1. Database:
   1. Collection of data stored in a computer system
   2. Allows user to enter, access, update, analyze, data quickly
   3. Think of a database as a collection of lists
   4. You can have many people working on same database at the same time
2. Four Types: tables, queries, forms, reports
   1. Tables:
      1. where data is stored
      2. linked together with primary keys and foreign keys
         1. because tables are linked -> relational databases
   2. Queries:
      1. retrieves the data and displays data you specify
      2. Allows you to ask ques about data in your tables
   3. Forms:
      1. Used to enter new records/ edit or delete records
   4. Reports:
      1. Summarize the fields in an easy to read format for managers
3. Tables:
   1. Fields are the types (column)
   2. Records are the rows
   3. Each row must have a unique identifier, primary key to differentiate
      1. Primary key must be unique

SQL: stands for Structured Query Language

1. What is it:
   1. SQL stands for Structured Query Language
   2. SQL lets you access and manipulate databases
   3. SQL became a standard of the American National Standards Institute (ANSI) in 1986, and of the International Organization for Standardization (ISO) in 1987
2. What can it do:
   1. SQL can execute queries against a database
   2. SQL can retrieve data from a database
   3. SQL can insert records in a database
   4. SQL can update records in a database
   5. SQL can delete records from a database
   6. SQL can create new databases
   7. SQL can create new tables in a database
   8. SQL can create stored procedures in a database
   9. SQL can create views in a database
   10. SQL can set permissions on tables, procedures, and views
3. Important SQL Commands:
   1. **SELECT** - extracts data from a database
   2. **UPDATE** - updates data in a database
   3. **DELETE** - deletes data from a database
   4. **INSERT INTO** - inserts new data into a database
   5. **CREATE DATABASE** - creates a new database
   6. **ALTER DATABASE** - modifies a database
   7. **CREATE TABLE** - creates a new table
   8. **ALTER TABLE** - modifies a table
   9. **DROP TABLE** - deletes a table
   10. **CREATE INDEX** - creates an index (search key)
   11. **DROP INDEX** - deletes an index
4. SELECT:
   1. Used to select data from database
   2. Data returned is stored in a result table, called a result-set
      1. |ex| - SELECT FirstName, LastName FROM Table;
      2. We can use “ \* ” to select all fields (asterisk)
5. SELECT DISTINCT:
   1. Used to return only distinct, unique values. Columns may contain duplicates and you may want distinct values
6. WHERE clause:
   1. Used to filter records and to extract only those records that fulfill a specific condition
   2. |ex| - SELECT \* FROM Customers  
       WHERE CustomerID=1;
7. AND, OR, NOT Operators (can be combined with the WHERE clause)
   1. The AND operator displays a record if all the conditions separated by AND is TRUE.
   2. The OR operator displays a record if any of the conditions separated by OR is TRUE.
   3. The NOT operator displays a record if the condition(s) is NOT TRUE.
   4. BASICALLY like in other languages
8. ORDER BY keyword:
   1. Used to sort the result-set in ascending or descending order
   2. It is defaulted to ascending but to use descending order, use the DESC keyword
   3. |ex|- SELECT \* FROM Customers  
       ORDER BY Country DESC;
9. INSERT INTO statement:
   1. Used to insert new records in a table
   2. Two ways to insert, the first specifies both the column names and the values to be inserted
   3. The second you are inserting into all columns so specifying the columns is not needed
10. NULL values
    1. A field with null value has no value
       1. If field left empty
    2. Use IS NULL and IS NOT NULL to test for the values
11. UPDATE Statement
    1. Used to update existing records in a table
    2. Format:
       1. UPDATE table\_name  
          SET column1 = value1, column2 = value2, ...  
          WHERE condition;
    3. The where clause is important since if omitted all records will be updated
12. DELETE statement
    1. Where clause is important or all records will be deleted
    2. Format:
       1. DELETE FROM table\_name  
          WHERE condition;
13. TOP, LIMIT, ROWNUM clause
    1. SELECT TOP clause
       1. used to specify the number of records to return. The SELECT TOP clause is useful on large tables with thousands of records. Returning a large number of records can impact on performance.
    2. NOTE: not all database systems support SELECT TOP but mySQL has LIMIT and Oracle uses ROWNUM
14. MIN( ) and MAX( )
    1. MIN( ) returns the smallest value of the selected column
    2. MAX( ) returns the largest value of the selected column
    3. |ex| -
       1. SELECT MIN(column\_name)  
          FROM table\_name  
          WHERE condition;
15. COUNT( ), AVG( ) and SUM( )
    1. The COUNT() function returns the number of rows that matches a specified criteria.
    2. The AVG() function returns the average value of a numeric column.
    3. The SUM() function returns the total sum of a numeric column.
    4. |EX|- (same format)
       1. SELECT COUNT(column\_name)  
          FROM table\_name  
          WHERE condition;
16. LIKE operator
    1. Used with a WHERE clause to search for patterns in a column
       1. Two wildcards used :
          1. % (percent) - represents a zero, one, or multiple characters
          2. \_ (underscore)- represents a single character
             1. MS Access uses a “ ? “ instead of underscore
    2. |ex| -
       1. WHERE CustomerName LIKE 'a%' Finds any values that start with "a"
       2. WHERE CustomerName LIKE '%a' Finds any values that end with "a"
       3. WHERE CustomerName LIKE '%or%' Finds any values that have "or" in any position
       4. WHERE CustomerName LIKE '\_r%' Finds any values that have "r" in the second position
       5. WHERE CustomerName LIKE 'a\_%\_%' Finds any values that start with "a" and are at least 3 characters in length
       6. WHERE ContactName LIKE 'a%o' Finds any values that start with "a" and ends with "o"
17. IN operator
    1. Allows you to specify multiple values in a WHERE clause
    2. |Ex| -
       1. SELECT \* FROM Customers  
          WHERE Country IN ('Germany', 'France', 'UK');
18. BETWEEN operator
    1. The BETWEEN operator selects values within a given range. The values can be numbers, text, or dates.The BETWEEN operator is inclusive: begin and end values are included.
    2. |EX|-
       1. SELECT column\_name(s)  
          FROM table\_name  
          WHERE column\_name BETWEEN value1 AND value2;
19. Aliases
    1. SQL aliases are used to give a table or column in a table a temporary name
    2. Used for readability
    3. Exists for only the duration of the query
    4. |ex|-
       1. SELECT CustomerID as ID, CustomerName AS Customer  
          FROM Customers;
    5. The following SQL statement creates two aliases, one for the CustomerName column and one for the ContactName column.
    6. **Note:** It requires double quotation marks or square brackets if the alias name contains spaces
20. JOIN
    1. **(INNER) JOIN**: Returns records that have matching values in both tables
    2. **LEFT (OUTER) JOIN**: Return all records from the left table, and the matched records from the right table
    3. **RIGHT (OUTER) JOIN**: Return all records from the right table, and the matched records from the left table
    4. **FULL (OUTER) JOIN**: Return all records when there is a match in either left or right table