2018 U.S. Information Technology Collegiate Conference Database Design Competition

Do not put your name(s) or your school's name on anything that you submit. Doing so will result in disqualification of your team. The only identifying information you should use is your team number.

PROBLEM STATEMENT: Watering Hole Dude Ranch

PART 1: Database Design

Draw the Entity Relationship Diagram (ERD) for the application described below. Specify the entities, the relationships between the entities, as well as the cardinality and optionality of the relationships. Clearly label all primary and foreign keys. Indicate what type of notation (crow's foot, Chen, or other) you are using to show cardinality (one or many) and optionality (mandatory or optional) at the top of your ERD. You may specify surrogate primary keys as needed to simplify the database design, which should be normalized to 3NF. ***Save your ERD as a pdf document***.

You have been hired by Watering Hole Dude Ranch located outside of San Antonio, Texas to develop a working database system to better organize and track their business information. You interview the staff (also called "ranch hands") and discover that the Watering Hole has several cabins of various sizes. The important information about a cabin is the number of bedrooms, number of bathrooms, how many people that the cabin can accommodate, and the cabin type.

The Watering Hole offers a number of vacation packages. Each package has a name, such as "Sage Brush Holiday", and a duration (the number of days), and the rate per person. For example, the "Sage Brush Holiday" is for 5 days, and the cost is $850 per person.

People come to the dude ranch to experience the cowboy way of life. They participate in activities such as hayrides, hoe-down dances, horse rides, etc. Each vacation package consists of one or more activity; and an activity may be included as part of more than one package. Information about the activity is the name of the activity, and the number of people that it can accommodate. When an activity is included as part of a package, one thing that the staff needs to know is whether or not they need to prepare food ("chow") for that particular package-activity (either "yes" or "no".)

People who visit the dude ranch are called "guests" by the ranch hands. Currently, the receptionist at the dude ranch fills out a paper form to keep up with reservations. A reservation form has a blank at the top where the receptionist enters a reservation number. This is a number that uniquely identifies each reservation. The reservation may be for one or more guest. However, each guest appears on only one

reservation. The reservation form lists the contact information about each of the guests, that is, each guest's first and last name, cell phone number, and email address. The cell phone number is used to uniquely identify each guest.

The reservation form also has blanks for the arrival date, the credit card number, and the vacation package (each reservation is for exactly one package, but a package may be selected by zero or more reservations.) A reservation also must indicate which cabin(s) are to be reserved. One or more cabins may be reserved by a single reservation; and cabins may appear on more than one reservation.

The owners of the dude ranch are optimistic that a well-designed database system will substantially improve their business processes. They are depending on you to analyze their business to identify areas that can benefit from such a system, and to design and develop the system itself.

<u>Submit your ERD (saved as pdf) to the contest server and ask one of the contest proctors for your password to start Part 2.</u>

Part 2: Database Implementation and DDL (Data Definition Language)

Once you log in to Part 2, you will be able to download DDL scripts for Oracle, MySQL, and Microsoft SQL Server. Choose the appropriate script for your environment to get started with part 2.

(1) Run ***create_dude_ranch*** in your SQL environment. This will create the tables and insert the data into the tables. (You will see a few error messages about dropping tables that do not exist. This is because you are running the script for the first time and there are some DROP TABLE commands at the start of the script. You can ignore these messages. Make sure you run all of the rest of the script to create the tables.)

(2) Modify the ***create_ dude_ranch*** script to accomplish the following tasks::
   a. Add appropriate primary key and foreign key constraints for the table package_activityWH.
   b. Write a constraint that insures that the column CHOW in the package_activityWH table will only accept the strings 'YES' or 'NO'.
   c. Add appropriate primary key and foreign key constraints for the table reserved_cabinWH.
   d. Just prior to the end of the script, insert the SQL code that will permit the user having username 'SCOTT' permission to view and update the guestWH table. SCOTT should also be able to add new guest records to the table.

(3) Save the modified script as ***TeamNN_create_ dude_ranch***, where NN is your team number and upload to the contest server.

Part 3. Queries

Save all queries in <u>one SQL script</u> named ***TeamNN_All_Queries***. Comment your code so that each of the queries are clearly labeled as ***Query1***, ***Query2***, etc. When you are done, upload your script to the contest server.

For all of the following queries, place the fields in the order that they are requested, and adjust the width of the columns if necessary, so that the column headings as well as the data in the results can be fully viewed and does not wrap around the line. Format all data and column headings as shown and order the records as specified.

