**Basics of SQL**

**Topics to be explored**

1. Default port number for commonly used databases
2. Understand basic DDL, DML and DCL operations
3. Constraints
   1. NOT NULL
   2. UNIQUE
   3. PRIMARY KEY
   4. FOREIGN KEY
   5. CHECK
   6. DEFAULT
4. Table relationships
   1. Primary key
   2. Foreign Key
   3. Cascading Referential Integrity
5. Identity Columns (Auto Increment)
   1. Identity Column in SQL
   2. Reset identity column value
   3. Retrieving identity column value
6. Select Statement
   1. Extract specific fields
   2. Extract records based on certain filter condition
   3. Wildcards in SELECT
   4. Select top n records
   5. Select top n percentage of records
7. SELECT INTO
8. GROUP BY
9. Join
   1. Inner Join
   2. Left Join
   3. Right Join
   4. Outer Join
   5. Self Join
   6. Cross Join
10. Operators
    1. UNION
    2. UNION ALL
    3. INTERSECT
    4. EXCEPT
11. Replace null in SQL Server
12. Stored Procedures
    1. Create stored procedure
    2. Alter stored procedure
    3. Execute stored procedure
    4. View definition of stored procedure
    5. Drop stored procedure
13. Functions
    1. Deterministic function
    2. Non-deterministic function
14. String functions
    1. ASCII
    2. CHAR
    3. LTRIM
    4. RTRIM
    5. LOWER
    6. UPPER
    7. REVERSE
    8. LEN
    9. LEFT
    10. RIGHT
    11. SUBSTRING
    12. CHARINDEX
    13. PATINDEX
    14. REPLICATE
    15. SPACE
    16. REPLACE
    17. STUFF
15. Datetime Functions
    1. DAY
    2. MONTH
    3. YEAR
    4. DATENAME
    5. DATEPART
    6. DATEADD
    7. DATEDIFF
16. Mathematical functions
    1. ABS
    2. CEILING
    3. POWER
    4. SQUARE
    5. SQRT
    6. FLOOR
    7. RAND
    8. ROUND
17. CAST in SQL
18. Temporary Tables
    1. Types of temporary table
    2. Local temporary table
    3. Global temporary table
19. Index
    1. Create index
    2. Types of index
    3. Clustered and Non clustered index
    4. Unique and Non unique index
    5. Advantages of index
    6. Disadvantages of Index
20. View
21. Triggers
    1. DDL Triggers
    2. DML Triggers
    3. Magic tables in trigger
22. Derived table
23. CTE (Common Table Expression)
24. Subqueries
    1. Corelated subquery
    2. Non-corelated subquery
25. Merge
26. Window functions
    1. Aggregate functions – AVG, SUM, COUNT, MIN, MAX
    2. Ranking functions – ROW\_NUMBER, RANK, DENSE\_RANK
    3. Analytic functions – LEAD, LAG, FIRST\_VALUE, LAST\_VALUE
27. Transaction
    1. ACID Property
    2. Commit, Rollback
28. Database Normalization
    1. 1 NF
    2. 2 NF
    3. 3 NF

**Questions**

1. Perform Various CRUD Operation using DDL and DML Operations
2. String, Numeric and Date Functions
   1. Show Case different String, Date and Number Functions
   2. Show different formats (at least 3) of Date Time and conversions between them
      1. Examples
      2. Datetime format as **MM/DD/YY**
      3. Datetime format in **YY.MM.DD** format etc
3. Understand and Illustrate Difference between
   1. Stored Procedure vs function
   2. Clustered vs non clustered index
   3. Delete vs truncate vs drop
   4. Where vs having
   5. Primary key vs unique key
   6. Local temporary table vs global temporary table
   7. Union vs union all
   8. Join vs union
   9. Count(1) vs count(\*) vs count(col\_name)
   10. rank, row\_number vs dense\_rank
4. Find min, max, avg and sum of salary for each department

|  |  |  |
| --- | --- | --- |
| EmployeeName | Department | Salary |

Expected result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Department | Min\_Salary | Max\_Salary | Avg\_Salary | Sum\_Salary |

1. Find all employees having duplicate entries in following table

|  |  |
| --- | --- |
| Name | Salary |
| A | 24000 |
| B | 20000 |
| C | 34000 |
| D | 90000 |
| E | 45000 |
| F | 60000 |
| G | 87000 |
| A | 24000 |
| D | 90000 |

1. Write a query to identify and delete duplicate records from following table

|  |  |
| --- | --- |
| Name | Salary |
| A | 24000 |
| B | 20000 |
| C | 34000 |
| D | 90000 |
| E | 45000 |
| F | 60000 |
| G | 87000 |
| A | 24000 |
| D | 90000 |

1. Find nth highest salary employee in each department

|  |  |  |
| --- | --- | --- |
| EmployeeName | Department | Salary |

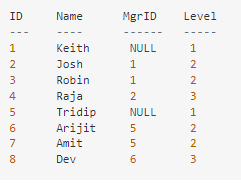
1. Find employees with salary more than their managers salary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EmployeeId | Name | Department | Salary | ManagerId |

1. Update a table and swap gender values

Gender Male should be updated to Female and Gender female should be updated to male

1. Write a SQL query to generate level of hierarchy



1. Write a stored procedure to generate records by gender being passed as parameter
2. Write a trigger that gets fired each time insertion and deletion is made in employee table and corresponding inserted/deleted record is dumped into audit table with operation field as INSERTED/DELETED