

Department of Computer Science & Engineering

University of Asia Pacific (UAP)

Program: B.Sc. in Computer Science and Engineering

Final Examination

Fall 2020

2nd Year 2nd Semester

Course Code: CSE 211

Course Title: Database Systems

Credits: 3.00

Full Marks: 120* (Written)

Duration: 2 Hours

* Total Marks of Final Examination: 150 (Written: 120 + Viva: 30)

Instructions:

1. There are **Four (4)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
 2. Non-programmable calculators are allowed.
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1. Cricket club owners with their respective Cricket players visit Bangladesh Cricket Board (BCB). Doctors of BCB may conduct one or more COVID-19 test on the players. Owners may admit players into the COVID-19 specialized hospital, allocated exclusively for the Cricket players, located at the opposite of BCB, in case of emergency. Otherwise they would be isolated in a five-star hotel for at least 14 days. 30

You may use abbreviations given as the following:

Cricket Club Owner as CCO, Cricket Player as CP, Doctor of BCB as DB, COVID-19 Specialized Hospital as CSH and Five-Star Hotel as FSH.

Details of Doctors (DB_ID, DB_Name, DB_Contact), CPs (CP_ID, CP_FirstName, CP_LastName, CP_Age) and COVID-19 Tests (CovT_ID, CovT_Name, CovT_Result) are must. Please add other necessary entities, attributes and relationships sets to complete the above mentioned scenario.

Based on this case study, please draw the corresponding Entity-Relationship (E-R) diagram with the latest notation. Please do not use the older notations.

2. a) Distinguish between the put(...) and get(...) functions supported by Key-Value Stores. How do NoSQL systems work differently than SQL systems? 10
- b) Compare the differences between the Data Warehouses and Data Lakes. 10
- c) Analyze the features of a Pivot-Table and a Data Cube. 10

3. The following relational schema form a part of a software company database held in a relational DBMS:

Product (Prod_ID, Prod_Name, Prod_Version, Prod_Price)
Developer (Dev_ID, Dev_Name, Prod_ID, T_ID)
Manager (M_ID, M_Name, Prod_ID)
Technology (T_ID, Platform, IDE)

Please write down the DML statements for the following queries:

5×6
=30

- a) Find the developer's name who is working in the Windows platform and his/her ID is equal to the last 6 digits of your own registration number.
- b) Show the names of managers working on a product resulting an app named "FilterCamera" with version number equal to your own registration number divided by 9 (please calculate the fractional number on your calculator).
- c) Find the names of the developers start with the first letter of your own first name and end with the last letter of your own last name.
- d) List the products developed in the IDE named Microsoft Visual Studio and the product name's length is equal to the length of your own full name.
- e) Find the most expensive products managed by you. Please use your own registration number as M_ID.
- f) List the Apple product names but not the Samsung ones.

OR

The following relational schema form a part of a software company database held in a relational DBMS:

Product (Prod_ID, Prod_Name, Prod_Version, Prod_Price)
Developer (Dev_ID, Dev_Name, Prod_ID, T_ID)
Manager (M_ID, M_Name, Prod_ID)
Technology (T_ID, Platform, IDE)

Please write down the Relational Algebra for the following queries:

5×6

- a) Find the names of the developers working on a product having product ID same as your own registration number. =30
- b) Show the price of the product having the product ID same as the last 3 digits of your own registration number.
- c) List the product names where the developers' last names match with your own last name.
- d) Find the developers' ID working on both Windows and Linux platforms.
- e) Show the developers' names working on the Android Studio IDE but not on the Microsoft Visual Studio IDE.
- f) List the developers' ID working on either Mobile or Web platforms.

4. Please write down the OLAP SQL commands for the following:

10×3

a) Pivot operation.

=30

b) Cube operation.

c) Rollup operation.

(N.B. Please use your own Registration Number, First Name, Last Name, Course Code, Course Title, Credits, Semester and Year.)