Continuous Assessment Task 1

Deadline: 5pm 16th February 2023

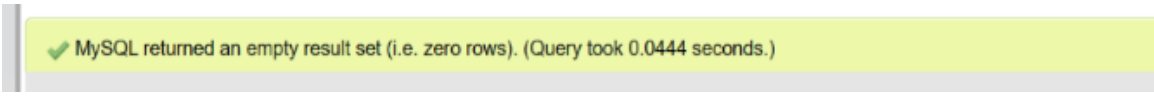
Submission Instructions: You need to carry out the task on macneill AND submit the sql code on Blackboard.

Follow the below instructions to access your SQL database on macneill and complete the exercise. Details of VPN access are here:
https://support.scss.tcd.ie/wiki/VPN_connection_from_Windows_10_-_students

To access your lab database:

1	Log in to your account on macneill.scss.tcd.ie using the username and password emailed to you.
2	Click on the database available there, its name will contain your username and end in _db

Inputting an SQL Command:

1	Click on the SQL tab
2	Type your SQL command
3	Click "Go". You should see something like this, if not don't panic, just edit your sql command and try again: 
4	Click the SQL tab again
5	Type your next command and so on to complete all of the tasks below.

Task 1: Creating and finding information in a MySQL Database

1	Create a table called Customers with the appropriate primary key, only the post code, address and contact name are allowed to be null and all strings using the varchar(255) data type. Also note the Postal code is best represented as text.

	CustomerName	ContactName	Address	City	PostalCode	Country
1	Jim Moore	James Moore	Frederick Street	Berlin	12209	Germany
2	Jane Smith	Jane Smith	Kevin Street	Mexico D.F.	12207	Mexico
3	Lucille Connors	Lucille Connors	Tpwnsend Street	Mexico D.F.	12207	Mexico
4	Phil Nolan	Philip Nolan	Sundale Road	London	WA1 1DP	UK
5	Veronica Green	Veronica Green	Shipyard Lane	Lulea	S958 22	Sweden

2	Insert the above data into the Customers table
3	Return all data in the Customers table.
4	Select all the different values from the Country column in the Customers table.
5	Select all records where the City column has the value "Berlin".
6	Select all records where the City column has the value 'Berlin' and the PostalCode column has the value 12209.
7	Select all records from the Customers table, sort the result alphabetically by the column City.
8	Insert another customer into the Customers table called Cardinal who lives in Stavanger, Norway.
9	Select all records from the Customers where the PostalCode column is empty
10	Select all records from the Customers where the PostalCode column is not empty
11	Set the name of anyone who lives in the UK to John Smith
12	Delete anyone in the table with postal code 12209
13	Return the name of all countries in the Customers table with (no countries repeated in the list) that contain the letter 'e' and in alphabetical order.

Your use of the macneill server is logged so please do not do anything there that is not part of the assignment. If you need access to a MySQL database for other reasons, please come and talk to me.

Make sure to only edit your database using the **SQL tab.**

Nb. Make sure to **only use the SQL tab** as instructed and not to manually edit any part of the tables you create (via other tabs). This is tracked by the system and parts of the exercise done using other tabs will receive a zero mark. This is not to punish anyone, it is simply required for the assignment, so follow the instructions correctly and ask if you have questions.

CA Task 2: Dependency Diagrams

Note: Submission instructions on last slide
Deadline: 5pm March 1st

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Football League Database

A football league is composed of four divisions (1,2,3,4) each containing many different teams, where each team has a unique name (e.g. Manchester united, Sheffield Wednesday etc.), and the number of points each team has amassed so far in the league competition. Information is also stored concerning each team's captain, and home ground address. The names of all professional footballers (not unique) in the league and the teams for which they play is stored in the database. Also, maintained in the database for each player is a record of their ability in the following positions (goalkeeper, defender, midfielder, striker) in a football team. A player can have the ability to play in more than one position. For example, a footballer named Alan Shearer, position = 'Defender', expertise = 2, however for position = 'Striker', expertise = 11, values > 0).

(a) Draw a Functional Dependence diagram for the relations in the above database stating any assumptions made in your solution.

(b) Derive a set of fully normalised relations (i.e. table names and attributes) from the dependence diagram, indicating clearly the primary key (candidate identifier(s)) and foreign keys of each relation.

(c) Write down any constraints on column values you may deem important.

