-content: center;
                display: block;
                text-align: center;
                background-color: #DBDADA;
                padding: 20px;
        }

        .travel-form form{
                display: inline-block;
        }

        .travel-form select, input{
                height: 60px;
                width: 300px;
        }

</style>



<title>Flights</title>
</head>
<body>

<%
String url,user,pass;
url="jdbc:mysql://localhost:3306/travel";
System.out.println(url);
user="root";
pass="";

DAO dao=new DAO(url,user,pass);

ResultSet rs;
rs=dao.getCompanies();

String day=(String)request.getAttribute("day");
String src=(String)request.getAttribute("src");
String dest=(String)request.getAttribute("dest");
ResultSet rs2;
```

```
%>

<a href="index.jsp">HOME</a>

<!-- Form for filtering -->

<div class="travel-form">
        <form action="filter" id="filter-form" method="post">
                <input type="hidden" name="day" value="<%=day%>">
                <input type="hidden" name="src" value="<%=src%>">
                <input type="hidden" name="dest" value="<%=dest%>">

                <select class="company" id="company" name="company">
                        <option value="all">All</option>
                        <%
                                do
                                {%>
                                        <option
value="<%=rs.getString("company")%>"><%=rs.getString("company")%> </option>
                                <%}
                                while(rs.next());
                        %>
                </select>

                <select class="stops" id="stops" name="stops">
                        <option value="all">All</option>
                        <option value="0">Non-Stop</option>
                </select>

                <input class="search" type="button" value="SEARCH"
onclick="validate_and_submit()">

        </form>
</div>




<div class="list">


<%
rs=null;
rs=(ResultSet)request.getAttribute("flights");
if(rs==null)
```

```
{%>
        <div class="error">Sorry!!! No flights found</div>
<% }

else
{%>

        <table>
                <tr>
                        <th>Flight</th>
                        <th>Departure</th>
                        <th>Duration</th>
                        <th>Arrival</th>
                        <th>Price</th>
                </tr>
        <%
        do
        {

                String disc= rs.getString("discount");
                String act_price= rs.getString("price");

                int discount=0;
                int a_price=Integer.parseInt(act_price);
                int d_price=0;
                if(disc!=null)
                {
                        discount=Integer.parseInt(disc);
                        d_price=(int)((double)a_price*(100.0-
(double)discount)/100.0);
                }
                String disc_price=Integer.toString(d_price);

                %>
                <tr>
                        <td>
                                <div class="company">

        <strong><%=rs.getString("company")%></strong><br>
                                </div>
                                <%=rs.getString("flight_num")%>
                        </td>


                        <td>
```

```
                              <div class="time">
                                      <%
                                      String
dept_time=rs.getString("dept_time");

        dept_time=dept_time.substring(0,dept_time.lastIndexOf(':'));
                                      %>
                                      <strong><%=dept_time%></strong><br>
                              </div>

                              <div class="city">
                                      <%=rs.getString("src_city")%>
                              </div>

                       </td>







                       <td>
                              <div class="duration">
                                      <%

        if(rs.getString("dur_hrs").compareTo("0")!=0)
                                      {%>

        <strong><%=rs.getString("dur_hrs")%>h </strong>
                                      <%}

        if(rs.getString("dur_min").compareTo("0")!=0)
                                      {%>

        <strong><%=rs.getString("dur_min")%>m </strong>
                                      <%}%>
                              </div>

                              <div class="num-stops">
                                      <%

        if(rs.getString("num_stops").compareTo("0")==0)
                                      {%>
                                              Non stop
```

```
                                        <%}
                                        else
                                        {%>
                                                <%=rs.getString("num_stops")%>
stop(s)
                                                <div class="stop-list">

                                                        <%

        rs2=dao.getStops(rs.getString("id"));
                                                        do{

        if(Integer.parseInt(rs2.getString("stop_no"))<Integer.parseInt(rs.getS
tring("num_stops"))){%>

        <%=rs2.getString("dest_city")%><span style='font-
size:15px;'>&#8594;</span>
                                                                <%}else
                                                                {%>

        <%=rs2.getString("dest_city")%>
                                                        <%}}
                                                        while(rs2.next());
                                                        %>


                                                </div>
                                        <%}%>
                                </div>
                        </td>


                        <td>
                                <div class="time">
                                        <%
                                        String
arr_time=rs.getString("arr_time");

        arr_time=arr_time.substring(0,arr_time.lastIndexOf(':'));
                                        %>
                                        <strong><%=arr_time%></strong><br>
                                </div>

                                <div class="city">
                                        <%=rs.getString("dest_city")%>
                                </div>

                        </td>

                        <%
                                if(disc==null)
                                {
                        %>
                        <td>
                                <div class="actual-price">

        <strong>&#x20b9;<%=rs.getString("price")%></strong>
                                </div>
                        </td>
                        <%  } else {     %>
                                <td>
                                        <div class="actual-price-discount">

        &#x20b9;<%=rs.getString("price")%>
                                        </div>
                                        <div class="actual-price price-
discount">

        <strong>&#x20b9;<%=disc_price%></strong>
                                        </div>
                                </td>

                        <%}%>

                </tr>
        <%}
        while(rs.next());
        }%>

</table>
</div>
</body>


<script type="text/javascript">
        function validate_and_submit(){
                // var src=document.getElementById("src").value;
                // var dest=document.getElementById("dest").value;
                // if(src===dest)
                // {
```

```
                //      //Error
                //      alert("Source and destination city cannot be same");
                // }
                // else
                        document.getElementById("filter-form").submit();
        }
</script>


</html>
```

SearchFlights.java

This servlet is responsible for fetching the flights based on source destination and date.

```
package travel;

import java.io.IOException;

import java.sql.ResultSet;
import java.text.DateFormat;
import java.text.ParseException;
import java.text.SimpleDateFormat;
import java.util.Date;

import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 * Servlet implementation class SearchFlights
 */
@WebServlet(name = "search", urlPatterns = { "/search" })
public class SearchFlights extends HttpServlet {
        private static final long serialVersionUID = 1L;

        private String dburl,dbuname,dbpass;

    /**
     * @see HttpServlet#HttpServlet()
     */
    public SearchFlights() {
        super();
        // TODO Auto-generated constructor stub
    }

    public void init()
    {
        dburl=getServletContext().getInitParameter("dburl");
        dbuname=getServletContext().getInitParameter("dbuname");
        dbpass=getServletContext().getInitParameter("dbpass");
    }

        /**
         * @see HttpServlet#doGet(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                response.getWriter().append("Served at:
").append(request.getContextPath());
        }

        /**
         * @see HttpServlet#doPost(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub

                //Get the parameters
                String src=request.getParameter("src");
                String dest=request.getParameter("dest");
                String date=request.getParameter("date");

                System.out.println(date);


                DAO dao=new DAO(dburl,dbuname,dbpass);
                ResultSet rs=null;

                // get day of week from date string
                String day;
                SimpleDateFormat format1=new SimpleDateFormat("yyyy-MM-dd");
                Date dt1=null;
                try
                {
                        dt1 = (Date) format1.parse(date);
                }
                catch (ParseException e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }
                DateFormat format2=new SimpleDateFormat("EEEE");
                day=format2.format(dt1);

                System.out.println(day);
                try
                {
                        rs=dao.getFlights(src,dest,day);
                }
                catch (Exception e)
                {
                        // TODO Auto-generated catch block
                        e.printStackTrace();
                }
                request.setAttribute("flights",rs);
                request.setAttribute("day",day);
                request.setAttribute("src",src);
                request.setAttribute("dest",dest);

                //Then redirect to dashboard
                request.getRequestDispatcher("flights.jsp").forward(request,
response);


        }

}
```

FilterFlights.java

This is the servlet for filtering the flights on different criteria like company and number of stops.

```
package travel;

import java.io.IOException;
```

```java
import java.sql.ResultSet;
import java.text.DateFormat;
import java.text.ParseException;
import java.text.SimpleDateFormat;
import java.util.Date;

import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 * Servlet implementation class SearchFlights
 */
@WebServlet(name = "filter", urlPatterns = { "/filter" })
public class FilterFlights extends HttpServlet {
        private static final long serialVersionUID = 1L;

        private String dburl,dbuname,dbpass;

    /**
     * @see HttpServlet#HttpServlet()
     */
    public FilterFlights() {
        super();
        // TODO Auto-generated constructor stub
    }

    public void init()
    {
        dburl=getServletContext().getInitParameter("dburl");
        dbuname=getServletContext().getInitParameter("dbuname");
        dbpass=getServletContext().getInitParameter("dbpass");
    }

        /**
         * @see HttpServlet#doGet(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                response.getWriter().append("Served at: 
").append(request.getContextPath());
        }

        /**
         * @see HttpServlet#doPost(HttpServletRequest request, 
HttpServletResponse response)
         */
        protected void doPost(HttpServletRequest request, HttpServletResponse 
response) throws ServletException, IOException {
                // TODO Auto-generated method stub

                //Get the parameters
                String src=request.getParameter("src");
                String dest=request.getParameter("dest");
                String day=request.getParameter("day");
                String company=request.getParameter("company");
                String stops=request.getParameter("stops");

                DAO dao=new DAO(dburl,dbuname,dbpass);
                ResultSet rs=null;

                System.out.println(day);

                try
                {
                        rs=dao.filterFlights(src,dest,company,stops,day);
                }
                catch (Exception e)
                {
                        // TODO Auto-generated catch block
                        e.printStackTrace();
                }
                request.setAttribute("flights",rs);
                request.setAttribute("day",day);
                request.setAttribute("src",src);
                request.setAttribute("dest",dest);

                //Then redirect to dashboard
                request.getRequestDispatcher("flights.jsp").forward(request, 
response);;


        }
```

```
}
```

DAO.java

This Java bean is responsible for interacting with the database. It takes care of all database operations- connecting with the database, querying the database and returning the required data to the servlets.

