Week 1 -Practice Quiz-Basic SQL

1.Which of the following statements are correct about **databases**?

- A database is a repository of data
- There are different types of databases - Relational, Hierarchical, No SQL, etc.
- A database can be populated with data and be queried
- **All of the above**

2.True or False: A SELECT statement is used to retrieve data from a table.

- **True**
- False

3. You are working on a Film database, with a FilmLocations table. You want to retrieve a list of films that were released in 2019.You run the following query but find that all the films in the FilmLocations table are listed. `SELECT Title,ReleaseYear, Locations FROMFilmLocations;`

What is missing?

- **A WHERE clause to limit the results to films released in 2019.**
- A LIMIT clause to limit the results to films released in 2019.
- Nothing, the query is correct.
- A DINSTINCT clause to specify a distinct year.

→ The query needs a WHERE clause like WHERE ReleaseYear=2019

4.Which of the following statements would you use to add a new instructor to the Instructor table.

- ```
  INSERT INTO Instructor(ins_id, lastname, firstname, city, country)
  VALUES(4, 'Doe', 'John', 'Sydney', 'AU');
  ```
- ```
  ADD INTO Instructor(ins_id, lastname, firstname, city, country)
  VALUES(4, 'Doe', 'John', 'Sydney', 'AU');
  ```
- ```
  SELECT Instructor(ins_id, lastname, firstname, city, country)
  FROM VALUES(4, 'Doe', 'John', 'Sydney', 'AU');
  ```
- ```
  UPDATE Instructor(ins_id, lastname, firstname, city, country)
  WITH VALUES(4, 'Doe', 'John', 'Sydney', 'AU');
  ```

→ The **INSERT INTO** statement is used to add rows to a table.

5. What is the function of a WHERE clause in an UPDATE statement?

- **A WHERE clause enables you to specify which rows will be updated**
- A WHERE clause is never used with an UPDATE statement.
- A WHERE clause enables you to list the column and data to be updated.
- A WHERE clause enables you to specify a new table to receive the updates.

→ A WHERE clause is used to restrict the rows in the result set.

→ If you run a UPDATE statement without a WHERE clause, you will update all the rows in the table.

Week 1- Graded Quiz: Basic SQL

1. True or False: The INSERT statement can be used to insert multiple rows in a single statement.

- **True**
- False

→ A single INSERT statement can be used to insert can be used to insert **one or multiple rows in a table**

2.Assume there exists an INSTRUCTOR table with several columns including FIRSTNAME, LASTNAME, etc. Which of the following is the most likely result set for the following query: `SELECT DISTINCT(FIRSTNAME) FROM INSTRUCTOR`

- LEON
  LEON
  PAUL
  PAUL
- **LEON**
  PAUL
  JOE
- LEON
  PAUL
  LEON
  JOE
- LEON KATSNELSON
  PAUL ZIKOPOLOUS
  JOE SANTARCANGELO

3.What does the following SQL statement do? `UPDATE INSTRUCTOR SET LASTNAME = 'Brewster' WHERE LASTNAME = 'Smith'`

- **Changes all rows for the instructor with a last name of Smith to have a last name of Brewster.**
- Change the row for the instructor with a last name of Brewster to have a last name of Smith.
- Change all rows in the table to have a last name of Smith.
- Change all rows in the table to have a last name of Brewster.

Quiz-Course 6. IBM Databases and SQL for Data Science with Python (Coursera)

Week 2 -Practice Quiz- Introduction to Relational Databases and Tables

1.What is the function of a **primary key**?

- The primary key is used to identify any rows in the table that contain NULL values.
- The primary key is used to grant access to a table.
- **The primary key uniquely identifies each row in a table**.
- The primary key enables you to add data to columns.

2. Data Manipulation Language (DML) statements like INSERT, SELECT, UPDATE, and DELETE are used to read and modify data.

- **True**
- False

3.Data Definition Language (DDL) statements are used to define, change, or delete database objects such as tables. Which statements are all DDL statements?

- SELECT and DELETE
- INSERT and UPDATE
- SELECT, INSERT, UPDATE
- **CREATE, ALTER, DROP**

→ DDL statements: CREATE, ALTER, TRUNCATE, DROP

4.Which of the following queries will change the data type of an existing column (phone) to the varchar data type?