(A) Functional Dependency Diagram Methodology

1. Underline all of the nouns in the description
2. Create a spreadsheet (or similar on paper) of example data where each column is named by one of the nouns identified in (1)
3. Check if there are any problems with identifying any of the nouns, hint: nouns with non unique values and add an identifier column for it, e.g. *clientID* if the problematic noun was *client*.
4. Check if any *other columns* should correspond with that new identifying column and change the example data where appropriate.
5. Go through each column and ask the question: “Does any other column(s) determine my value? The answer can be
   a. “no”,
   b. “yes, the … column determines my value” or
   c. “yes , the columns … and … determine my value”
6. Write the name of the determining column(s) within a single box with an arrow pointing to the name of the other column (boxed on its own)

(B) Normalised Relations Methodology

1. Using the functional dependency diagram from (A), identify all of the boxed attribute names that determine something else in the diagram, e.g. clientID determines clientname
2. Work through each to create a relation or table with the primary key being the boxed attribute, B, e.g. the existence of clientID should indicate the need for a client table with clientID as the primary key.
3. Add all determined from B as attributes in that table.
4. Do the same for all other boxed attributes identified in (1) above, underlining the primary keys.
5. Add a note to each table to say which attributes are foreign keys of others.

(C) Constraints Methodology

1. Read through the question again but paying special attention to the sentences that add a constraint to the data in some way, e.g. if a client belongs to one of 5 user groups, a sensible constraint to add is that the values of Usergroup attribute must be the values, 1-5.
2. Make a list of all constraints that should be applied.

Submission Instructions

Submit your work in a single document (any file extension is ok) via Blackboard by Friday March 1st.

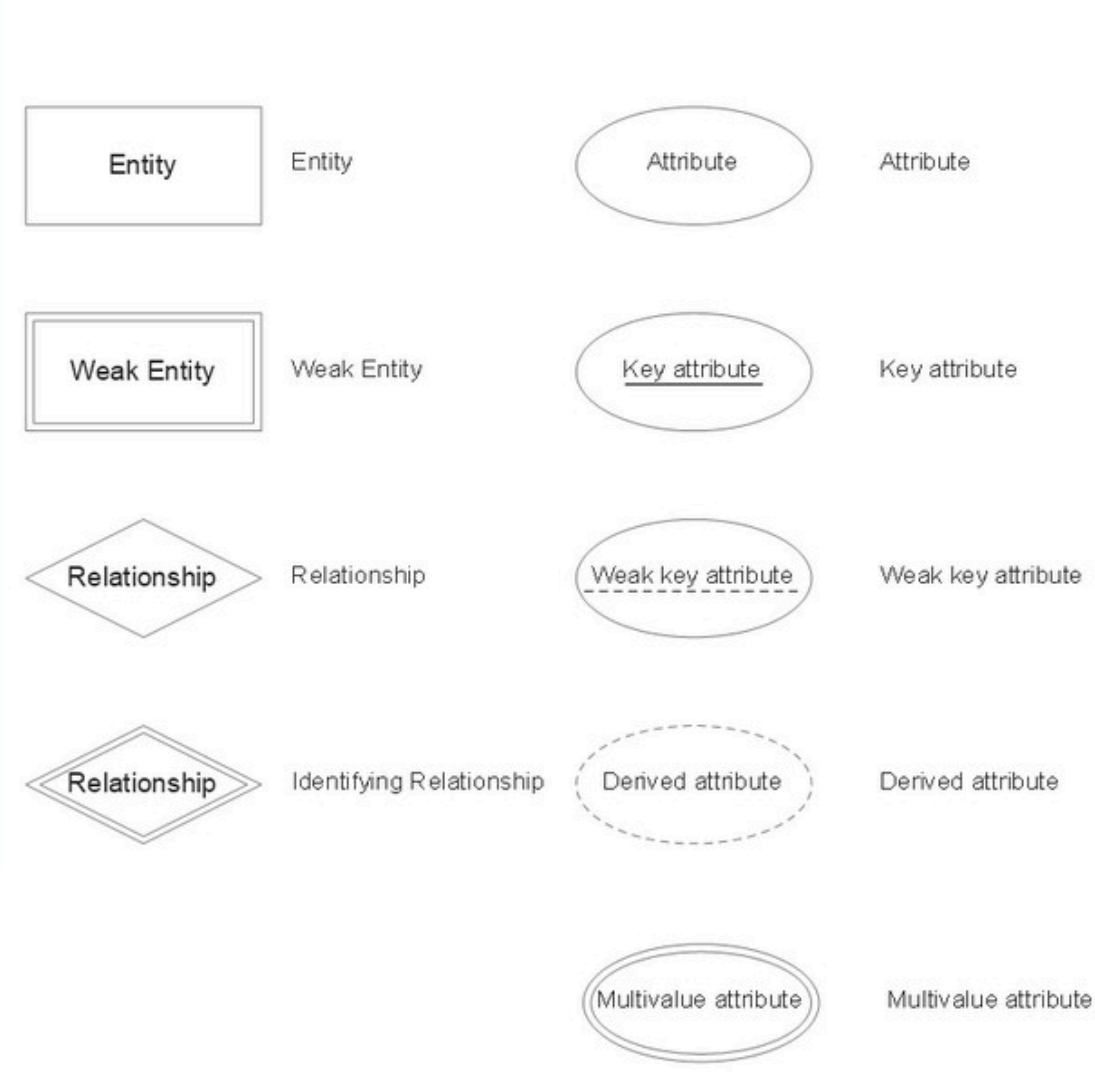
Questions: Please submit in form:

https://forms.gle/2BTmBdLfihW2i1Ws8

CA Tasks 3 and 4

Deadline for both is: 5pm March 29th 2024
Please upload the SQL queries to Blackboard and complete the exercise on macneill (your actions there are logged and checked).

Reminder:



Weak Entity: An entity that cannot be uniquely identified by its own attributes and relies on the relationship with other entity is called weak entity

Multivalued attribute: An attribute that can hold multiple values is known as multivalued attribute.

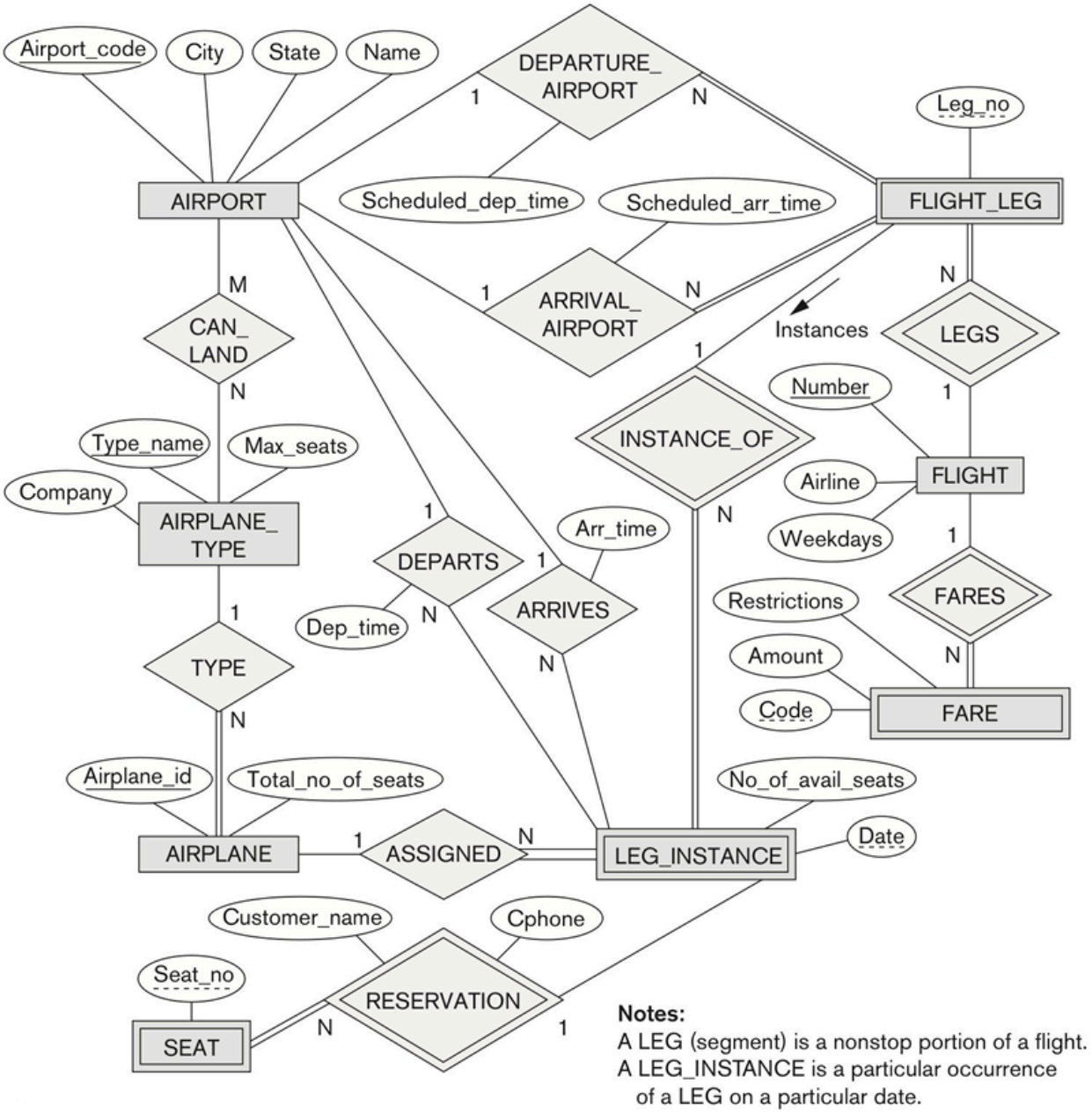
Weak key attribute (or partial key): an attribute that in combination with the owner's key creates a key for a weak entity.