```
package travel;

import java.sql.*;

public class DAO {

        private Connection con;
        private Statement stmt;
        private String url,uname,password;

        public DAO(String url, String uname, String password)
        {
                this.url=url;
                this.uname=uname;
                this.password=password;
        }

        //Function to establish the connection
        private void setConnection() throws ClassNotFoundException,
SQLException
        {
                Class.forName("com.mysql.jdbc.Driver");
                con=DriverManager.getConnection(url,uname,password);
                stmt=con.createStatement();
        }

        //Function to close the connection
        private void closeConn() throws SQLException
        {
                con.close();
        }

        //Function for getting cities
        public ResultSet getCities() throws ClassNotFoundException,
SQLException
        {
                setConnection();
                String query="select * from cities";
                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet getFlights(String src, String dest, String day)
throws ClassNotFoundException, SQLException
        {
                setConnection();
                String query1="(select * from flights where
src_city=\'"+src+"\' and dest_city=\'"+dest+"\' and day=\'"+day+"\')";

                String query2="(select * from offers where CURRENT_TIMESTAMP
between start_time and end_time)";

                String query="select * from "+query1+" f left join "+query2+"
o on f.src_city=o.src and f.dest_city=o.dest";

                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet getOffers() throws ClassNotFoundException,
SQLException
        {
                setConnection();

                String query="select * from offers where CURRENT_TIMESTAMP
between offers.start_time and offers.end_time";
```

```
                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);


                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet getCompanies() throws ClassNotFoundException,
SQLException
        {
                setConnection();

                String query="select distinct(company) as company from
flights";

                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);


                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet filterFlights(String src, String dest, String
company, String stops, String day) throws ClassNotFoundException,
SQLException
        {
                setConnection();
                String query1="select * from flights where
src_city=\'"+src+"\' and dest_city=\'"+dest+"\' and day=\'"+day+"\'";
```

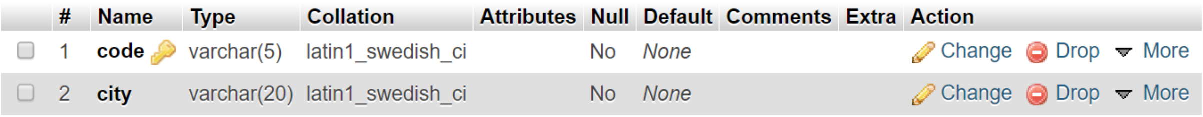
```
                if(company.compareToIgnoreCase("all")!=0)
                        query1+=" and company='"+company+"'";
                if(stops.compareToIgnoreCase("all")!=0)
                        query1+=" and num_stops='"+stops+"'";


                String query2="(select * from offers where CURRENT_TIMESTAMP
between start_time and end_time)";

                String query="select * from ("+query1+") f left join
"+query2+" o on f.src_city=o.src and f.dest_city=o.dest";

                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
                public ResultSet getStops(String flight_id) throws
ClassNotFoundException, SQLException
                {
                        setConnection();


                        String query="select * from flight_stops where
flight_id='"+flight_id+"' order by stop_no";

                        System.out.println(query);

                        ResultSet rs=stmt.executeQuery(query);


                        if(rs.next())
                        {
                                return rs;
                        }
                        closeConn();
```

```
                              return null;
                    }

}
```

Deployment Descriptor: web.xml

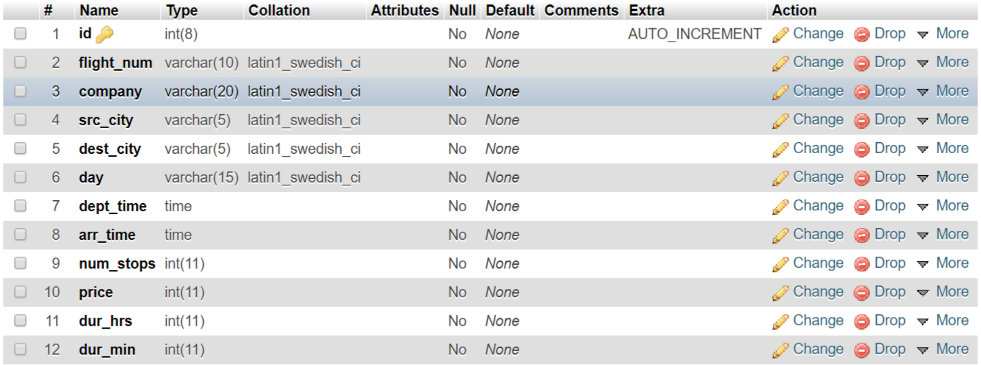
```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://xmlns.jcp.org/xml/ns/javaee"
xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee
http://xmlns.jcp.org/xml/ns/javaee/web-app_3_1.xsd" id="WebApp_ID"
version="3.1">
  <display-name>travel</display-name>
  <context-param>
    <param-name>dburl</param-name>
    <param-value>jdbc:mysql://localhost:3306/travel</param-value>
  </context-param>
  <context-param>
    <param-name>dbuname</param-name>
    <param-value>root</param-value>
  </context-param>
  <context-param>
    <param-name>dbpass</param-name>
    <param-value></param-value>
  </context-param>
</web-app>
```

DATABASE SCHEMA



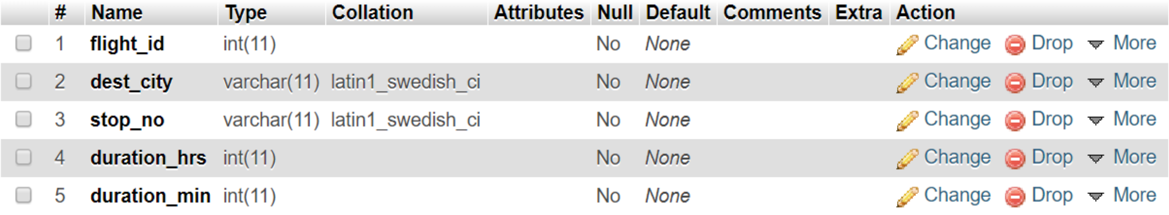
	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**code** 🔑	varchar(5)	latin1_swedish_ci		No	*None*			Change Drop More
□	2	**city**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop More

cities table



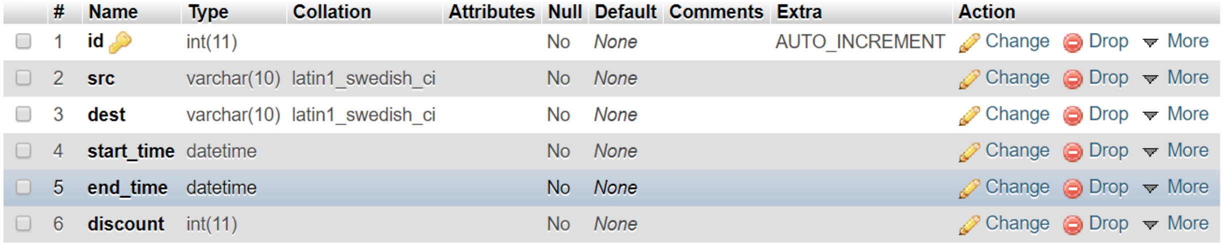
	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**id** 🔑	int(8)			No	*None*		AUTO_INCREMENT	Change Drop ▾ More
□	2	**flight_num**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	3	**company**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	4	**src_city**	varchar(5)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	5	**dest_city**	varchar(5)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	6	**day**	varchar(15)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	7	**dept_time**	time			No	*None*			Change Drop ▾ More
□	8	**arr_time**	time			No	*None*			Change Drop ▾ More
□	9	**num_stops**	int(11)			No	*None*			Change Drop ▾ More
□	10	**price**	int(11)			No	*None*			Change Drop ▾ More
□	11	**dur_hrs**	int(11)			No	*None*			Change Drop ▾ More
□	12	**dur_min**	int(11)			No	*None*			Change Drop ▾ More

flights table



	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**flight_id**	int(11)			No	*None*			Change Drop ▾ More
□	2	**dest_city**	varchar(11)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	3	**stop_no**	varchar(11)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	4	**duration_hrs**	int(11)			No	*None*			Change Drop ▾ More
□	5	**duration_min**	int(11)			No	*None*			Change Drop ▾ More

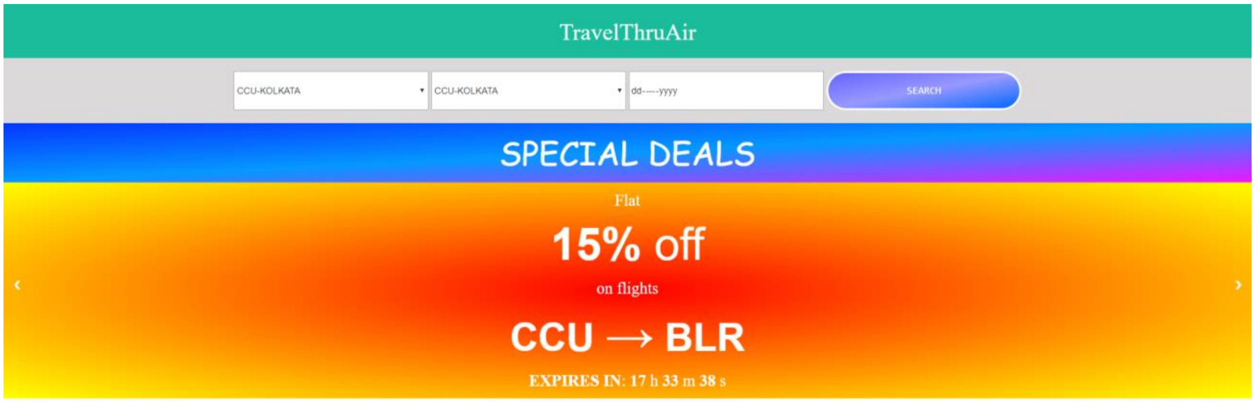
flight_stops table



	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**id** 🔑	int(11)			No	*None*		AUTO_INCREMENT	Change Drop ▾ More
□	2	**src**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	3	**dest**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
□	4	**start_time**	datetime			No	*None*			Change Drop ▾ More
□	5	**end_time**	datetime			No	*None*			Change Drop ▾ More
□	6	**discount**	int(11)			No	*None*			Change Drop ▾ More

offers table

OUTPUT:



TravelThruAir

CCU-KOLKATA ▾ CCU-KOLKATA ▾ dd-----yyyy SEARCH

SPECIAL DEALS

Flat

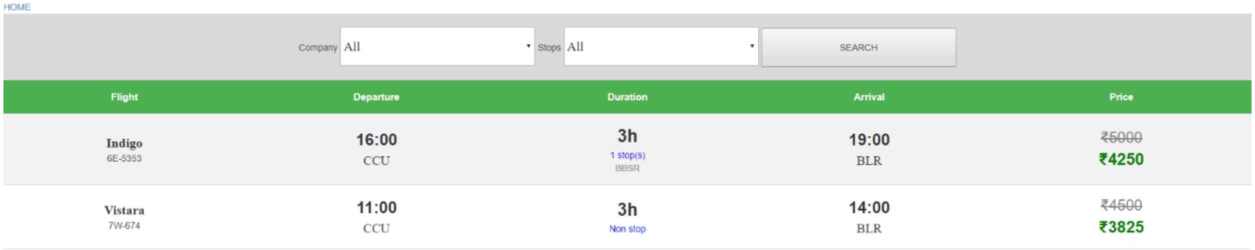
15% off

on flights

‹ CCU ⟶ BLR ›

EXPIRES IN: 17 h 33 m 38 s

Fig 1. Home page

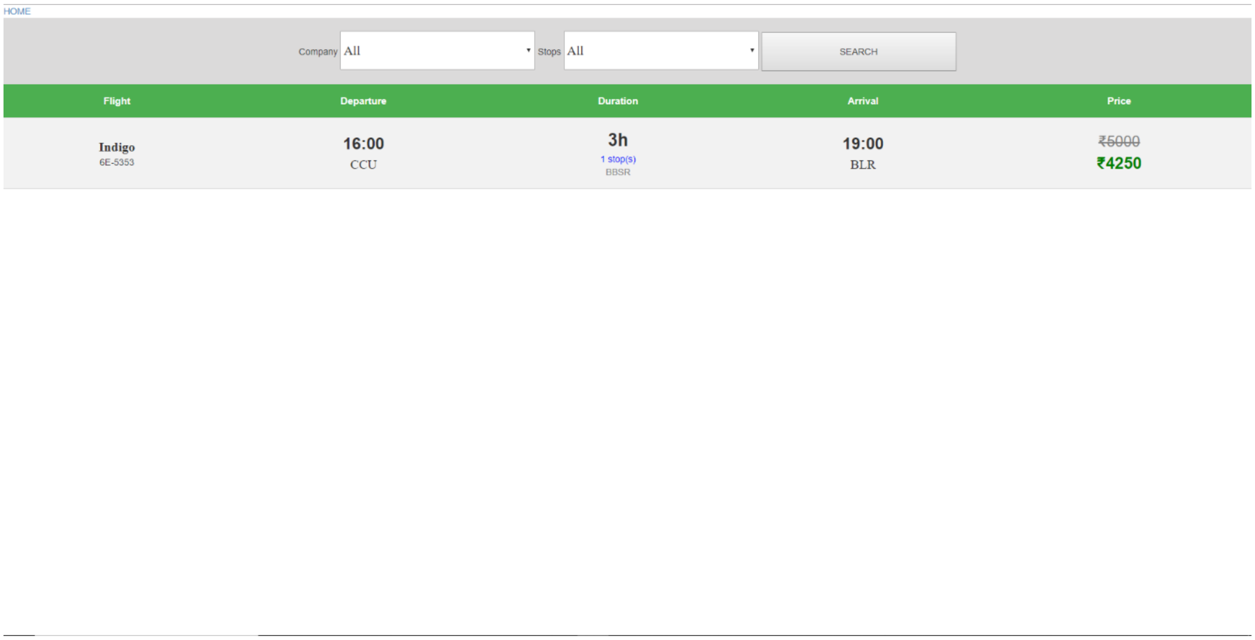


HOME

Company All ▾ Stops All ▾ SEARCH

Flight	Departure	Duration	Arrival	Price
Indigo 6E-5353	16:00 CCU	3h 1 stop(s) BBSR	19:00 BLR	~~₹5000~~ ₹4250
Vistara 7W-674	11:00 CCU	3h Non stop	14:00 BLR	~~₹4500~~ ₹3825

Fig 2. Flight search page



Flight	Departure	Duration	Arrival	Price
Indigo 6E-5353	16:00 CCU	3h 1 stop(s) BBSR	19:00 BLR	~~₹5000~~ ₹4250

Fig 3. Filtered flights

DISCUSSION:

1. Design patterns have been used to develop the application.
2. The main design pattern used here is Data Access Object or DAO. A separate class has been designed which interacts with the database and fetches data from it. The servlets only create objects of the DAO class and calls its respective methods. No servlet directly interacts with the database. This allows loose coupling. In case there is a change in database query or the database platform there is no need to change the codes in the servlets. For every database platform a separate DAO can be defined and worked with.
3. The various components of the design pattern can be classified as :
   - **Business Object:** The jsp pages, i.e., frontend
   - **Data Acess Object:** The DAO class
   - **Transfer Object:** The Servlet classes
   - **Data Source:** 'travel' database

ASSIGNMENT NUMBER: 6

PROBLEM STATEMENT

Design a Mail server and client program that implements SMTP and POP3 protocols for sending and receiving emails. An acknowledgement is sent to the sender whenever the recipient views the email. Recipient should find email notifications whenever (s)he logs in. Two possible use cases are shown above. For the details of POP3 and SMTP protocols you can refer to RFC 1939 (http://tools.ietf.org/html/rfc1939) and RFC 821 (http://tools.ietf.org/html/rfc821), respectively

Observe corresponding packet flow using Wireshark and report on traffic analysis.

CODE:

index.jsp

This is the homepage that shows the inbox of the user

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<%@ page import="com.mailapp.FetchMail" %>
<%@ page import="javax.mail.*" %>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Inbox</title>
</head>
<body>

        <%
                ServletContext context = pageContext.getServletContext();
                String
from=(String)request.getServletContext().getInitParameter("fromMail");
                String
password=(String)request.getServletContext().getInitParameter("password");
                FetchMail fm=new
FetchMail("pop.gmail.com","pop3",from,password);
                Message messages[]=fm.fetchMails();
        %>

        <a href="SendMail.html">Compose Mail</a>
        <h1>INBOX</h1>
        <div class="table-mess">
                <table>
                        <tr>
                                <th>From</th>
                                <th>Subject</th>
                                <th>Message</th>
                        </tr>

                        <%
                                for (int i = 0; i < messages.length; i++)
                                {
                                 Message message = messages[i];
                        %>
                        <tr>
                                <td><%=message.getFrom()[0]%></td>
                                <td><%=message.getSubject()%></td>
                                <td><%=message.getContent().toString()%></td>
                        </tr>
                        <%   }

                        %>


                </table>
        </div>
</body>
</html>
```

