**Institute of Vocational Education**

**Department of Information and Communications Technology**

**HDSE (IT114105)**

**ITP4501 Programming Techniques for Mobile Systems**

**Summer Semester 2021-2022**

**Assignment**

**Submission Guidelines**

* This is an individual assignment.
* The submission deadline of the assignment to is **11:55pm, 26 June 2022 (Sunday).**
* You need to submit all program sources (in a single zip file) and your answer of two questions in section 7 (in a MS Word file) to the Moodle website http://moodle.vtc.edu.hk assignment dropbox before the deadline. You are advised to upload your work at a time reasonably earlier than the cut-off date and time. Moodle allows multiple submissions, however, only the latest copy will be retained. You will receive **ZERO MARKS for LATE SUBMISSION**.
* You are also required to give a demonstration. 40 marks will be deducted if demonstration is not done.

1. **Aims and Objectives**

* To gain experience in mobile application UI and program design.
* To gain practical skill of Android application development.
* To understand the constraints and limitation of mobile application and the ways to overcome them.
* To obtain knowledge on connecting the mobile device to the internet services and building a multi-tier distributed system.

1. **Introduction**

In this assignment, you are required to develop an Android Application to play a Tic-Tac-Toe Game. This app will also record the result and corresponding time required to complete a game and use charts to show the history records.

You can use following link to know how to play a Tic-Tac-Teo game:

https://en.wikipedia.org/wiki/Tic-tac-toe

1. **Functional Requirements**

Listed below are the basic requirements of your application. You need to refer to the Local Database section for the database schema.

|  |  |
| --- | --- |
|  | 1. A main activity which contains a main menu for players to choose. The four main functions are: Play, Game Ranking, Your Records and Close. |

A picture containing calendar

Description automatically generated A picture containing calendar

Description automatically generated A picture containing shape

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1. When players touch the "Play" button on the main menu, they start to play the game with CPU. Players will mark an 'O' on an available button which does not contain any mark ('O' or 'X') by touching it. After players touch on an available button, CPU will RANDOMLY to mark a 'X' on an available button. To simplify your workload, you are not required to write an AI for CPU to win the game.

When players or CPU who succeed in placing three of their marks in a horizontal, vertical, or diagonal row is the winner. Your app will save the record of this game to the GamesLog table in a local database and then your app will show a "Continue" for players to restart the game.

|  |  |
| --- | --- |
|  | 1. When players touch the "Game Ranking" button on the main menu, your app will download a JSON from your own api server. You MUST use a ListView to show all the records in the JSON string. |

Table

Description automatically generated Chart, pie chart

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1. When players touch the "Your Records" button on the main menu, Your app will load the records in the GamesLog table from your local database. You MUST use a ListView to show all these records. Your app will provide a button "Show in Pie Chart" which let players to show winning status (Win, Lose, Draw) by using a Pie Chart.

Note: You are encouraged to design and implement extra features. 10% of the total mark will be allocated on such additional functions. Refer to section 7 Marking Guidelines for more details.

1. **Local Database**

The database scheme described here is an extremely simple one. Many fields are intended not to be included in order to reduce the complexity of this assignment. You are free to add columns and tables to the database to fit for your own needs.

**GamesLog** (**gameID**, playDate, playTime, duration, winningStatus)

1. **Ranking JSON Server**

You can obtain a ranking list from your own api server and the data returned is in JSON format.

The JSON string returned is shown below:

[{"Name":"Kenny Lam","Duration":104},

{"Name":"Peter Kwong","Duration":25},

{"Name":"John Chan","Duration":38},

{"Name":"Johnny Kwong","Duration":117},

{"Name":"Mary Lam","Duration":23},

{"Name":"David Wong","Duration":49},

{"Name":"Alan Ma","Duration":18},

{"Name":"Carrie Lam","Duration":68},

{"Name":"Chris Lam","Duration":93},

{"Name":"Mary Cheung","Duration":78}]

You need to sort the JSON data by using duration in ascending order to obtain the ranking.

1. **Additional Constraints**

* The UI of the mobile application must be produced with Android widgets such as **TextView**, **CheckBox**, and **Spinner** etc. Web-based UI is **NOT** allowed.
* The statistical charts must be produced using Android built-in graphics API such as **drawRect()** and **drawText()**. Using any other external drawing packages or libraries is **NOT** allowed.

1. **Marking Guidelines**

You project will be assessed according to the items below.

* Database initialisation.
* Level of completion.
* Correctness.
* UI design (no mark will be given if you are using the same design in this document).
* Program design and implementation.
* Program style and comments.
* Driving Question: How can an organization get benefit from a central computerized management system by using a mobile app?
* Briefly discuss how ITP4510, ITP4522 and ITP4915M modules help you to finish this assignment.

10 marks will be allocated to extra features not described in section 3. Each student can develop at most 3 additional functions such as animation effect or sound effect on the Android device or any other relevant and useful functions.

10 marks **will be deducted** if you do not submit your answer of last two questions in section 7:

Driving Question: How can an organization get benefit from a central computerized management system by using a mobile app?

Briefly discuss how ITP4510, ITP4522 and ITP4915M modules help you to finish this assignment.

40 marks **will be deducted** if demonstration is not done.

**END**