- `ALTER COLUMN phone SET DATA TYPE VARCHAR(20);`
- `ALTER TABLE author ALTER COLUMN phone DATA TYPE = VARCHAR(20);`
- **`ALTER TABLE author ALTER COLUMN phone SET DATA TYPE VARCHAR(20);`**
- `ALTER TABLE author ALTER COLUMN phone SET TYPE VARCHAR(20);`

```
CREATE TABLE employee (
    employee_id INT PRIMARY KEY,
    age INT,
    salary DECIMAL (10,2),
    last_name VARCHAR(50),
    employee_code CHAR(8),
    job_description TEXT,
    hire_date TIMESTAMP,
    appointment_date DATE,
    appointment_time TIME
);
```

Different Data Types:

→ **INT**: Integer
→ **DECIMAL**: Decimal (10, 2) a decimal number up to 10 digits in total, where 2 digits for the decimal part.
→ **VARCHAR** (Variable-Length Character): is a character (string): VARCHAR(50): max length of 50 characters.
→ **CHAR** (Fixed-Length Character): is a character (string): CHAR(8), always occupies 8 characters
→ **TEXT**: is used for longer text or character data
→ **TIMESTAMP**: 2023-01-20 10:30:00
→ **DATE:** 2023-01-20
→ **TIME:** 10:30

5.The five basic SQL commands are:

- **CREATE, SELECT, INSERT, UPDATE, DELETE**
- SELECT, COPY, PASTE, INSERT, ALTER
- CREATE, INSERT, RETRIEVE, MODIFY, DELETE
- None of the above

Week 2 Graded Quiz: Relational DB Concepts and Tables

1.Which of the following statements about a database is/are correct?

- **A database is a logically coherent collection of data with some inherent meaning**
- Data can only be added and queried from a database, but not modified.
- Only SQL can be used to query data in a database.
- All of the above

→ A database is a repository or logically coherent collection of data with some inherent meaning

2.Attributes of an entity become _____ in a table.

- rows
- **columns**
- constraints
- keys

3.The CREATE TABLE statement is a....

- DML statement
- **DDL statement**
- Both of the above

→ The CREATE TABLE statement defines a table, so it is a DDL statement.

Week 3 – Practice Quiz: Refining Your Results

1.You want to retrieve a list of employees in alphabetical order of Lastname from the Employees table. Which SQL statement should you use?

- `SELECT * FROM Employees SORT BY Lastname;`
- **`SELECT * FROM Employees ORDER BY Lastname;`**
- `SELECT * FROM Employees GROUP BY Lastname;`
- `SELECT * FROM Employees ORDER BY Lastname DESC;`

2.Which keyword is used to set a condition for a GROUP BY clause?

- SELECT
- WHERE
- ORDER BY
- **HAVING**

➔
```
SELECT department, COUNT(*) AS employee_count
FROM employees
GROUP BY department
HAVING COUNT(*) > 5;

SELECT customer_id, SUM(total_amount) AS total_order_amount
FROM orders
GROUP BY customer_id
HAVING SUM(total_amount) > 1000;
```

3. You want to retrieve a list of authors from Australia, Canada, and India from the table Authors. Which SQL statement is correct?

- **SELECT * FROM Author WHERE Country IN ('Australia', 'Canada', 'India');**
- SELECT * FROM Author IF Country ('Australia', 'Canada', 'India');
- SELECT * FROM Author WHERE Country BETWEEN('Australia', 'Canada', 'India');
- SELECT * FROM Author WHERE Country LIST ('CA', 'IN');

4. You want to retrieve a list of books priced above $10 and below $25 from the table Book. What are the **two ways** you can specify the range?

- **SELECT Title, Price FROM Book WHERE Price BETWEEN 10 and 25;**
- SELECT Title, Price FROM Book WHERE Price IN (10, 25);
- **SELECT Title, Price FROM Book WHERE Price >= 10 and Price <= 25;**
- SELECT Title, Price FROM Book WHERE Price 10 to 25;

5.You want to retrieve Salary information for an employee called Ed from the Employee table. You write the following statement:

```
SELECT Firstname, Lastname, Salary FROM Employees
```

You see all the employees listed, and it's hard to find Ed's information. Which clause should you add to reduce the number of rows returned?

- WHERE Employees = 'Ed';
- GROUP BY Firstname = 'Ed';
- **WHERE Firstname = 'Ed';**
- ORDER BY Firstname;

Week 3 – Graded Quiz: Refining Your Results

1. You want to select author's last name from a table, but you only remember the author's last name starts with the letter B, which string pattern can you use?

- SELECT lastname from author where lastname like 'B#'
- **SELECT lastname from author where lastname like 'B%'**
- SELECT lastname from author where lastname like 'B$'
- None of the above

→ You can use the % sign as a **wildcard** to indicate zero or more missing characters. Wildcard character (%) as a substitute for unknown characters in a pattern

2. In a SELECT statement, which SQL clause controls how the result set is displayed?

- **ORDER BY clause**
- ORDER IN clause
- ORDER WITH clause

→ You use the ORDER BY clause to control the order of rows in the result set.

3.Which of the following can be used in a SELECT statement to restrict a result set?