SendMail.html

This is the form for composing a mail.

```
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Compose Mail</title>
</head>
<body>
        <h2>Compose Mail</h2>
        <div class="mail-form">
                <form id="email-form" action="send" method=post>
                        To: <input type="email" name="recipient"
required=""><br>
                        Sub: <input type="text" name="subject"><br>
                        Message: <input type="text" name="message"
required=""><br>
                        <input type="button" value="Send Mail"
onclick="validate_and_submit()">
                </form>
        </div>
</body>

<script type="text/javascript">
        function validate_and_submit(){

                //May insert validation here
                document.getElementById("email-form").submit();
        }
</script>
```

```
</html>
```

FetchMail.java

This servlet is responsible for fetching the email from the inbox of the user.

```
package com.mailapp;

import java.util.Properties;

import javax.mail.Folder;
import javax.mail.Message;
import javax.mail.PasswordAuthentication;
import javax.mail.Session;
import javax.mail.Store;

public class FetchMail
{
        private String host, storeType, user, password, from;

        public FetchMail(String host, String storeType, String user, String
password)
        {
                this.host=host;
                this.storeType=storeType;
                this.user=user;
                this.password=password;
                this.from=from;
        }

        //Function to fetch the mail
        public Session getSession()
        {
                //create properties field
              Properties properties = new Properties();

              properties.put("mail.pop3.host", host);
              properties.put("mail.pop3.port", "995");
              properties.put("mail.pop3.starttls.enable", "true");

            //get Session
             Session session = Session.getDefaultInstance(properties);
              return session;
        }
        public Message[] fetchMails()
        {
                Session emailSession=getSession();
                Message[] messages = null;
                try
                {
                        //create the POP3 store object and connect with the pop
server
                        Store store = emailSession.getStore("pop3s");

                        store.connect(host, user, password);

                        //create the folder object and open it
                    Folder emailFolder = store.getFolder("INBOX");
                    emailFolder.open(Folder.READ_ONLY);

                    // retrieve the messages from the folder in an array and
print it
                    messages = emailFolder.getMessages();
                }
                catch(Exception e)
                {
                        e.printStackTrace();
                }
                return messages;
        }

}
```

SendServlet.java

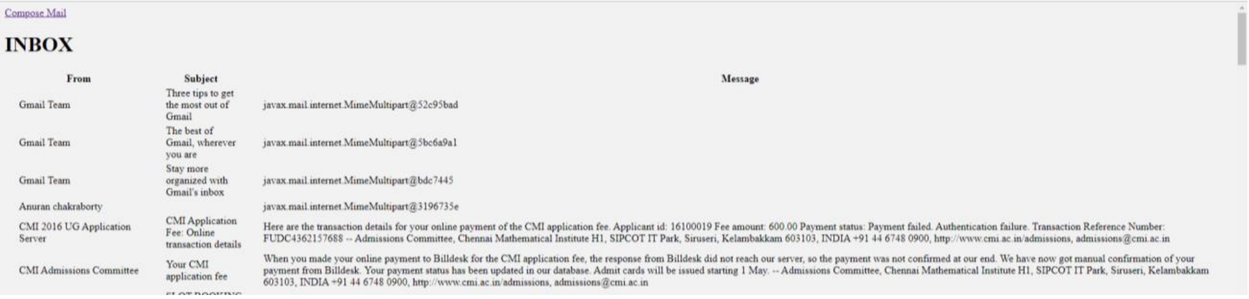
This servlet is responsible for sending an email.

```
package com.mailapp;

import java.io.IOException;
import java.util.Properties;

import javax.mail.*;
import javax.mail.internet.*;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
```

```
/**
 * Servlet implementation class SendServlet
 */
@WebServlet(name = "send", urlPatterns = { "/send" })
public class SendServlet extends HttpServlet {
        private static final long serialVersionUID = 1L;

    /**
     * Default constructor.
     */
    public SendServlet() {
        // TODO Auto-generated constructor stub
    }

        /**
         * @see HttpServlet#doGet(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                response.getWriter().append("Served at:
").append(request.getContextPath());
        }

        /**
         * @see HttpServlet#doPost(HttpServletRequest request,
HttpServletResponse response)
         */
        protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
                // TODO Auto-generated method stub
                doGet(request, response);

                String sendTo=(String)request.getParameter("recipient");
                String sub=(String)request.getParameter("subject");
                String mess=(String)request.getParameter("message");
                String
from=(String)request.getServletContext().getInitParameter("fromMail");
                String
password=(String)request.getServletContext().getInitParameter("password");

                System.out.println(sendTo);
                //Send the mail
```

```
               sendMail(from, password, sendTo, sub, mess);
               response.sendRedirect("index.jsp");

        }

        private void sendMail(String from, String password, String sendTo,
String sub, String mess) {
               // TODO Auto-generated method stub
               //Get properties object
        Properties props = new Properties();
        props.put("mail.smtp.host", "smtp.gmail.com");
        props.put("mail.smtp.socketFactory.port", "465");

props.put("mail.smtp.socketFactory.class","javax.net.ssl.SSLSocketFactory");
        props.put("mail.smtp.auth", "true");
        props.put("mail.smtp.port", "465");
        //get Session
        Session session2 = Session.getInstance(props,
                       new javax.mail.Authenticator() {
                        protected PasswordAuthentication
getPasswordAuthentication() {
                        return new PasswordAuthentication(from,password);
         }
        });

        try
        {
            MimeMessage message = new MimeMessage(session2);
            message.addRecipient(Message.RecipientType.TO,new
InternetAddress(sendTo));
            message.setSubject(sub);
            message.setText(mess);
            //send message
            Transport.send(message);
            System.out.println("message sent successfully");
        }
        catch (Exception e)
        {
               e.printStackTrace();
        }
        }

}
```

