# ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
## ORGANISATION OF ISLAMIC COOPERATION (OIC)
# Department of Computer Science and Engineering (CSE)

SEMESTER FINAL EXAMINATION                      SUMMER SEMESTER, 2017-2018
DURATION: 3 Hours                                              FULL MARKS: 150

## CSE 4635: Web Architecture

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **8 (eight)** questions. Answer any **6 (six)** of them. **Question no. 1 is mandatory.**
Figures in the right margin indicate marks.

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**[Question no. 1 is mandatory]**

1. Suppose you have to implement an online computer shop. The information about different kinds of computers are stored in a database. To represent an entity in this database, you have to use object representation of the database table (for example the `Customer` class is the representation of `Customer` table of the database) where one instance represents one row.

   To keep track of each customer's choices, you can implement a `ShoppingCart`. The shopping cart is something that should exist during a session only. Each session will have its own instance (meaning that all customers will have their own shopping carts). The user is presented with a list of computers available to buy through a web page. For this scenario, answer the followings:

   a) What are the web technologies suitable to implement this application? Justify your choice.          5
   b) Which web architecture is best suited for this application and why?          5
   c) How do you manage the component architecture specifically for business logics to get the benefits of web architectural design pattern?          5
   d) Design and draw a detail web architectural model, showing relationships between different parts of the application with your chosen architecture, patterns and technologies.          10

2. a) What is the advantage of using HEAD method while making an HTTP request? Explain with example.          8
   b) Suppose you want to design your personal 'PhoneBookML' language. Define your XML tags for describing your contact information and your friends' contacts using these tags. Think about what properties should be defined as attributes and what properties are best described as elements. Make sure your documents are well-formed.          12
   c) Draw an architectgure to generate dynamic web page.          5

3. a) Why do you need to perform session tracking? Explain with an example.          10
   b) Write an authentication filter to check the password given by a user in filter class, if given password is 'admin', it will forward the request to the WelcomeAdmin servlet otherwise it will display an error message.          10
   c) Give an example code to demonstrate HTTP requrests forwarding mechanism using Servlet's RequestDispatcher.          5

4. a) Sometimes, some pre-processing needs to be done after the user has submitted a form. The result of this pre-processing decides where the control flow should go next. Such pre-processing code is frequently referred to as a "controller". JSP can be used to implement this controller. Give an example code of the controller using JSP technology. Your controller should invoke/redirect to one Servlet and two JSP pages.          9
   b) What are the differences between Request attributes, Session attributes, and ServletContext attributes?          6
   c) Briefly explain the JSP standard tag libraries according to their functionalities.          10

5. a) What are the differences between Java Bean and Entity Bean?          5

b) The Model 1 architecture has one thing going for it: simplicity. If your project is small, simple, and self-contained, it is the quickest way to get up and running. Explain the disadvantages of Model 1 architecture for developing a web project. **10**

c) Write a JavaScript function to get the values of First and Last name of the following form. **6**

```html
<form id="form1" onsubmit="getFormvalue()">
First name: <input type="text" name="fname" value="X"><br>
Last name: <input type="text" name="lname" value="Lname"><br>
<input type="submit" value="Submit">
</form>
```

d) Write the advantages of using JSON over XML. **4**

6. a) "RMI is used as standard API for many distributed objects in EJB" – Explain the statement. **5**

b) Suppose you have to implement an RMI application for the police department. Consider a scenario that a motorcyclist has crossed the speed limit and a policeman has stopped the rider. Officer wants to fine him and before that, he wants to check wheather the driver was issued for warrants. Through his smart device, the officer places a request to the central computer to check warrant history. From the RMI coding perspective, the client submits the request and the server executes the result, returns the result to the client. Write a Java RMI application for the scenario. **20**

7. a) Consider the Façade architectural pattern given in Figure 1. **2+3**
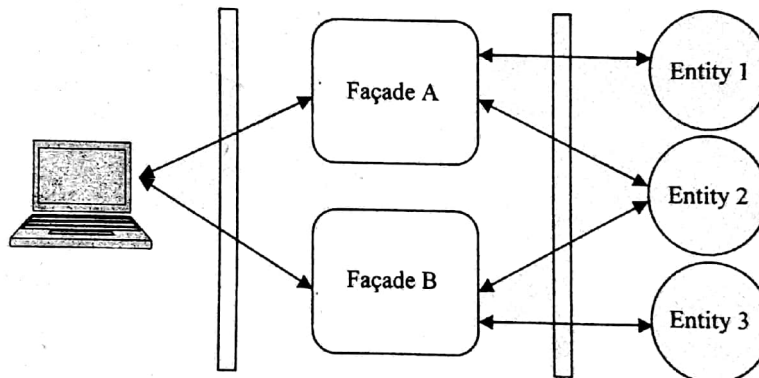


Figure 1: Façade pattern

Map this pattern with an online banking application scenario as a distributed web application and illustrate how you would implement this pattern. [Hint: Writing code segments are enough]

b) Why does EJB need two interfaces, home interface and remote interface? Explain with example. **10**

c) Demonstrate with code how to invoke a Stateless Session Bean from Servlet and display any output through a JSP page. **10**

8. a) What is DAO pattern? With a real-life example describe how you could use DAO pattern and Entity Beans. **12**

b) What is the relationship between entity manager and persistence context? Give an example use of the annotation named @PersistenceContext. **5**

c) What are entities in EJB 3.0? Consider the following schema of a database table for course information: **8**

```
Student (student_id, student_name, department, phone_number)
```

i. Where, student_id is the primary key and need to be generated automatically. Write an Entity class for this table in EJB 3.0.