Database Systems ASSIGNMENT # 2

Due Data: 27th March 2023. **MARKS: 140**

HONOR POLICY

This assignment is a learning opportunity that will be evaluated based on your ability to think, work through a problem in a logical manner. You may however discuss verbally or via email the assignment with your classmates or the course instructor, and use the Internet to do your research, but the written work or code should be your own. Plagiarized reports or code will get a zero. If in doubt, ask the course instructor.

INSTRUCTIONS

20% will be of submission and 80% will be given on the basis of the demo. This is a group assignment of 2 students in a group. We will give you a schema on the demo time to map your queries on. Demo Query's difficulty level will be - Basic 30% + Medium 40% + Hard 30%.

CASE STUDY

Consider an example of a small private airport database that is used to keep track of airplanes, their owners, airport employees, and pilots. From the requirements for this database, the following information was collected:

1. Each AIRPLANE has a
   registration number [Reg#],
   is of a particular plane type [OF_TYPE],
   is stored in a particular hangar [STORED_IN].

   Each PLANE_TYPE has a
   model number [Model],
   a capacity [Capacity],
   a weight [Weight].

   Each HANGAR has a
   number [Number],
   a capacity [Capacity],
   a location [Location].

2. The database also keeps track of the OWNERs of each plane [OWNS] and the EMPLOYEEs who have maintained the plane [MAINTAIN]. Each relationship instance in OWNS relates an AIRPLANE to an OWNER and includes the purchase date [Pdate]. Each relationship instance in MAINTAIN relates an EMPLOYEE to a service record [SERVICE]. Each plane undergoes service many times; hence, it is related by [PLANE_SERVICE] to a number of SERVICE records. A SERVICE record includes as attributes the date of maintenance [Date], the number of hours spent on the work [Hours], and the type of work done [Work_code].
   (HINT: Carefully choose entity type, also provide reason of your choice.)

3. An OWNER is either a person or a corporation. (HINT: Carefully choose category [OWNER]). Both pilots [PILOT] and employees [EMPLOYEE] are subclasses of PERSON. Each PILOT has specific attributes license number [Lic_num] and restrictions [Restr]; each EMPLOYEE has specific attributes salary [Salary] and shift worked [Shift]. All PERSON entities in the database have data kept on their Social Security number [Ssn], name [Name], address

[Address], and telephone number [Phone]. For CORPORATION entities, the data kept includes name [Name], address [Address], and telephone number [Phone].

4. The database also keeps track of the types of planes each pilot is authorized to fly [FLIES] and the types of planes each employee can do maintenance work on [WORKS_ON].

Question

1. Draw an Complete ERD diagram for the above-mentioned scenario. Do not forget to underline the keys and to mention the cardinalities. Marks / 10
2. Create all required tables in SQL and then Insert at least 20 dummy data into each table. Marks / 5
3. Write a SQL query to find the registration numbers of airplanes that have never undergone maintenance. Marks / 5
4. Write a SQL query to find the names and addresses of corporations that own airplanes with a capacity greater than 200. Marks / 5
5. Write a SQL query to find the average salary of employees who work the night shift (between 10 PM and 6 AM). Marks / 5
6. Write a SQL query to find the top 5 employees with the highest total number of maintenance hours worked. Marks / 5
7. Write a SQL query to find the names and registration numbers of airplanes that have undergone maintenance in the past week. Marks / 5
8. Write a SQL query to find the names and phone numbers of all owners who have purchased a plane in the past month. Marks / 5
9. Write a SQL query to find the number of airplanes each pilot is authorized to fly. Marks / 5
10. Write a SQL query to find the location and capacity of the hangar with the most available space. Marks / 5
11. Write a SQL query to find the number of planes owned by each corporation, sorted in descending order by number of planes. Marks / 5
12. Write a SQL query to find the average number of maintenance hours per plane, broken down by plane type. Marks / 5
13. Write a SQL query to find the names of owners who have purchased a plane that requires maintenance work from an employee who is not qualified to work on that type of plane. Marks / 5
14. Write a SQL query to find the names and phone numbers of owners who have purchased a plane from a corporation that has a hangar in the same location as the owner. Marks / 10

15. Write a SQL query to find the names of pilots who are qualified to fly a plane that is currently undergoing maintenance. Marks / 5

16. Write a SQL query to find the names of employees who have worked on planes owned by a particular corporation, sorted by the total number of maintenance hours worked. Marks / 5

17. Write a SQL query to find the names and registration numbers of airplanes that have never been owned by a corporation or undergone maintenance work from an employee who works the day shift. Marks / 5

18. Write a SQL query to find the names and addresses of owners who have purchased a plane from a corporation that has also purchased a plane of the same type in the past month. Marks / 5

19. Write a Query to find the total number of planes stored in each hangar. Marks / 5

20. Write a Query to find the total number of planes of each plane type. Marks / 5

21. Write a Query to find the total number of services performed on each plane. Marks / 5

22. Write a Query to find the average salary of employees in each shift. Marks / 5

23. Write a Query to find the total number of planes each owner owns. Marks / 5

24. Write a Query to find the number of planes each pilot is authorized to fly. Marks / 5

25. Write 4 Queries Other than this and write their Importance in the Comments why do you think they are important and where can they be used. Marks /10

Submission

You will submit your assignment using GitHub. You will provide the link to the assignment GitHub repo. Make sure you have set your repo as private. You will add **musadac** as collaborators. You have to do this as soon as possible to avoid any last minute hassle.
Bonus 10 Marks will be awarded.

If you fail to submit using Github no worries you can zip your File. You must follow the the Folder Structure as below. And Upload it on Google Classroom.

README.md is the Explanation and Implementation of each and every question what challenges you faced and what solution you did to make it correct all in one file. This will act as Report add Images of your result in this file. Also Explain your ERD in this file.

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|_____ GithubUser/i21XXXX_Assignment_2_DB
                    |_____ ERD.png
                    |_____ Q1.sql
                    |_____ Q2.sql
                    |_____ Q3.sql
                    |_____ Q4.sql
                    |_____ Q5.sql
                    |_____ Q6.sql
                    |_____ Q7.sql
                    |_____ Q8.sql
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                    |_____ Q15.sql
                    |_____ Q16.sql
                    |_____ Q17.sql
                    |_____ Q18.sql
                    |_____ Q19.sql
                    |_____ README.md
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Good Luck 😊