- HAVING
- WHERE
- DISTINCT
- **All of the above**

Week 3 – Practice Quiz: FUNCTIONS and Multiple Tables and Subqueries

1. Which of the following statements about built-in database functions is correct?

- **Built-in database functions reduce the amount of data that is retrieved**.
- Built-in database functions may increase network bandwidth consumed.
- Built-in database functions must be called from a programming language like Python.
- Built-in database functions may increase processing time.

➔ Built-in database functions process within the database itself, so the **amount of data that is retrieved to the client machine is significantly reduced**.

➔ Built-in database functions can **reduce network traffic and use of bandwidth** and speed up data processing

➔ When working with large data sets, it may be faster to use built in functions, **rather than** first retrieving the data into your application and then executing functions on the retrieved data

Quiz-Course 6. IBM Databases and SQL for Data Science with Python (Coursera)

2. Which of the following SQL queries would return the day of the week each dog was rescued?

- `SELECT DAYOFWEEK(RescueDate) From PetRescue;`
- `SELECT RescueDate From PetRescue WHERE Animal = 'Dog';`
- **`SELECT DAYOFWEEK(RescueDate) From PetRescue WHERE Animal = 'Dog';`**
- `SELECT DAY(RescueDate) From PetRescue WHERE Animal = 'Dog';`

➔ The `DAYOFWEEK() function` returns the day of the week, and the WHERE clause correctly specifies the animal as a dog.

3. What is the result of the following query: `SELECT (Current_Date – RescueDate) FROM PetRescue`

- Returns the rescue date for each rescue.
- Returns the current date and rescue date columns.
- Returns today's date.
- **Returns how long it has been since each rescue.**

4. Which of the following queries will return the employees who earn less than the average salary?

- `SELECT AVG(Salary) FROM Employees WHERE Salary < AVG(Salary)`
- **`SELECT * FROM Employees WHERE Salary < (SELECT AVG(Salary) FROM Employees);`**
- `SELECT * FROM Employees WHERE Salary < (SELECT AVG(Salary))`
- `SELECT * FROM Employees WHERE Salary < AVG(Salary)`

➔ The `AVG(Salary)` function must be included in a **sub-query** within the WHERE clause.

5. What are the three ways to work with multiple tables in the same query?

- Sub-queries, Implicit joins, normalization.
- Sub-queries, APPEND, JOIN operators
- **Sub-queries, Implicit joins, JOIN operators**
- Built-in functions, implicit joins, JOIN operators

➔ You can retrieve information from more than one table by using a sub-query, an implicit join, or a JOIN operator like INNER JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, or FULL OUTER JOIN.

Week 3 – Graded Quiz: FUNCTIONS and Multiple Tables and Subqueries

1. Which of the following queries will return the data for employees who belong to the department with the highest value of department ID.

- `SELECT * FROM EMPLOYEES WHERE DEP_ID = MAX(DEP_ID)`
- `SELECT * FROM EMPLOYEES WHERE DEPT_ID_DEP = MAX (SELECT DEPT_ID_DEP FROM DEPARTMENTS)`
- **`SELECT * FROM EMPLOYEES WHERE DEP_ID = (SELECT MAX(DEPT_ID_DEP) FROM DEPARTMENTS)`**
- `SELECT * FROM EMPLOYEES WHERE DEP_ID = (SELECT DEPT_ID_DEP FROM DEPARTMENTS WHERE DEPT_ID_DEP IS MAX)`

2. A DEPARTMENTS table contains DEP_NAME, and DEPT_ID_DEP columns and an EMPLOYEES table contains columns called F_NAME and DEP_ID. We want to retrieve the Department Name for each Employee. Which of the following queries will correctly accomplish this?

- `SELECT D.F_NAME, E.DEP_NAME FROM EMPLOYEES E, DEPARTMENTS D WHERE DEPT_ID_DEP = DEP_ID`
- `SELECT E.F_NAME, D.DEP_NAME FROM EMPLOYEES, DEPARTMENTS`
- `SELECT F_NAME, DEP_NAME FROM EMPLOYEES E, DEPARTMENTS D WHERE E.DEPT_ID_DEP = D.DEP_ID`
- **`SELECT F_NAME, DEP_NAME FROM EMPLOYEES, DEPARTMENTS WHERE DEPT_ID_DEP = DEP_ID`**

3. You are writing a query that will give you the total cost to the Pet Rescue organization of rescuing animals. The cost of each rescue is stored in the Cost column. You want the result column to be called "Total_Cost". Which of the following SQL queries is correct?

- `SELECT SUM(Cost) FROM PetRescue`
- **`SELECT SUM(Cost) AS Total_Cost FROM PetRescue`**
- `SELECT SUM(Total_Cost) From PetRescue`
- `SELECT Total_Cost FROM PetRescue`

Week 4- Practice Quiz- Accessing Databases Using Python

1.Which API do you use to connect to a database from Python?

