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

MID SEMESTER EXAMINATION
 DURATION: 1 HOUR 30 MINUTES

WINTER SEMESTER, 2022-2023
 FULL MARKS: 75

SWE 4537: Server Programming

Programmable calculators are not allowed. Do not write anything on the question paper.
 Answer all 3 (three) questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. Imagine you want to build a new social media platform "ConnectPal". Here users can connect with each other based on common interests, share their piece of mind with others, and also play group quests with their friends. Answer the following concerns regarding the platform.
 - a) In the platform, you want to implement HTTP for transferring files – such as text, images, sound, video, and other multimedia files – over the web. Defend your decision as to why you would choose HTTP over different protocols. 6
(CO1)
(PO1)
 - b) Provide an example for the following types of HTTP request methods to design the backend infrastructure for "ConnectPal": 1 × 9
(CO1)
(PO1)
 - GET
 - HEAD
 - POST
 - PUT
 - DELETE
 - CONNECT
 - OPTIONS
 - TRACE
 - PATCH
 - c) You have created the following URL that will be used to access a specific group quest page on "ConnectPal", which will allow users to engage in collaborative gaming activities with others who share the same interest in gaming. Now explain different parts of the following URL: 3
(CO1)
(PO1)
`https://www.connectpal.com:101/groups/quest?id=123&interests=RPG+gaming#level1`
 - d) When users click on the given URL in Question 1(c), how will you establish the connection between the client and server? Describe the HTTP Request and Response format for the given URL in Question 1(c). 3 + 4
(CO1)
(PO1)
2.
 - a) Imagine you have started your career at "MetaLow" as a backend developer. Your company is developing a web application for a healthcare system that needs to exchange patient information securely between various medical facilities. As a backend developer what type of web service will you choose? Justify your answer. 6
(CO2)
(PO2)
 - b) Suppose you are working on a project to integrate weather information into a mobile weather app *WeatherMatic*. You have two options: using a web service or integrating with a weather API. Justify your preferred option. 6
(CO2)
(PO2)
 - c) If you want to implement a proxy server for the *WeatherMatic* app mentioned in Question 2(b), what type of proxy server can you implement and where can you implement it? What are the advantages and disadvantages of your decision? 1 + 5
(CO2)
(PO2)

- d) In the *WeatherMatic* app, your line manager wants to let users sign in through their Google accounts. Explain the working procedures with respect to OAuth Flow along with the necessary diagrams. 7
(CO2)
(PO2)
3. *MagellanTV* is a streaming service that specializes in documentary content. It offers a wide range of documentaries across various genres, including history, science, nature, and more. As a system architect, answer the following questions:
- a) *MagellanTV* initially followed a monolithic architecture. However, it is gaining popularity recently. So, your line manager has asked you to convert it into a microservice architecture right away. But you disagree with him. Convince your line manager about the alternative options before converting *MagellanTV* into a microservice architecture. 6
(CO3)
(PO2)
- b) *MagellanTV* has gained so much popularity that you had to implement microservice architecture to make the system more modular and scalable. However, users are complaining that the documentaries buffer a lot. They are not satisfied with the performance of the streaming service. How to improve your design so that users can enjoy the documentaries with minimal buffer and improve user satisfaction? 6
(CO3)
(PO3)
- c) Now, *MagellanTV* is expanding its platform to allow users to discover what others are streaming in their current location, while also enabling users to engage in discussions through threaded comments and liking each other's comments. 3 + 5
(CO3)
(PO3)
- i. Design the database schema to adopt the requirements.
 - ii. Apply necessary techniques to reduce the load on the server while providing better performance.
- d) Draw a high-level architecture of *MagellanTV*. Provide the necessary microservices and other components to show how they communicate with each other. 5
(CO3)
(PO3)