OUTPUT:

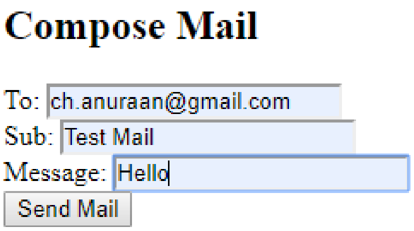


Compose Mail

INBOX

From	Subject	Message
Gmail Team	Three tips to get the most out of Gmail	javax.mail.internet.MimeMultipart@52c95bad
Gmail Team	The best of Gmail, wherever you are	javax.mail.internet.MimeMultipart@5bc6a9a1
Gmail Team	Stay more organized with Gmail's inbox	javax.mail.internet.MimeMultipart@bdc7445
Anuran chakraborty		javax.mail.internet.MimeMultipart@3196735e
CMI 2016 UG Application Server	CMI Application Fee: Online transaction details	Here are the transaction details for your online payment of the CMI application fee. Applicant id: 16100019 Fee amount: 600.00 Payment status: Payment failed. Authentication failure. Transaction Reference Number: FUDC4362157688 -- Admissions Committee, Chennai Mathematical Institute H1, SIPCOT IT Park, Siruseri, Kelambakkam 603103, INDIA +91 44 6748 0900, http://www.cmi.ac.in/admissions, admissions@cmi.ac.in
CMI Admissions Committee	Your CMI application fee	When you made your online payment to Billdesk for the CMI application fee, the response from Billdesk did not reach our server, so the payment was not confirmed at our end. We have now got manual confirmation of your payment from Billdesk. Your payment status has been updated in our database. Admit cards will be issued starting 1 May. -- Admissions Committee, Chennai Mathematical Institute H1, SIPCOT IT Park, Siruseri, Kelambakkam 603103, INDIA +91 44 6748 0900, http://www.cmi.ac.in/admissions, admissions@cmi.ac.in
	SLOT BOOKING	

Fig 1. Home page showing the inbox



Compose Mail

To: ch.anuraan@gmail.com

Sub: Test Mail

Message: Hello

Fig 2. Form for composing mail

ASSIGNMENT NUMBER: 7

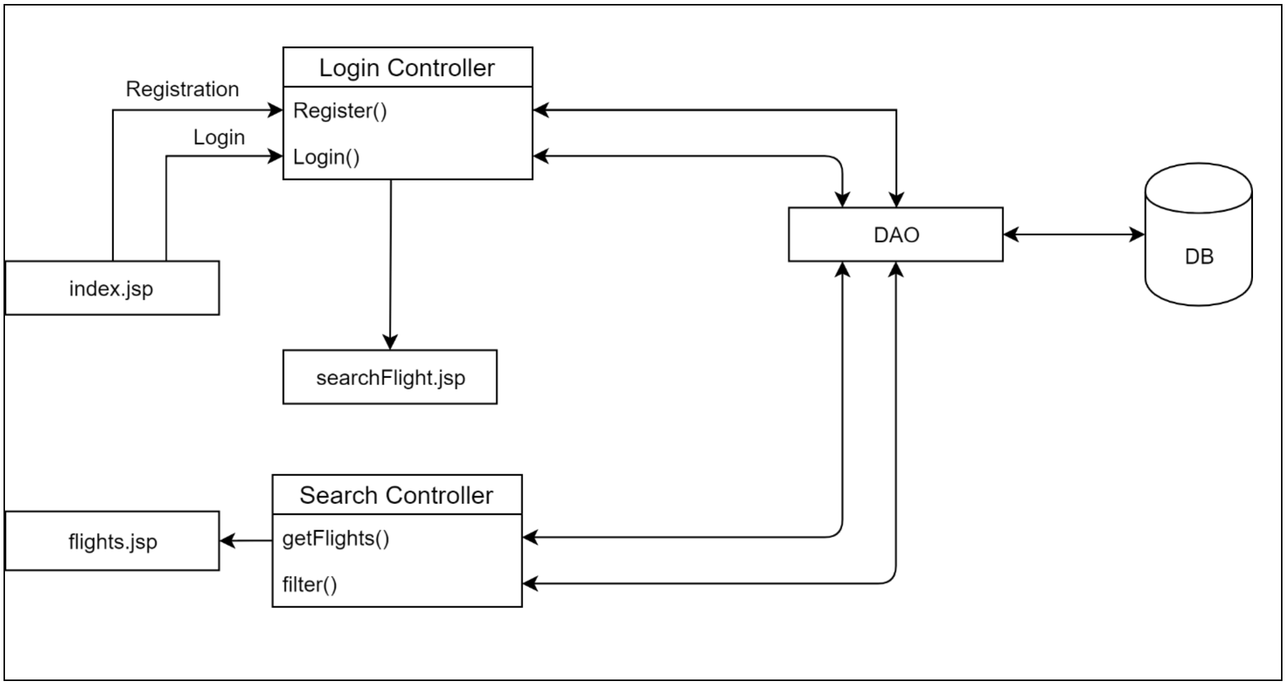
PROBLEM STATEMENT:

Implement a web application for “Travel Thru Air” based on Spring MVC framework to support any of the following two use cases

1. A list of current special deals must appear on the home page. Each special deal must display the departure city, the arrival city, and the cost. These special deals are set up by the marketing department and change during the day, so it can’t be static. Special deals are only good for a limited amount of time. 2. A user may search for flights, given a departure city, time and an arrival city. The results must display the departure city, the arrival city, the total cost, and how many legs the flight will have.

Provide a login controller for user login facility. The solution should reflect each layer of the spring framework.

FLOW DIAGRAM:



CODE:

index.jsp

This is the login page where the user can register and login to search for flights.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
        pageEncoding="ISO-8859-1"%>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
        <meta charset="ISO-8859-1">
        <title>Login</title>

        <style type="text/css">

                body{
                        background-color: #a2a2a2;
                }

                #login-page{
                        width:360px;
                        padding:10% 0 0;
                        margin:auto;
                }

                #formAll{
                        position: relative;
                        z-index: 100;
                        background: #ffffff;
                        max-width: 360px;
                        margin: 0 auto 100px;
                        padding: 45px;
                        text-align: center;
                }

                select, input{
                        font-family: "Times New Roman", serif;
                        outline:1;
                        background: #f2f2f2;
                        width: 100%;
                        border: 0;
                        margin: 0 0 15px;
                        padding: 15px;
                        box-sizing: border-box;
                        font-size: 14p;
                }

                #submit{
                        text-transform: uppercase;
                        padding: 15px;
                        color: #FFFFFF;
                        background: #000000;
                        cursor: pointer;
                }

                .register-Form{
                        display: none;
                }

                .forgot-pass-form{
                        display: none;
                }

                #duplicateUname{
                        display:none;
                        color: red;

                }

        </style>

        <script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js">
        </script>




</head>


<body>

        <div id="login-page">
                <div id="form">
                        <form id="loginform formAll" class="loginform"
action="login" method="post">
                                <input type="text" name="username" required=""
placeholder="Enter your Username"><br>
```

```
                                <input type="password" name="password"
required="" placeholder="Enter your password"><br>
                                <input type="submit" id="submit" name="submit"
value="Login">
                                <p class="notReg"> Not registered? <a
class="reg-here" href="#">Register Here </a></p>

                        </form>

                        <form id="reg formAll" class="register-Form"
action="register" method="post">
                                <input type="text" name="name" required=""
placeholder="Enter your name"><br>

                                <div id="duplicateUname">Sorry, this username
is already taken</div>

                                <input type="text" name="username"
placeholder="Enter your Username"><br>
                                <input type="password" name="password"
placeholder="Enter your password"><br>

                                <input type="submit" id="submit" name="submit"
value="Register">
                                <p class="alreadyReg"> Already registered? <a
class="login-here" href="#">Login Here </a></p>
                        </form>

                        <form id="forgot formAll" class="forgot-pass-form"
action="forgot" method="post">
                                <input type="text" name="username"
placeholder="Enter your username">
                                <input type="password" name="password"
placeholder="Enter new password">
                                <input type="submit" name="submit" id="submit"
value="Change Password">
                        </form>

                </div>
        </div>

</body>

<script type="text/javascript">
                $(document).ready(function(){
                        $('.reg-here').click(function(){
                                $('.loginform').hide();
                                $('.forgot-pass-form').hide();
                                $('.register-Form').show();
                        });

                        $('.forgot-pass').click(function(){
                                $('.loginform').hide();
                                $('.forgot-pass-form').show();
                                $('.register-Form').hide();
                        })

                        $('.login-here').click(function(){
                                $('.loginform').show();
                                $('.forgot-pass-form').hide();
                                $('.register-Form').hide();
                        });
                });

