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

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2020-2021**

DURATION: 1 HOUR 30 MINUTES **FULL MARKS: 75**

CSE 4635: Web Architecture

Programmable calculators are not allowed. Do not write anything on the question paper.

Answer **all 3 (three) questions**. Marks of each question and corresponding CO and PO are written in the right margin with brackets.

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1. a) What do you mean by **'thin'** client and **'thick'** client? Explain using examples. 4 (CO1) (PO1)

   b) Explain the construction of request and response messages. What are the major differences between request and response messages? 8 (CO1) (PO2)

   c) The following diagram represents the architectural pattern used to create the famous web application called 'BanglaGram'. An arrow in between two pages signifies that a user can navigate from one page to the other. 6+7 (CO3, CO4) (PO2, PO3)

   This application allows users to view pictures of different sceneries of Bangladesh, taken and uploaded by other users of the application. A user also has the option to search for other users using a search function. A user can follow other users, and the feed of the user will always be filled with pictures of other users that he/she follows.

   Answer the following questions:

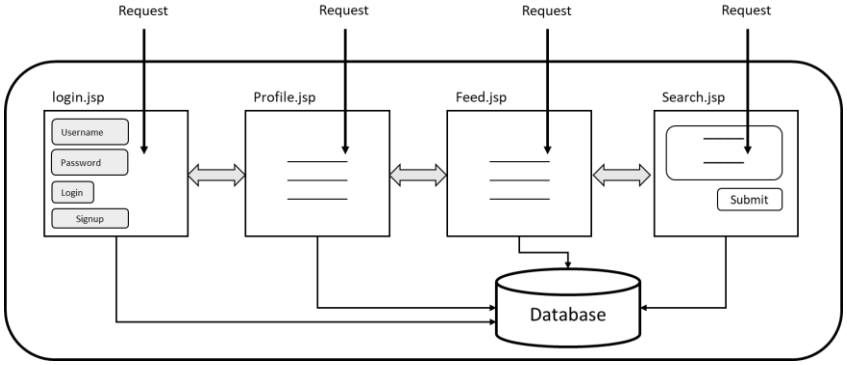

Figure 1: Figure for Question 1 (c)

   i. Examine some of the problems of this design pattern.
   ii. Design an appropriate design pattern (with proper explanation and figure) that should be followed to solve the problems of the given pattern.

2. a) Create a servlet, a servlet filter, and a corresponding web.xml file (all with code) that will combinedly handle the login, session and verification of users for the application mentioned in 1(c). Assume for now that you will only allow a user with the username "TonyStark" and the password "I am Iron Man" to successfully login into the web app. 12 (CO4) (PO3)

   b) What are some of the differences between XML and HTML? 3 (CO1) (PO2)

c) Suppose you are using XML technology to store the invoice and billing information of some shopping mart. Each invoice includes: 6+4 (CO4) (PO2, PO3)

- A unique invoice number
- A date of purchase
- A billing address
- A delivery address, if different from the billing address
- Name of customer
- A list of items giving code number, description or category ('description' is used for non-perishable items, 'category' is used for perishable items), quantity ordered, price and amount due for each item in the invoice
- Total weight of items in kg

Now, answer the following questions:

i. Create a DTD according to the requirements of the above-mentioned document. Your DTD should also contain an entity defining the email id of the customer.

ii. A customer made the following purchase:
Name of customer: Mr. John; Email: john@abc.xyz
Delivery address: House number 3
Date: 18th November, 2020
Item ID: 02; Description: Mouse pad; Quantity: 3; Price: 300/- each
Item ID: 19; Category: Food (chocolate); Quantity: 5; Price: 150/- each
Weight: 0.6 kg

Construct this order as an XML document, conforming to the DTD you created earlier.

3 a) A certain web application requires the users to perform the following operations: 4 (CO1) (PO1)

i. Choose desired items for purchase from a list of items
ii. Enter credit card information on a web page
iii. Add the image of a receipt as an attachment
iv. Write reviews after buying a certain product

For each of the operations mentioned above, which request methods should be used to send the client-side requests and why?

b) The MVC pattern ensures a clean and proper separation of concerns – Explain. 6 (CO1) (PO1)

c) What are the differences between **ServletContext** and **ServletConfig** interfaces? 3 (CO1) (PO1)

d) Consider the following scenario and answer the subsequent question: 12 (CO5) (PO2, PO3)

The result processing system of a certain university has two portals: one for students, the other for faculty members. Faculty members can log in and choose the courses they conduct from a list of offered courses. They can then grade students for a particular semester for each individual course they conduct. The grade point that can be assigned for any course is one of the following: A+, A-, B+, B-, C, and D.
Students can login into the system using their portal and check the grades they have received for the courses they have taken. They can also add private comments under their grades in case they have any confusion about the score they received.

Develop the above-mentioned result processing system by using your knowledge of different web application technologies you have learnt so far. You do not have to write any code; however, you have to briefly describe the purpose of each servlet, servlet filter, javabean, jsp page etc. that you use to develop the project.