- Census API
- Watson API
- **DB API**
- REST API

→ DB API (Database API) will enable you to connect to a database from Python to access and manipulate data

2.Which of the following functions would you use to query data from a table in SQLite using Python?

- `sqlite.query()`
- `sqlite.cursor()`
- `sqlite.connect()`
- **`sqlite.execute()`**

→ The function `sqlite.execute()` is used to execute SQL queries and statements in SQLite from Python.

→ To query data from a table in SQLite using Python:

1. **`sqlite.connect()`**: This method is used to establish a connection to the SQLite database.
2. **`sqlite.cursor()`**: Then you create a cursor object. This runs queries and fetch results from the database.
3. **`sqlite.execute()`**: Then use this method to execute SQL statements like SELECT, INSERT, UPDATE, DELETE,etc

3. Resources used by the DB API are released automatically when the program ends. There is no need to specifically close the connection.

- **False**
- True

4. Which of the following is the correct order for accessing relational databases using Python?

- create, execute Python statements, connect, close connection.
- create statements, connect.
- create and execute SQL statements, connect, close connection.
- **connect, create and execute SQL statements, close connection.**

5.Line magics: start with a single % (percent) sign and apply to a particular line in a cell.

- **True.**
- False

→ **Line magics**: % and **Cell magics**: %%

Week 4- Graded Quiz- Accessing Databases Using Python

1. Cell magics: start with a double %% sign and apply to the entire cell.

- **True**

2. A Dataframe represents a tabular, spreadsheet-like data structure containing an ordered collection of columns, each of which can be a different value type.
A pandas dataframe in Python can be used for storing the result set of a SQL query.

- **True**

3. Which of the following statement(s) about Python is **NOT correct** (i.e. False)?

- The Python ecosystem is very rich and provides easy to use tools for data science.
- **Due to its proprietary nature, database access from Python is not available for many databases**.
- There are libraries and APIs available to access many of the popular databases from Python.
- Python is a popular scripting language for connecting and accessing databases.

Week 5 - Final Exam

1. The _____ statement is called a query, and the output we get from executing the query is called a result set.

- **SELECT**
- DROP DATABASE
- ALTER
- CREATE TABLE

2.Which of the following SQL statements will delete the students with the last name Smith?

- `DELETE 'Smith' FROM STUDENTS`
- **`DELETE FROM STUDENTS WHERE LAST_NAME = 'Smith'`**
- `DELETE FROM TEACHERS WHERE LAST_NAME = 'Smith'`
- `DELETE FROM STUDENTS WHERE LAST_NAME FROM 'Smith'`

3.The primary key of a relational table uniquely identifies each _____ in a table.

- attribute
- **row**
- relation
- column

4.Data Definition Language (DDL) and Data Manipulation Language (DML) are what?

- The basic categories for providing security to databases.
- **The basic categories of the SQL language based on functionality.**
- The basic categories for managing data.
- The basic categories of the PYTHON language based on functionality.

5.When querying a table called Author that contains a list of authors and their country of residence, which of the following will return N of authors from each country?

- `SELECT Country, distinct(Country) FROM Author GROUP BY Country`
- `SELECT Distinct(Country) FROM Author`
- `SELECT Country, count(Country) FROM Author`
- **`SELECT Country, count(Country) FROM Author GROUP BY Country`**

6. You want to retrieve a list of books that have between 450 and 600 pages. Which clause would you add to the following SQL statement:
`SELECT Title, Pages FROM Book _____`

- `WHERE Pages = 450`
- `WHERE Pages 450 - 600`
- **`WHERE Pages >= 450 and pages <= 600`**
- `IF Pages >= 450 and Pages <= 600`

7.Which of the following queries will retrieve the HIGHEST value of PRICE in a table called PRODUCTS?

- SELECT MIN(PRICE) FROM PRODUCTS
- SELECT HIGHEST(PRICE) FROM PRODUCTS
- **SELECT MAX(PRICE) FROM PRODUCTS**
- SELECT MOST(PRICE) FROM PRODUCTS

8.Which of the following queries will retrieve the last name of the employee who earns the lowest salary?

- `SELECT MIN(SALARY) FROM EMPLOYEES`
- `SELECT LAST_NAME, MIN(SALARY) FROM EMPLOYEES GROUP BY F_NAME`
- **`SELECT LAST_NAME FROM EMPLOYEES WHERE SALARY = (SELECT MIN(SALARY) FROM EMPLOYEES)`**
- `SELECT FIRST_NAME FROM EMPLOYEES WHERE SALARY IS LOWEST`

9.A **database cursor** is a _____ that enables traversal over the records in a database.

- Control variant
- Control object
- **Control structure**
- Control statement

10. Cell magics: start with a double %% sign and apply to the entire cell. (T/F)

- **True**
- False