</script>

</html>
```

searchFlight.jsp

This is the page where the user can search for flights and the special deals are shown after the user has logged in.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
        pageEncoding="ISO-8859-1"%>

<%@ page import="java.sql.*" %>
<%@ page import="com.flight.DAO" %>
<%@ page import="com.flight.User" %>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<link rel="stylesheet" href="style.css">
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">

<!-- Latest compiled and minified CSS -->
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css">
```

```
<!-- jQuery library -->
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>

<!-- Latest compiled JavaScript -->
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></script>


<style>
        .title-bar{
        width: 100%;
        color: white;
        padding: 10px;
        font-family: serif;
        font-size: 100px;
        text-align: center;
        background-color: #1abc9c;
        }

        .error{
                text-align: center;
                font-size: 30px;
                font-family: serif;
        }

        .travel-form{
                margin: auto;
                align-content: center;
                display: block;
                text-align: center;
                background-color: #DBDADA;
                padding: 20px;
        }

        .travel-form form{
                display: inline-block;
        }

        .travel-form select, input{
                height: 60px;
                width: 300px;
        }

        .search{
                background-color: #000faa;
                color: white;
                font-style: strong;
                font-size: large;
                font-weight: 300;
                font-family: monospace;
                border-radius: 100px;
                border: solid;
                background-image: linear-gradient(to bottom right, #6666ff,
#9999ff, #0066ff);
        }

        .special-deals{
                width: 100%;
                padding: 10px;
                font-family: serif;
                font-size: 50px;
                text-align: center;
                color: white;
                font-family: cursive;
                background-image: linear-gradient(to bottom right, #0636ff,
#0699ff, #f016ff);
        }

        .offer{
                width: 100%;
                color: white;
                padding: 10px;
                text-align: center;
                background-color: #1abc9c;
                background-image: radial-gradient(red, yellow);
        }

        .normal-text{
                font-size: 25px;
                font-family: serif;
        }

        .discount{
                font-size: 70px;

        }
        .source{
                font-size: 60px;
        }

        /* Hide the images by default */
        .slide {
          display: none;
        }

        /* Next & previous buttons */
        .prev, .next {
          cursor: pointer;
          position: absolute;
          top: 50%;
          width: auto;
          margin-top: -75px;
          padding: 16px;
          color: white;
          font-weight: bold;
          font-size: 18px;
          transition: 0.6s ease;
          border-radius: 0 3px 3px 0;
          user-select: none;
        }

        /* Position the "next button" to the right */
        .next {
          right: 0;
          border-radius: 3px 0 0 3px;
        }

        /* On hover, add a black background color with a little bit see-
through */
        .prev:hover, .next:hover {
          background-color: rgba(0,0,0,0.8);
        }


</style>

<script type="text/javascript">
        function timeDiff(target) {
                function z(n) {return (n<10? '0' : '') + n;}
                var timeDiff = target - (new Date());
                var hours    = timeDiff / 3.6e6 | 0;
                var minutes  = timeDiff % 3.6e6 / 6e4 | 0;
                var seconds  = timeDiff % 6e4 / 1e3 | 0;
                if (hours<0 || minutes<0 || seconds<0) {
                  document.getElementById('divBody').style.display='none';
                  document.getElementById('divExpired').style.display='';
                  return '<b>EXPIRED</b>';
                  }
                else {
                  return '<b>' + z(hours) + '</b> h <b>' + z(minutes) + '</b>
m <b>' + z(seconds) + '</b> s';
                  }
                }

        var addFunctionOnWindowLoad = function(callback){
          if(window.addEventListener){
                  window.addEventListener('load',callback,false);
          }else{
                  window.attachEvent('onload',callback);
          }
        }
</script>



<title>Home</title>
</head>
<body>

<!-- Title bar -->
<div class="title-bar">
        <h1> TravelThruAir </h1>
</div>
<%
                response.setHeader("Cache-Control","no-cache, no-store, must-
revalidate");
                System.out.println((User)session.getAttribute("user"));
                //Session check
                if(((User)session.getAttribute("user")).getUname()==null)
                {
                        System.out.println("Hi");
                        response.sendRedirect("index.jsp");
                        return;
                }
%>
```

```
<%
        String url,user,pass;
        url="jdbc:mysql://localhost:3306/travel";
        System.out.println(url);
        user="root";
        pass="";

        DAO dao=new DAO(url,user,pass);
        ResultSet rs;
        rs=dao.getCities();
%>

<ul>
        <li class="logout"><a href="index.jsp">Home</a></li>
        <li class="logout"><a
href="<%=request.getContextPath()%>/logout">Logout</a></li>
        <li class="nameDisp">Hi,
<%=((User)(session.getAttribute("user"))).getName()%></li>
</ul>

<!-- Form -->
<div class="travel-form">
        <form action="search" id="travel-form" method="post">
                <select class="src" id="src" name="src">
                        <%
                                do
                                {%>
                                        <option
value="<%=rs.getString("code")%>"><%=rs.getString("code")%>-
<%=rs.getString("city")%> </option>
                                <%}
                                while(rs.next());
                                rs=dao.getCities();
                        %>
                </select>

                <select class="dest" id="dest" name="dest">
                        <%
                                do
                                {%>
                                        <option
value="<%=rs.getString("code")%>"><%=rs.getString("code")%>-
<%=rs.getString("city")%> </option>
                                <%}
                                while(rs.next());
                        %>
                </select>

                <input type="date" id="date" name="date" required="">
                <input class="search" type="button" value="SEARCH"
onclick="validate_and_submit()">

        </form>
</div>

<div class="special-deals">
        SPECIAL DEALS
</div>


<!-- Offers -->
<div class="offers-container">
        <%
                rs=dao.getOffers();
                if(rs==null)
                {%>
                        <div class="error">No offers right now</div>
                <% }
                else
                {
                        do
                        {%>
                                <div class="offer slide">
                                        <!-- START TIME:
<%=rs.getString("start_time") %>
                                        END TIME: <%=rs.getString("end_time")
%> -->
                                        <div class="normal-text">Flat</div>
                                        <div
class="discount"><strong><%=rs.getString("discount") %>%</strong> off</div>
                                        <div class="normal-text">on
flights</div>
                                        <div
class="source"><strong><%=rs.getString("src") %> </strong> <span style='font-
size:75px;'>&#8594;</span> <strong><%=rs.getString("dest") %> </strong></div>
                                        <div class="normal-text"><div
id="countdown<%=rs.getString("id")%>"></div>

                                                <script language="javaScript">
                                                function
doCountDown<%=rs.getString("id")%>(target) {

        document.getElementById('countdown<%=rs.getString("id")%>').innerHTML
= '<span style=\"color:white\"><b>EXPIRES IN</b></span>: ' +
timeDiff(target);
                                                      var lag = 1020 - (new
Date() % 100);

        setTimeout(function(){doCountDown<%=rs.getString("id")%>(target);},
lag);
                                                      }
                                                var x<%=rs.getString("id")%> =
function doStart<%=rs.getString("id")%>() {
                                                      //Insert Expiration Date
from mySQL into t var
                                                      var
t="<%=rs.getString("end_time")%>".split(/[- :]/);

        doCountDown<%=rs.getString("id")%>(new Date(t[0],t[1]-
1,t[2],t[3],t[4],t[5]));
                                                }

addFunctionOnWindowLoad(x<%=rs.getString("id")%>);

                                              </script>
                                      </div>
                              </div>

                              <!-- Next and previous buttons -->
                              <a class="prev" onclick="plusSlides(-
1)">&#10094;</a>
                              <a class="next"
onclick="plusSlides(1)">&#10095;</a>
                      <%}
                      while(rs.next());
              }
        %>
</div>

</body>

<script type="text/javascript">
        var today = new Date().toISOString().split('T')[0];
        document.getElementsByName("date")[0].setAttribute('min', today);
```

```
//Script for slideshow
var slideIndex = 1;
showSlides(slideIndex);
showSlidesAuto();

// Next/previous controls
function plusSlides(n) {
  showSlides(slideIndex += n);
}

// Thumbnail image controls
function currentSlide(n) {
  showSlides(slideIndex = n);
}

function showSlides(n) {
  var i;
  var slides = document.getElementsByClassName("slide");
  console.log(slides.length);
  if (n > slides.length) {slideIndex = 1}
  if (n < 1) {slideIndex = slides.length}
  for (i = 0; i < slides.length; i++) {
          slides[i].style.display = "none";
  }
  slides[slideIndex-1].style.display = "block";
}

function showSlidesAuto() {
  var i;
  var slides = document.getElementsByClassName("slide");
  for (i = 0; i < slides.length; i++) {
    slides[i].style.display = "none";
  }
  slideIndex++;
  if (slideIndex > slides.length) {slideIndex = 1}
  slides[slideIndex-1].style.display = "block";
  setTimeout(showSlidesAuto, 5000); // Change image every 2 seconds
}

function validate_and_submit(){
        var src=document.getElementById("src").value;
        var dest=document.getElementById("dest").value;
```

```
                if(src===dest)
                {
                        //Error
                        alert("Source and destination city cannot be same");
                }
                else
                        document.getElementById("travel-form").submit();
        }


</script>

</html>
```

flights.jsp

This is the page which will show the list of all flights depending on the source destination and the date chosen. It also shows any available discount on flights being shown. The flights can also be filtered by company or Non-stop or more stops.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<%@ page import="java.sql.*" %>
<%@ page import="com.flight.*" %>

<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">

<!-- Latest compiled and minified CSS -->
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/css/bootstrap.min.css">

<!-- jQuery library -->
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>

<!-- Latest compiled JavaScript -->
```

```
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.0/js/bootstrap.min.js"></s
cript>


<style>

        .flight{
                width: 100%;
                text-align: center;
                margin: 20px;
                padding: 5px;

                border: solid;
        }

        table{
                width: 100%;
        }

        th {
                background-color: #4CAF50;
                color: white;
                font-size: 15px;
        }
        th, td {
          padding: 15px;
          text-align: center;
          border-bottom: 1px solid #ddd;
        }
        tr:nth-child(even) {background-color: #f2f2f2;}

        .company{
                font-size: 20px;
                font-family: serif;
        }

        .stops{
                font-size: 20px;
                font-family: serif;
        }

        .time{
                font-size: 25px;
                font-family: sans-serif;
                font-weight: 100;
        }
        .city{
                font-size: 20px;
                font-family: serif;
        }

        .actual-price{
                font-size: 27px;
                font-family: sans-serif;
        }

        .actual-price-discount{
                font-size: 23px;
                font-family: sans-serif;
                text-decoration: line-through;
                color: grey;
        }

        .price-discount{
                color: green;
                font-size: 25px;
        }

        .num-stops{
                color:blue;
        }

        .error{
                text-align: center;
                font-size: 30px;
                font-family: serif;
        }

        .duration{
                font-size: 27px;
                font-family: sans-serif;
        }

        .stop-list{
                color: grey;
        }

        .travel-form{
                margin: auto;
                align-content: center;
                display: block;
                text-align: center;
                background-color: #DBDADA;
                padding: 20px;
        }

        .travel-form form{
                display: inline-block;
        }

        .travel-form select, input{
                height: 60px;
                width: 300px;
        }


</style>




<title>Flights</title>
</head>
<body>

<%
                response.setHeader("Cache-Control","no-cache, no-store, must-
revalidate");
                System.out.println((User)session.getAttribute("user"));
                //Session check
                if(((User)session.getAttribute("user")).getUname()==null)
                {
                        System.out.println("Hi");
                        response.sendRedirect("index.jsp");
                        return;
                }
%>

<%
String url,user,pass;
url="jdbc:mysql://localhost:3306/travel";
System.out.println(url);
user="root";
pass="";
```

```
DAO dao=new DAO(url,user,pass);

ResultSet rs;
rs=dao.getCompanies();

String day=(String)request.getAttribute("day");
String src=(String)request.getAttribute("src");
String dest=(String)request.getAttribute("dest");
ResultSet rs2;
%>

<ul>
        <li class="logout"><a href="index.jsp">Home</a></li>
        <li class="logout"><a 
href="<%=request.getContextPath()%>/logout">Logout</a></li>
        <li class="logout">Hi, 
<%=((User)(session.getAttribute("user"))).getName()%></li>
</ul>
<!-- Form for filtering -->

<div class="travel-form">
        <form action="filter" id="filter-form" method="post">
                <input type="hidden" name="day" value="<%=day%>">
                <input type="hidden" name="src" value="<%=src%>">
                <input type="hidden" name="dest" value="<%=dest%>">

                <select class="company" id="company" name="company">
                        <option value="all">All</option>
                        <%
                                do
                                {%>
                                        <option 
value="<%=rs.getString("company")%>"><%=rs.getString("company")%> </option>
                                <%}
                                while(rs.next());
                        %>
                </select>

                <select class="stops" id="stops" name="stops">
                        <option value="all">All</option>
                        <option value="0">Non-Stop</option>
                </select>

