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

SEMESTER FINAL EXAMINATION   SUMMER SEMESTER, 2021-2022
DURATION: 3 HOURS   FULL MARKS: 150

CSE 4643: Mobile Application Development

Programmable calculators are not allowed. Do not write anything on the question paper.
Answer **all 6 (six)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

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1. a) Illustrate the working principle of PWAs with appropriate diagrams and explanation. — 8 (CO1) (PO1)

   b) An application has defined its minSDK = (your last two id digits % 19) + 1, maxSDK = 29, targetSDK = 29 & compileSDK = 29. This app is currently running on your device. — 5 × 2 (CO2) (PO2)
      i. If your device running on API 29 receives an OTA update and is updated to API 30 then what changes will occur to the application?
      ii. Explain the relationship between minSDK, targetSDK and compileSDK with forward compatibility for the application.

   c) Distinguish between Intent Filters and Intent and how they work in tandem with Activities for your Mobile Application. — 7 (CO2) (PO2)

2. a) Elucidate the different types of App Components which are the entry points through which the system of a user can enter your application with appropriate examples. — 8 (CO2) (PO2)

   b) "Constraint Layout is better than Relative Layout" – Justify this statement with appropriate examples and diagrams (if necessary). — 7 (CO2) (PO2)

   c) Write the standard user Interface (UI) design guidelines that you followed while developing your application for the Course "*CSE 4644*". — 10 (CO4) (PO3)

3. a) Classify the different types of permission with appropriate examples and explanations post Android 6.0 Marshmallow era. — 5 (CO3) (PO1)

   b) Generalize the best practices and alternatives for app permissions with appropriate examples. — 5 (CO4) (PO1)

   c) Bank applications have accumulated much popularity since its inception. A banking application known as "*ACBD Bank*" allows you to transfer money to other users of the same and different bank with two factor authorization, accommodates different cards, recharge your mobile, pay utility or credit card bills, display monthly cost breakdown statistics, use QR payment amongst many others. — 15 (CO3) (PO1, PO3)
   Determine the required permissions for this app. Write a Java Code requesting various permissions using the traditional method for this application.

4. a) Illustrate the workflow of requesting permissions in Android Mobile Applications with appropriate diagrams and an example.

    b) "You can access files that belong to other applications" – this statement is true for which storage types? Compare the permissions associated with these storage types.

    (CO3)
    (PO1,
    PO3)

    c) **Google Assistant** requires a lot of computational resources and processing power for speech processing and semantic analysis in mobile phones. Elucidate which technique is used to circumvent these shortcomings and what advantages does it offer to the users.

    8
    (CO3)
    (PO1,
    PO3)

5. a) In Shared Storage of any android application if a user wants to store video or audio type data then the system enables which directories to store them? Will these data disappear from those directories if the application is uninstalled, if not then explain why?

    7
    (CO3)
    (PO1,
    PO3)

    b) Suppose you have an app named *"Gambare"* that has a special button which generates a file *"Cicada"*. You want to store a cryptic message in this file whenever you click the button. Write the Java codes for the following:

    5+10
    (CO3)
    (PO3)

    i. Store the string *"Your_ID_Number's birthday will be celebrated at Yokohama on Your_brith_date"* in your file *"Cicada"*. For instance, **"154419's birthday will be celebrated at Yokohama on 3rd January, 2023"**. Use different string variables to store your id and birthdate.

    ii. Access the file *"Cicada"* and check if the file contains the string you stored. If the match is found then print the **matched string** in the *Android console* or else print *"Match not found"*.

    c) Compare Room Persistence Library with SQLite and analyze which is better for your mobile application.

    3
    (CO3)
    (PO3)

6. a) Explain what kind of sensor is *Linear Acceleration*? Write a JAVA code to declare an instance of this sensor using the Sensor Framework classes.

    9
    (CO4)
    (PO3)

    b) "The data delay or sampling rate of Sensor Events should be set at maximum capability" – justify this statement.

    4
    (CO3)
    (PO1,
    PO3)

    c) Two entities named *"Student" and "Department"* of the *Room Database* is provided. A student can belong to either CSE, EEE, CEE, MCE, BTM or TVE departments. These entities represent the following tables in the database as shown in Table 1. A Data Access Object (DAO) as **StuDept** is defined for this database. Using the Room Components write the following JAVA codes.

    4×3
    (CO3)
    (PO1,
    PO3)

Table 1: A sample table for Question 6.c)

Student	Department
• Student_ID • Student_name • CGPA • Dept_ID	• Dept_ID • Dept_Name • Dept_HoD

i. Create the Entity Class for Student and Department separately.

ii. Write a DAO query for displaying the respective department name and the number of students majoring in each department for all the departments.

iii. Write a DAO query for displaying the students whose CGPA is greater or equal to 3.7 and Dept_ID is CSE or EEE.