Identifying relationship : The relationship that relates the weak entity type to an owner entity type is known as identifying relationship.

CA Task 3

Consider the relations for an airline reservation database application provided below.

(a) What are the referential integrity constraints that should hold on the schema? [40%]
(b) Write appropriate SQL statements to define the database. [40%]



Examples:

(a) The following referential integrity constraints should hold:

FLIGHT_LEG.(FLIGHT_NUMBER) --> FLIGHT.(NUMBER)

Hint: there are at least 11 more constraints to find

(b)

CREATE TABLE AIRPORT (AIRPORT_CODE CHAR(3) NOT NULL,

NAME VARCHAR(30) NOT NULL,

CITY VARCHAR(30) NOT NULL,

STATE VARCHAR(30),

PRIMARY KEY (AIRPORT_CODE));

Hint: there should be 11 tables created in total

CA Task 4

Consider the following Hotel, Room, Booking and Guest schemas in a DBMS. The hotelNo is the primary key for Hotel table and roomNo is the primary key for the Room relation. Booking stores the details of room reservations and bookingNo is the primary key. Guest stores the guests details and guestNo is the primary key. [20%]

Hotel	(hotelNo, hotelName, hotelType, hotelAddress, hotelCity, numRoom)
Room	(roomNo, hotelNo, roomPrice)
Booking	(bookingNo, hotelNo, guestNo, checkIn, checkOut, totalGuest, roomNo)
Guest	(guestNo, firstName, lastName, guestAddress)

(a) Write the SQL to list full details of all the hotels.

(b) Write the SQL to list full details of all the hotels in New York.

(c) Write the SQL to list the guests in New York in descending order by last name.

Task 5

The below is a relational database design to represent employees in a company and all relevant data that needs to be stored about them. Complete the 11 questions A-K below. First, do question (A), creating all of the tables on macneill and inserting the data. Then, try to do figure out if the DBMS will allow each of the other statements to be successful.

For each part A)-K) report whether or not the command executed (YES/NO) successfully and if it did not, explain why not in your answer uploaded to Blackboard.

Deadline: 5pm 12th April via Blackboard and macneill

Task 6

A) Create all of the tables shown and insert all of the information displayed. Then, try

B) Insert into Project relation:

< 'Terrible Project', NULL, 'Dublin', 4 >

C) Insert into Works_on relation: <'888665555',3,NULL>

D) Insert into DEPT_LOCATIONS relation: <5,'Houston'>

E) Insert into Employee relation:

<'Janet','F','Smith', '677678989', '1960-04-05', '6357 Windswept, Katy, TX', F, 28000, '987654321', 9>

F) Delete any Dependent with Depentent_name = 'Elizabeth'

G) Delete any tuples in Department with Mgr_ssn='333445555'

H) Delete any tuples in Employee with Bdate = '1965-01-09'

I) Set the Mgr_ssn in Department relation to NULL for any Department with Dno = 4

J) Update any Employee with SSN='333445555' to have date of birth '1983-09-25'

K) Update the Pno to 21 of all rows with ESSN='123456789' in the Works_on relation

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

Please format your answer as follows

Upload the following to Blackboard in the appropriate link.

Please submit a text file on Blackboard and enter the commands as usual on macneill.

Name:
ID:

A) YES, completed
B) YES/NO, reason why
C) …