                <input class="search" type="button" value="SEARCH" 
onclick="validate_and_submit()">
```

```
        </form>
</div>




<div class="list">


<%
rs=null;
rs=(ResultSet)request.getAttribute("flights");
if(rs==null)
{%>
        <div class="error">Sorry!!! No flights found</div>
<% }

else
{%>

        <table>
                <tr>
                        <th>Flight</th>
                        <th>Departure</th>
                        <th>Duration</th>
                        <th>Arrival</th>
                        <th>Price</th>
                </tr>
        <%
        do
        {

                String disc= rs.getString("discount");
                String act_price= rs.getString("price");

                int discount=0;
                int a_price=Integer.parseInt(act_price);
                int d_price=0;
                if(disc!=null)
                {
                        discount=Integer.parseInt(disc);
                        d_price=(int)((double)a_price*(100.0-
(double)discount)/100.0);
                }
                String disc_price=Integer.toString(d_price);

                %>
                <tr>
                        <td>
                                <div class="company">

        <strong><%=rs.getString("company")%></strong><br>
                                </div>
                                <%=rs.getString("flight_num")%>
                        </td>


                        <td>
                                <div class="time">
                                        <%
                                        String 
dept_time=rs.getString("dept_time");

        dept_time=dept_time.substring(0,dept_time.lastIndexOf(':'));
                                        %>
                                        <strong><%=dept_time%></strong><br>
                                </div>

                                <div class="city">
                                        <%=rs.getString("src_city")%>
                                </div>

                        </td>







                        <td>
                                <div class="duration">
                                        <%

        if(rs.getString("dur_hrs").compareTo("0")!=0)
                                        {%>

        <strong><%=rs.getString("dur_hrs")%>h </strong>
                                        <%}
        if(rs.getString("dur_min").compareTo("0")!=0)
                                      {%>

        <strong><%=rs.getString("dur_min")%>m </strong>
                                      <%}%>
                               </div>

                               <div class="num-stops">
                                      <%

        if(rs.getString("num_stops").compareTo("0")==0)
                                      {%>
                                              Non stop
                                      <%}
                                      else
                                      {%>
                                              <%=rs.getString("num_stops")%>
stop(s)
                                              <div class="stop-list">

                                                      <%

        rs2=dao.getStops(rs.getString("id"));
                                                      do{

        if(Integer.parseInt(rs2.getString("stop_no"))<Integer.parseInt(rs.getS
tring("num_stops"))){%>

        <%=rs2.getString("dest_city")%><span style='font-
size:15px;'>&#8594;</span>
                                                              <%}else
                                                              {%>

        <%=rs2.getString("dest_city")%>
                                                      <%}}
                                                      while(rs2.next());
                                                      %>


                                              </div>
                                      <%}%>
                               </div>
                       </td>
```

```
                        <td>
                                <div class="time">
                                        <%
                                        String
arr_time=rs.getString("arr_time");

        arr_time=arr_time.substring(0,arr_time.lastIndexOf(':'));
                                        %>
                                        <strong><%=arr_time%></strong><br>
                                </div>

                                <div class="city">
                                        <%=rs.getString("dest_city")%>
                                </div>

                        </td>

                        <%
                                if(disc==null)
                                {
                        %>
                        <td>
                                <div class="actual-price">

        <strong>&#x20b9;<%=rs.getString("price")%></strong>
                                </div>
                        </td>
                        <% } else {     %>
                                <td>
                                        <div class="actual-price-discount">

        &#x20b9;<%=rs.getString("price")%>
                                        </div>
                                        <div class="actual-price price-
discount">

        <strong>&#x20b9;<%=disc_price%></strong>
                                        </div>
                                </td>

                        <%}%>

                </tr>
        <%}
        while(rs.next());
        }%>

</table>
</div>
</body>


<script type="text/javascript">
        function validate_and_submit(){
                // var src=document.getElementById("src").value;
                // var dest=document.getElementById("dest").value;
                // if(src===dest)
                // {
                //      //Error
                //      alert("Source and destination city cannot be same");
                // }
                // else
                        document.getElementById("filter-form").submit();
        }
</script>


</html>
```

error.jsp

This is the page where any error related to login and registration are shown.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>

<%
String str=(String)request.getAttribute("msg");
System.out.println(str);
%>
<h1><%=str %></h1>
```

```
</body>
</html>
```

User.java

This is the Java class that stores the user details.

```
package com.flight;

public class User {
        private String name,uname,password;

        public User(String name,String uname, String password)
        {
                this.name=name;
                this.uname=uname;
                this.password=password;
        }

        public String getName() {
                return name;
        }

        public String getUname() {
                return uname;
        }

        public String getPassword() {
                return password;
        }
}
```

LoginController.java

This is a Spring Controller responsible for the registration of users and the login.

```
package com.flight;

import org.springframework.beans.factory.annotation.Value;
import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.RequestParam;
import org.springframework.web.bind.annotation.SessionAttributes;
import org.springframework.web.servlet.ModelAndView;
```

```java
import java.sql.*;

@Controller
@SessionAttributes("user")
public class LoginController {

        @Value("jdbc:mysql://localhost:3306/travel")
        String dburl;

        @Value("root")
        String dbuname;

        @Value("")
        String dbpass;

        @RequestMapping(value="/login", method = RequestMethod.POST)
        public ModelAndView Login(@RequestParam("username") String uname,
@RequestParam("password") String password)
        {
                DAO dao=new DAO(dburl,dbuname,dbpass);
                ResultSet rs=null;
                try
                {
                        rs = dao.loginCheck(uname, password);
                }
                catch (ClassNotFoundException | SQLException e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }
                ModelAndView modelAndView = new ModelAndView();
                if(rs!=null)
                {
                        User u=null;
                        //Set the session
                        try
                        {
                                u = new User(rs.getString("name"),
rs.getString("uname"), rs.getString("password"));
                        }
                        catch (SQLException e)
                        {
                                // TODO Auto-generated catch block
                                e.printStackTrace();
                        }
                         modelAndView.addObject("user", u);
                         modelAndView.setViewName("searchFlight.jsp");
                         return modelAndView;
                }
                else
                {
                        System.out.println("Error"+rs);
                        String msg=new String("sorry!! Wrong credentials");
                        System.out.println(msg);
                        modelAndView.addObject("msg", msg);
                        modelAndView.setViewName("error.jsp");
                        return modelAndView;
                }
        }


        @RequestMapping(value="/register", method = RequestMethod.POST)
        public ModelAndView Register(@RequestParam("name") String name,
@RequestParam("username") String uname, @RequestParam("password") String
password)
        {
                DAO dao=new DAO(dburl,dbuname,dbpass);

                User u=new User(name,uname,password);

                try {
                        if(dao.checkUname(uname))
                        {
                                ModelAndView modelAndView = new ModelAndView();
                                String msg="sorry!! Duplicate username";
                                modelAndView.addObject("msg", msg);
                                modelAndView.setViewName("error.jsp");
                                return modelAndView;
                        }
                }
                catch (Exception e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }

                try{
                        dao.register(u);
                }
                catch(Exception e)
                {
                        e.printStackTrace();
                }
                ModelAndView modelAndView = new ModelAndView();
                modelAndView.setViewName("searchFlight.jsp");
                return modelAndView;
        }

        @RequestMapping(value="/logout", method = RequestMethod.GET)
        public ModelAndView Logout()
        {
                User u=new User(null,null,null);
                ModelAndView modelAndView = new ModelAndView();
                modelAndView.addObject("user", u);
                modelAndView.setViewName("index.jsp");
                return modelAndView;
        }


}
```

SearchFlights.java

This is the Controller responsible for the flight search and flight filtering

```
package com.flight;

import org.springframework.beans.factory.annotation.Value;
import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.RequestParam;
import org.springframework.web.servlet.ModelAndView;

import java.sql.*;
import java.text.SimpleDateFormat;
import java.util.Date;
import java.text.DateFormat;

@Controller
public class SearchFlights
{
        @Value("jdbc:mysql://localhost:3306/travel")
        String dburl;

        @Value("root")
        String dbuname;

        @Value("")
        String dbpass;

        @RequestMapping(value="/search", method = RequestMethod.POST)
        public ModelAndView getFlights(@RequestParam("src") String src,
@RequestParam("dest") String dest, @RequestParam("date") String date)
        {
                System.out.println(dburl);
                DAO dao=new DAO(dburl,dbuname,dbpass);

                ResultSet rs=null;

                // get day of week from date string
                String day;
                SimpleDateFormat format1=new SimpleDateFormat("yyyy-MM-dd");
                Date dt1=null;
                try
                {
                        dt1 = (Date) format1.parse(date);
                }
                catch (Exception e1) {
                        // TODO Auto-generated catch block
                        e1.printStackTrace();
                }
                DateFormat format2=new SimpleDateFormat("EEEE");
                day=format2.format(dt1);

                System.out.println(day);
                try
                {
                        rs=dao.getFlights(src,dest,day);
                }
                catch (Exception e)
                {
                        // TODO Auto-generated catch block
                        e.printStackTrace();
                }

                ModelAndView mv=new ModelAndView();
                mv.setViewName("flights.jsp");
                mv.addObject("flights",rs);
                mv.addObject("day",day);
                mv.addObject("src",src);
                mv.addObject("dest",dest);

                return mv;

        }

        @RequestMapping(value="/filter", method = RequestMethod.POST)
        public ModelAndView filter(@RequestParam("src") String src,
@RequestParam("dest") String dest, @RequestParam("day") String day,
@RequestParam("company") String company, @RequestParam("stops") String stops)
        {
                System.out.println(dburl);
                DAO dao=new DAO(dburl,dbuname,dbpass);
                ResultSet rs=null;

                System.out.println(day);

                try
                {
                        rs=dao.filterFlights(src,dest,company,stops,day);
                }
                catch (Exception e)
                {
                        // TODO Auto-generated catch block
                        e.printStackTrace();
                }

                ModelAndView mv=new ModelAndView();
                mv.setViewName("flights.jsp");
                mv.addObject("flights",rs);
                mv.addObject("day",day);
                mv.addObject("src",src);
                mv.addObject("dest",dest);

                return mv;

        }

}
```

