**Homework #4**

**CECS 378 – Spring 2021 Cappel**

**Due:** Wednesday, March 10th prior to class (11:59 PM)

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**Homework #4 is focused on database and data center security.**

**There are 5 total questions all worth 20 points each (100 pts total).**

**Chapter 5 – Database and Data Center Security**

1. Define the terms *database*, *database management system*, and *query language*.

* Database: A structured collection of data stored for use by one more applications
* Database management system: Suite of programs for constructing and maintain the database and for offering ad hoc query facilities to multiple user and applications
* Query language: Provides a uniform interface to the database for users and applications

1. List and briefly describe some administrative policies that can be used with a RDBMS.

Centralized administration: A small number of privileged users may grant and revoke access rights

Owner-ship administration: The owner of a table may grant or revoke access rights to the table

Decentralized administration: The owner of a table may grant or revoke authorization rights to other users, allowing them to grant or revoke access rights to the table.

1. What are the disadvantages of database encryption?

Two disadvantages of using database encryption are key management and inflexibility. Authorized users must have decryption key for the data for which they have access. It also leads to inflexibility since it becomes more difficult to perform record searching.

1. The following table provides information on members of a mountain climbing club:

|  |  |  |  |
| --- | --- | --- | --- |
| **Climber-ID** | **Name** | **Skill Level** | **Age** |
| 123 | Edmund | Experienced | 80 |
| 214 | Arnold | Beginner | 25 |
| 313 | Bridget | Experienced | 33 |
| 212 | James | Intermediate | 27 |

The primary key is *Climber-ID*. Explain whether or not each of the following rows can be added to the table. If a row cannot be added, explain why not.

Climber with id 214 cannot be added since he has a primary key that is already in the table.

Climber with blank id cannot be added since he is missing a primary key.

Climber with id 15 can be added since his primary key is not in the table already.

|  |  |  |  |
| --- | --- | --- | --- |
| **Climber-ID** | **Name** | **Skill Level** | **Age** |
| 214 | Abbot | Intermediate | 40 |
|  | John | Experienced | 19 |
| 15 | Jeff | Intermediate | 42 |

1. The following table shows a list of pets and their owners that is used by a veterinarian service.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **P\_Name** | **Type** | **Breed** | **DOB** | **Owner** | **O\_Phone** | **O\_E-mail** |
| Kino | Dog | Poodle | 3/27/07 | M. Downs | 5551236 | md@abc.com |
| Teddy | Cat | Chartreaux | 4/2/08 | M. Downs | 1232343 | md@abc.com |
| Filo | Dog | Poodle | 2/24/02 | R. James | 2343454 | rj@abc.com |
| AJ | Dog | Collie Mix | 11/12/05 | Liz Frier | 3456567 | liz@abc.com |
| Cedro | Cat | Unknown | 12/10/06 | R. James | 7865432 | rj@abc.com |
| Woolley | Cat | Unknown | 10/2/10 | M. Trent | 9870678 | mt@abc.com |
| Buster | Dog | Collie | 4/4/11 | Ronny | 4565433 | ron@abc.com |

1. Describe four problems that are likely to occur when using this table.
   1. Data duplication because of repeated owner’s details
   2. No primary key in the table, difficult to find unique identification of a row
   3. Data is denormalized, updates and inserts are more expensive
   4. More storage is used because of redundancy
2. Break the table into two tables in a way that fixes the four problems.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **P\_Name** | **Type** | **Breed** | **DOB** | **Owner\_ID** |
| Kino | Dog | Poodle | 3/27/07 | 1 |
| Teddy | Cat | Chartreaux | 4/2/08 | 6 |
| Filo | Dog | Poodle | 2/24/02 | 2 |
| AJ | Dog | Collie Mix | 11/12/05 | 3 |
| Cedro | Cat | Unknown | 12/10/06 | 2 |
| Woolley | Cat | Unknown | 10/2/10 | 4 |
| Buster | Dog | Collie | 4/4/11 | 5 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Owner\_ID** | **Owner** | **O\_Phone** | **O\_E-mail** |
| 1 | M. Downs | 5551236 | Md@abc.com |
| 2 | R. James | 2343454 | rj@abc.com |
| 3 | Liz Frier | 3456567 | liz@abc.com |
| 4 | M. Trent | 9870678 | mt@abc.com |
| 5 | Ronny | 4565433 | ron@abc.com |
| 6 | M. Downs | 1232343 | md@abc.com |