Query1. Create a query that lists the guest's name (formatted as "Lastname, Firstname", with only the Initials capitalized) and their arrival date formatted as shown in the results below. Only include those guests who have arrival dates in June or July 2018, and order by the date. Save this query as **Query1**.

```
Guest                  Arrival Date
--------------------   ------------------
Roberts, Terrance      June 2, 2018
Roberts, Cynthia       June 2, 2018
Roberts, Roberta       June 2, 2018
Janis, Tom             July 4, 2018
```

Query2. List the names of all cabins that have no current reservations. Order by the cabin name. Save as **Query2**.

```
Available Cabins
--------------------
Cowboy Cove
Mountain View
```

Query3. Write a query that shows the packages that have 4 or more activities included with that package. List package name and the number of activities included with that package. Put in descending order by the number of activities. Save as **Query3**.

```
Packages with most activities                Number
---------------------------------------- ----------
Rent-the-Ranch                                    6
Watering Hole Deluxe                              4
American Warm Season                              4
```

Query4. This query will select information about each reservation. List the reservation number, the name of the package, and the total cost for every guest listed on that reservation. For example, if a reservation has 3 people, and it is for the "American Winter Season", which has a price of $650 per person, the total cost would be 3 * 650 = 1950. Format the data as shown in the results below. Only include those reservations where the total cost exceeds $2,000 and order by the reservation number. Save as **Query4**. The results are shown below:

Reservation	Package Name	Total Cost
25	Rent-the-Ranch	$5,000
78	American Warm Season	$6,800
87	Tenderfoot Deluxe	$3,600

Query5. Create a query that lists all cabins that accommodate more than the average number of people for *its own cabin type.* Save as **Query5**. The results of this query are:

Cabin Name	Can Accommodate
Large Lodge	24
Bear Den	15
Aspen Suite	20

Query6. Create a view named ***vw_PackageRevenue*** that will list the total revenue generated by each vacation package. Revenue is calculated as cost per person multiplied by the number of guests who have signed up for that package. Save the script to create the view as **Query6.** Next, generate the list by retrieving data through the view. The result of this query is:

Package Name	Total Revenue
American Winter Season	2600.00
American Warm Season	6800.00
Watering Hole Deluxe	4800.00
Rent-the-Ranch	5000.00

Query7. Create a stored procedure named ***sp_CabinInventory*** that will accept a cabin type as a parameter and prepare a list of all cabins of the cabin type specified along with cabin name, number of guests it can accommodate, reservation number for each cabin, guest's arrival date and number of guests on that reservation. Save the script to create the stored procedure as **Query7**. The result of executing this stored procedure for cabin type "Log" is:

CTYPE	CNAME	NUMACCOM	RNUM	ARRIVAL_DATE	NumOfGuest
Stone	Bear Den	15	RS39	2018-02-19	1
Stone	Tamarack Cottage	4	RS23	2018-05-12	3
Stone	Tamarack Cottage	4	RS37	2018-05-15	1

TIE BREAKER – THIS WILL ONLY BE USED IN CASE OF A TIE.

List the guest's name, arrival date and departure date (this is determined by the number of days in the package.) Only list those guests whose packages are 5, 6, or 7 days long. Order as shown.

Guest	Arrival Date		Departure Date	
Hebert, Bobby	Monday	02/19/18	Monday	02/26/18
Redding, Harry	Saturday	05/12/18	Thursday	05/17/18
Redding, Marcie	Saturday	05/12/18	Thursday	05/17/18
Redding, Antonio	Saturday	05/12/18	Thursday	05/17/18
Roberts, Roberta	Saturday	06/02/18	Saturday	06/09/18
Roberts, Cynthia	Saturday	06/02/18	Saturday	06/09/18
Roberts, Terrance	Saturday	06/02/18	Saturday	06/09/18
Hollister, Bennie	Tuesday	05/15/18	Sunday	05/20/18
Baxter, Julie	Wednesday	04/18/18	Monday	04/23/18
Baxter, George	Wednesday	04/18/18	Monday	04/23/18
Baxter, Nate	Wednesday	04/18/18	Monday	04/23/18
Baxter, Joan	Wednesday	04/18/18	Monday	04/23/18
Baxter, Nate	Wednesday	04/18/18	Monday	04/23/18
Baxter, Nathan	Wednesday	04/18/18	Monday	04/23/18
Baxter, Kitty	Wednesday	04/18/18	Monday	04/23/18
Baxter, Macy	Wednesday	04/18/18	Monday	04/23/18

Part 4. SQL KNOWLEDGE: This part of the competition tests your knowledge of SQL. Find the questions in 2018-DB_Part4.pdf on the contest server, which is printed on your check-in ticket. Use the answer sheet provided on the next page. Fill in the circle of the correct answer completely. Answers that are not completely filled in will not be considered marked.

Turn in the completed answer sheet to one of the exam proctors.

TEAM No. _____

PART 4: SQL KNOWLEDGE

Fill in the circle completely.

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D

Upon completion, detach this page and turn into competition proctor.