DAO.java

This Java bean is responsible for interacting with the database. It takes care of all database operations- connecting with the database, querying the database and returning the required data to the controllers.

```
package com.flight;

import java.sql.*;

public class DAO {

        private Connection con;
        private Statement stmt;
        private String url,uname,password;

        public DAO(String url, String uname, String password)
        {
                this.url=url;
                this.uname=uname;
                this.password=password;
        }

        //Function to establish the connection
        private void setConnection() throws ClassNotFoundException,
SQLException
        {
                Class.forName("com.mysql.jdbc.Driver");
                con=DriverManager.getConnection(url,uname,password);
                stmt=con.createStatement();
        }

        //Function to close the connection
        private void closeConn() throws SQLException
        {
                con.close();
        }

        //Function for getting cities
        public ResultSet getCities() throws ClassNotFoundException,
SQLException
        {
                setConnection();
                String query="select * from cities";
                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet getFlights(String src, String dest, String day)
throws ClassNotFoundException, SQLException
        {
                setConnection();
                String query1="(select * from flights where
src_city=\'"+src+"\' and dest_city=\'"+dest+"\' and day=\'"+day+"\')";

                String query2="(select * from offers where CURRENT_TIMESTAMP
between start_time and end_time)";

                String query="select * from "+query1+" f left join "+query2+"
o on f.src_city=o.src and f.dest_city=o.dest";

                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet getOffers() throws ClassNotFoundException,
SQLException
        {
                setConnection();

                String query="select * from offers where CURRENT_TIMESTAMP
between offers.start_time and offers.end_time";
```

```
                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);


                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet getCompanies() throws ClassNotFoundException,
SQLException
        {
                setConnection();

                String query="select distinct(company) as company from
flights";

                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);


                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
        public ResultSet filterFlights(String src, String dest, String
company, String stops, String day) throws ClassNotFoundException,
SQLException
        {
                setConnection();
                String query1="select * from flights where
src_city=\'"+src+"\' and dest_city=\'"+dest+"\' and day=\'"+day+"\'";
```

```
                if(company.compareToIgnoreCase("all")!=0)
                        query1+=" and company='"+company+"'";
                if(stops.compareToIgnoreCase("all")!=0)
                        query1+=" and num_stops='"+stops+"'";


                String query2="(select * from offers where CURRENT_TIMESTAMP
between start_time and end_time)";

                String query="select * from ("+query1+") f left join
"+query2+" o on f.src_city=o.src and f.dest_city=o.dest";

                System.out.println(query);

                ResultSet rs=stmt.executeQuery(query);

                if(rs.next())
                {
                        return rs;
                }
                closeConn();
                return null;
        }

        //Function for getting flights
                public ResultSet getStops(String flight_id) throws
ClassNotFoundException, SQLException
                {
                        setConnection();


                        String query="select * from flight_stops where
flight_id='"+flight_id+"' order by stop_no";

                        System.out.println(query);

                        ResultSet rs=stmt.executeQuery(query);


                        if(rs.next())
                        {
                                return rs;
                        }
                        closeConn();
                        return null;
                }

                //Function for login
                public ResultSet loginCheck(String username, String password)
throws ClassNotFoundException, SQLException
                {
                        setConnection();
                        String query="select * from logininfo where
uname=\'"+username+"' and password=\'"+password+"'";
                        System.out.println(query);
                        ResultSet rs=stmt.executeQuery(query);

                        if(rs.next())
                        {
                                return rs; //Means username password exists
                        }
                        closeConn();
                        return null;
                }

                //Function for checking duplicate username
                public boolean checkUname(String username) throws
ClassNotFoundException, SQLException
                {
                        setConnection();
                        String query="select * from logininfo where
uname=\'"+username+"'";
                        System.out.println(query);
                        ResultSet rs=stmt.executeQuery(query);

                        if(rs.next())
                        {
                                return true; //Means username password exists
                        }
                        closeConn();
                        return false;
                }

                //Function for registering
                public void register(User u) throws ClassNotFoundException,
SQLException
                {
                        setConnection();
```

```
                       String query="insert into logininfo
values('"+u.getName()+"','"+u.getUname()+"','"+u.getPassword()+"')";
                       System.out.println(query);
                       int res=stmt.executeUpdate(query);
                       closeConn();

               }

}
```

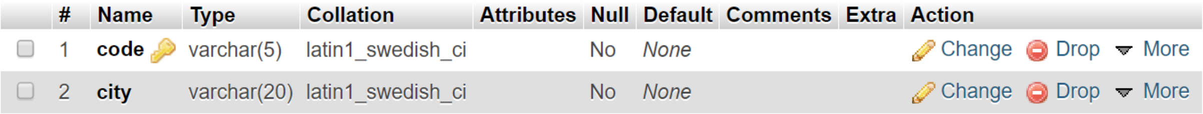
Deployment Descriptor: web.xml

```
<!DOCTYPE web-app PUBLIC
 "-//Sun Microsystems, Inc.//DTD Web Application 2.3//EN"
 "http://java.sun.com/dtd/web-app_2_3.dtd" >

<web-app>
  <display-name>Archetype Created Web Application</display-name>

  <context-param>
    <param-name>dburl</param-name>
    <param-value>jdbc:mysql://localhost:3306/travel</param-value>
  </context-param>
  <context-param>
    <param-name>dbuname</param-name>
    <param-value>root</param-value>
  </context-param>
  <context-param>
    <param-name>dbpass</param-name>
    <param-value></param-value>
  </context-param>

  <servlet>
        <servlet-name>flight</servlet-name>
        <servlet-
class>org.springframework.web.servlet.DispatcherServlet</servlet-class>
        <load-on-startup>1</load-on-startup>
  </servlet>

  <servlet-mapping>
        <servlet-name>flight</servlet-name>
        <url-pattern>/</url-pattern>
  </servlet-mapping>
</web-app>
```

flight-servlet.xml

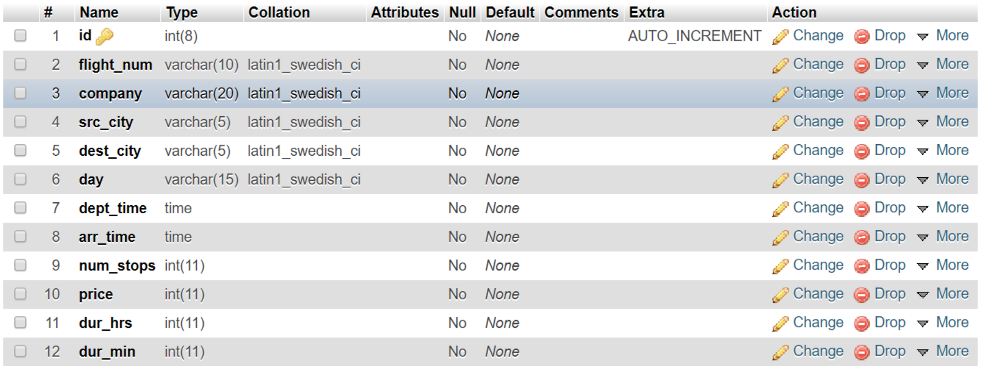
```
<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"
        xmlns:ctx="http://www.springframework.org/schema/context"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:mvc="http://www.springframework.org/schema/mvc"
        xsi:schemaLocation="http://www.springframework.org/schema/beans
        http://www.springframework.org/schema/beans/spring-beans-2.5.xsd
        http://www.springframework.org/schema/mvc
        http://www.springframework.org/schema/mvc/spring-mvc-3.0.xsd
        http://www.springframework.org/schema/context
        http://www.springframework.org/schema/context/spring-context-2.5.xsd
">


        <ctx:annotation-config></ctx:annotation-config>
        <ctx:component-scan base-package="com.flight"></ctx:component-scan>
</beans>
```

DATABASE SCHEMA



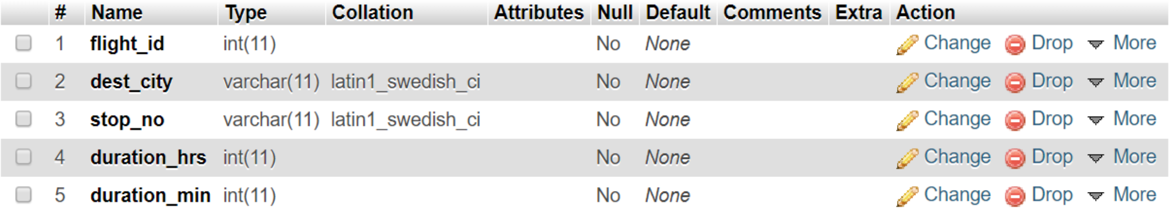
	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**code**	varchar(5)	latin1_swedish_ci		No	*None*			Change Drop More
□	2	**city**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop More

cities table



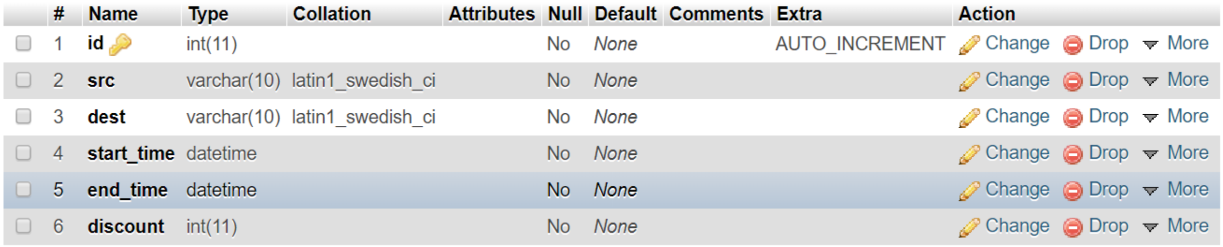
	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
□	1	**id**	int(8)			No	*None*		AUTO_INCREMENT	Change Drop More
□	2	**flight_num**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop More
□	3	**company**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop More
□	4	**src_city**	varchar(5)	latin1_swedish_ci		No	*None*			Change Drop More
□	5	**dest_city**	varchar(5)	latin1_swedish_ci		No	*None*			Change Drop More
□	6	**day**	varchar(15)	latin1_swedish_ci		No	*None*			Change Drop More
□	7	**dept_time**	time			No	*None*			Change Drop More
□	8	**arr_time**	time			No	*None*			Change Drop More
□	9	**num_stops**	int(11)			No	*None*			Change Drop More
□	10	**price**	int(11)			No	*None*			Change Drop More
□	11	**dur_hrs**	int(11)			No	*None*			Change Drop More
□	12	**dur_min**	int(11)			No	*None*			Change Drop More

flights table



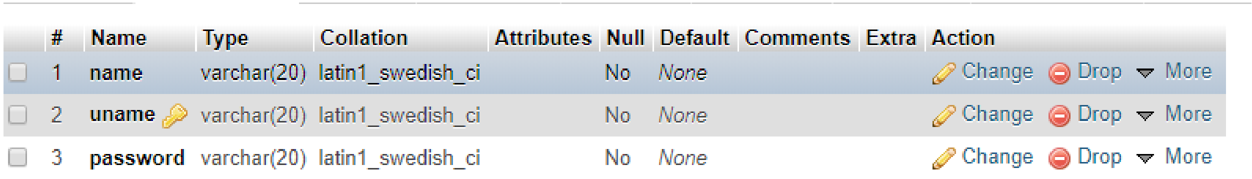
	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
☐	1	**flight_id**	int(11)			No	*None*			Change Drop ▾ More
☐	2	**dest_city**	varchar(11)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
☐	3	**stop_no**	varchar(11)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
☐	4	**duration_hrs**	int(11)			No	*None*			Change Drop ▾ More
☐	5	**duration_min**	int(11)			No	*None*			Change Drop ▾ More

flight_stops table



	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
☐	1	**id** 🔑	int(11)			No	*None*		AUTO_INCREMENT	Change Drop ▾ More
☐	2	**src**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
☐	3	**dest**	varchar(10)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
☐	4	**start_time**	datetime			No	*None*			Change Drop ▾ More
☐	5	**end_time**	datetime			No	*None*			Change Drop ▾ More
☐	6	**discount**	int(11)			No	*None*			Change Drop ▾ More

