1. In your own words, write a short description of Relational Database Management Software (RDBMS). Make sure you cite an example.
   a relational database management software is a type of software specifically designed to create, manage, and allow users to interact with relational databases, which organize data into rows and columns. they collectively form a table where data points are related to each other. a good example of a rdbms is mysql.
2. You have been tasked to install MySQL database software on a Windows 10 PC. List and explain 5 requirements or factors you will consider before installing the software binaries.
   system hardware requirements, this is most important step because i encountered disk space availability issues when attempting to download mysql 5 for the final lab. we need to verify that the computer meets the mysql's minimum hardware specifications. this includes sufficient ram, cpu processing power, and enough disk space. insufficient resources will lead to poor performance or installation failure.
   port availability, because mysql usually runs on port 3306 for network connections. before installing, we should check whether the port is available and not in use for another application/blocked by firewall. if port 3306 is unavailable, we should either free it up or plan to configure mysql to use an alternative port during installation. For example, in setting up two mysql versions for the final lab, i had to configure a new port number for mysql 5.
   operating system compatibility and version, confirm that the windows 10 version is compatible with mysql version we are installing. check to see if, we are running a 32-bit or a 64-bit windows 10.
   user privileges and permissions, we need administrator rights on the windows 10 computer to proper install mysql. the installation process requires permissions to create directories, install services, modify windows registry, and configure system settings. without admin privileges, the installation will fail.
   network configuration, we need to consider whether mysql will be accessed locally only or over a network. this will affect the security settings, firewall configurations, and where we need to configure remote access permissions during installation.
3. What is the similarity and differences between these terms: "delete", "drop" and "truncate".
   similarities, delete, drop, and truncate are used to remove data from a database. they all result in data being deleted, though at different levels with different implications.
   differences, delete is dml, it slowing removes specific rows from a table based on a condition without affecting the table structure one by one. we can roll back if used with a transaction. truncate is ddl, removing all rows from table quickly, keeping the structure intact, but all data is erased. it cannot be rolled back but it is very fast. lastly, drop is ddl. removes the entire table from the database, completely purging the table structure. it is very fast but cannot be rolled back.
4. List 5 data types in MySQL databases.
   INT, standard integer
   CHAR, fixed length nonbinary character string
   TEXT, small nonbinary string
   DATE, date value in ccyy-mm-dd format
   TIME, time value in hh:mm:ss format
5. Write a command to create a table in MySQL. The table must have at least 3 columns and the first column must have auto increment and primary key.

```
CREATE TABLE
  patient (
    ssn INT AUTO_INCREMENT PRIMARY KEY,
    last_name VARCHAR(50),
    NOT NULL,
    first_name VARCHAR(50),
    NOT NULL,
    date_of_birth DATE
  );
```

6. Database security is a very important topic to DBAs and software developers. Describe 4 ways you can secure your MySQL database.
   physical security, whether our database server is on-premises or in a cloud data center, it must be located within a secure, climate-controlled environment.
   administrative access controls, not every user should have access to the entire database. their permissions should be restricted to the minimum levels necessary for them to do their jobs.
   encryption, all data, including data in the database and credential data, should be protected with best-in-class encryption while at rest and in transit.
   backup security, all backups, copies or images of the database must be subject to the same security controls as the database itself.
7. Describe the concept of High Availability in database architecture.
   high availability means keeping a database running all the time with little or no downtime. it makes sure users can access their data whenever they need it by quickly fixing problems and handling maintenance without stopping the service. for example, if one server crashes, another backup server automatically takes over so users don't notice any interruption.
8. Write a command to display a list of all the tables in a MySQL database server. Sort the results by the name of the database.

```
SELECT
   tabe_schema AS database_name,
   table_name
FROM
   information_schema.tables
WHERE
   table_type = 'BASE TABLE'

 ORDER BY
   tabe_schema,
   table_name;
```

9. What is data protection and what strategy can you deploy to protect data in a MySQL database server?
   data protection is a set of measures to keep sensitive information safe from loss and corruption while making sure it stays readily available. for example, in mysql you can create regular backups of your database and encrypt passwords so if hackers break in, they can't read the stolen data.