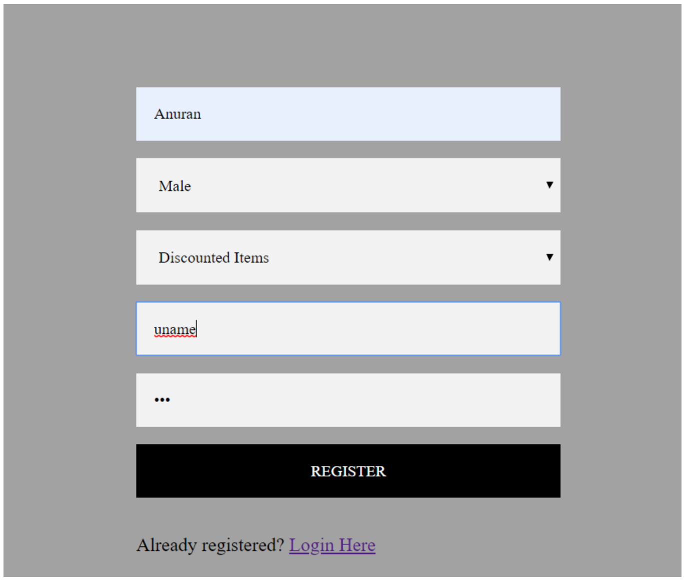
offers table



	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
☐	1	**name**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
☐	2	**uname** 🔑	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop ▾ More
☐	3	**password**	varchar(20)	latin1_swedish_ci		No	*None*			Change Drop ▾ More

logininfo table

OUTPUT:



Anuran

Male

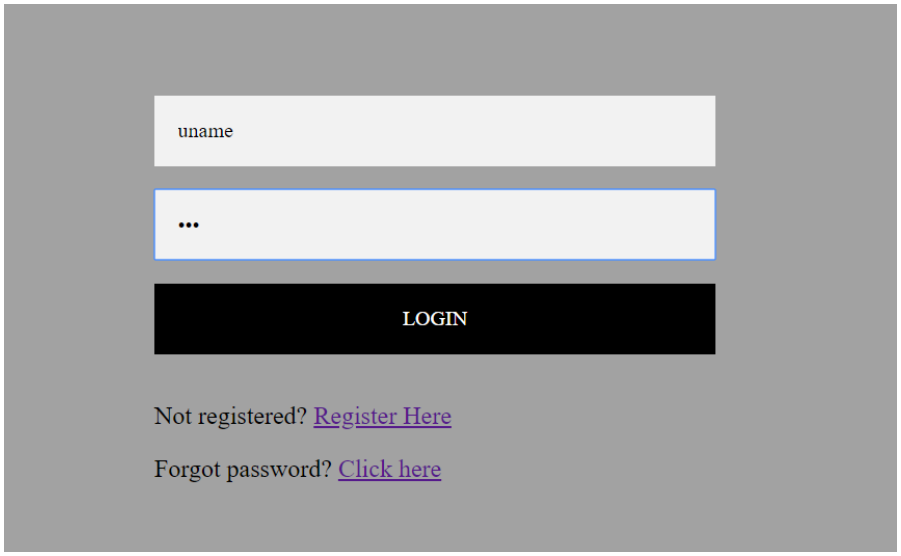
Discounted Items

uname

•••

Already registered? Login Here

Fig. 1 User Registration process



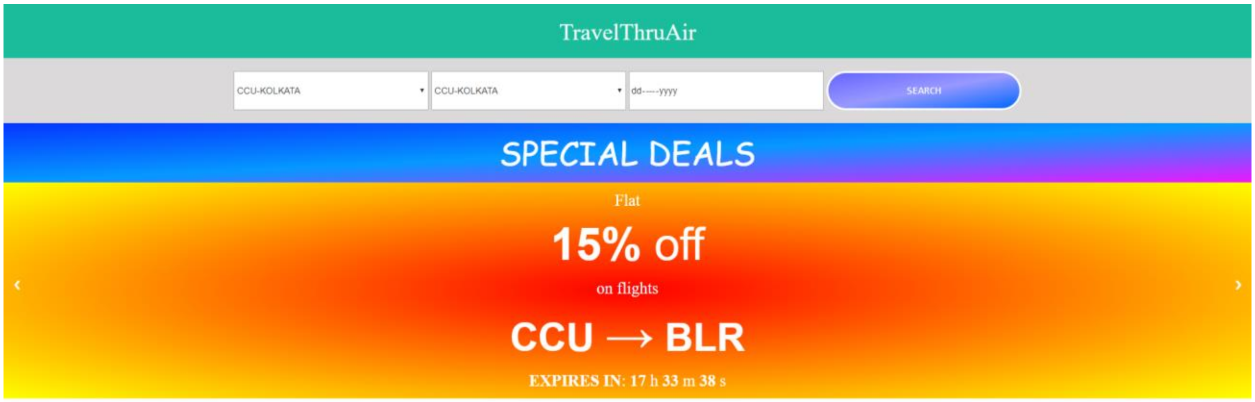
uname

•••

Not registered? Register Here

Forgot password? Click here

Fig. 2 User Login process



SPECIAL DEALS

Flat

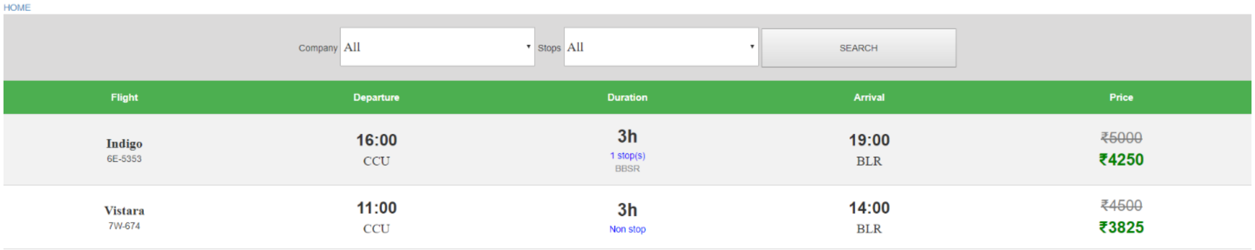
15% off

on flights

CCU ⟶ BLR

EXPIRES IN: 17 h 33 m 38 s

Fig 3. Home page

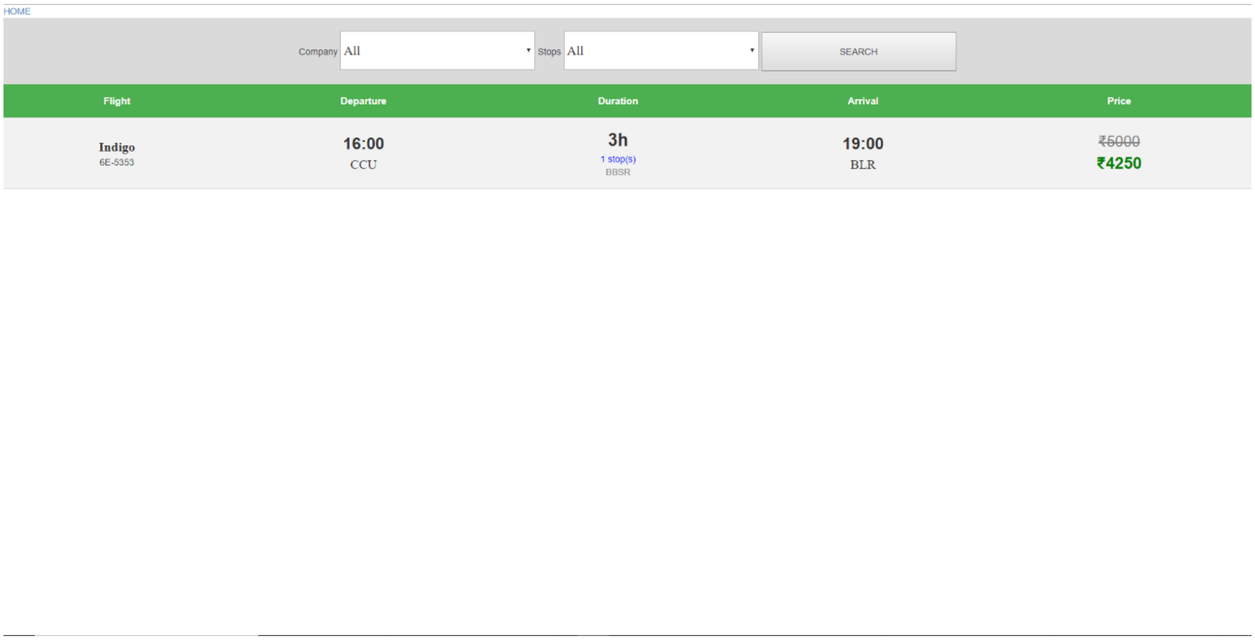


Company All

Stops All

Flight	Departure	Duration	Arrival	Price
Indigo 6E-5353	16:00 CCU	3h 1 stop(s) BBSR	19:00 BLR	~~₹5000~~ ₹4250
Vistara 7W-674	11:00 CCU	3h Non stop	14:00 BLR	~~₹4500~~ ₹3825

Fig 4. Flight search page



Company All

Stops All

Flight	Departure	Duration	Arrival	Price
Indigo 6E-5353	16:00 CCU	3h 1 stop(s) BBSR	19:00 BLR	~~₹5000~~ ₹4250

Fig 5. Filtered flights

DISCUSSION:

It can be observed from the outputs that the application works in accordance with the given problem statement. The application has a signup-login-logout framework. To maintain session instead of using HttpSession as we did in JSP-Servlet applications, the @SessionAttribute annotation of Spring Framework has been used. Session is invalidated on logout so that users cannot access items page without logging in. HttpRequest and HttpResponse objects are substituted by @RequestParam annotation and ModelAndView object in the controllers.

On succcessful login, the website displays flights according to the choices entered by the user. It also allows the user to enter preferences and shows list of flights accordingly. Instead of using various servlets for login-signup-logout, the Spring framework helps us to keep one controller for user validation and registration. Also, instead of updating servlet and servlet-mapping tags in the web.xml file, the @RequestMapping annotation is used. This keeps the deployment task simple for the programmer.