CS 262-L	**Database Systems**
Spring 2023	**Due:** Week 3

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Lab 3 - Queries On Northwind Schema And Solutions With Output

1. **Create a new table Student which have the following schema Student(RegNo: String, FirstName: String, LastName: String, GPA: Float, Contact: Integer).**

```
CREATE TABLE student(
RegNo VARCHAR 100,
FirstName VARCHAR 100,
LastName VARCHAR 100,
GPA FLOAT, Contact INT);
```

	RegNo	FirstName	LastName	GPA	Contact
1	2021-CS-1	Hashir	Husnain	4	324
2	2021-CS-2	Shahzaib	Rafi	NULL	753
3	2021-CS-3	Shakeel	uni	NULL	951
4	2021-CS-7	Shahzaib	Irfan	3.63	852
5	2021-CS-9	Ayesha	Nadeem	3.45	456
6	2021-CS-6	Mahnoor	Fatima	3.55	125
7	2021-CS-12	Afraz	Butt	3.65	123
8	2021-CS-41	Muhammad	Hamza	3.11	615
9	2021-CS-21	Fakham	Chaudhry	NULL	NULL
10	2021-CS-42	Vishma	Khurram	NULL	522
11	2021-CS-43	Mahnoor	Ejaz	3.3	NULL

Figure 1: *A query that generates a table with the above mentioned schema.*

2. **Add at least 5 records of your own class in which one or two students have GPA undefined.**
   Added through GUI Interface. INSERT Query can be written too in this case. For figure, see above.

3. **Display all the data from the table Student.**
   `SELECT *`

FROM student

	RegNo	FirstName	LastName	GPA	Contact
1	2021-CS-1	Hashir	Husnain	4	324
2	2021-CS-2	Shahzaib	Rafi	NULL	753
3	2021-CS-3	Shakeel	uni	NULL	951
4	2021-CS-7	Shahzaib	Irfan	3.63	852
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11	2021-CS-43	Mahnoor	Ejaz	3.3	NULL

Figure 2: *A query that fetches all data from the table student.*

4. **Display specific columns form the table Student.**
   SELECT FirstName
   FROM student

	FirstName
1	Hashir
2	Shahzaib
3	Shakeel
4	Shahzaib
5	Ayesha
6	Mahnoor
7	Afraz
8	Muhammad
9	Fakham
10	Vishma
11	Mahnoor

Figure 3: *A query that fetches specific columns from the table student.*

5. **Display all the data of students where GPA > 3.5 OR Display all the data of students where GPA <= 3.5**.
   Both queries are functionally the same. Only the operator changes in line 3. The GPA values having values NULL (see *figure 1*) are also covered in the query output.
   SELECT *
   FROM student
   WHERE GPA <= 3.5;

	RegNo	FirstName	LastName	GPA	Contact
1	2021-CS-9	Ayesha	Nadeem	3.45	456
2	2021-CS-41	Muhammad	Hamza	3.11	615
3	2021-CS-43	Mahnoor	Ejaz	3.3	NULL

Figure 4: *A query that outputs all values of GPA* $\leq 3.50 covering NULL too.$

6. **Does the above 2 queries covers all the data?**
   No they don't. It is because as above, NULL values are NOT counted as *definite* values. And so, all data is not covered in the above queries. Let us consider this statement in query form and then see its output.
   `SELECT` *
   `FROM` student
   `WHERE` GPA > 3.5 OR GPA <= 3.5;

	RegNo	FirstName	LastName	GPA	Contact
1	2021-CS-1	Hashir	Husnain	4	324
2	2021-CS-7	Shahzaib	Irfan	3.63	852
3	2021-CS-9	Ayesha	Nadeem	3.45	456
4	2021-CS-6	Mahnoor	Fatima	3.55	125
5	2021-CS-12	Afraz	Butt	3.65	123
6	2021-CS-41	Muhammad	Hamza	3.11	615
7	2021-CS-43	Mahnoor	Ejaz	3.3	NULL

Figure 5: *A query output showing NULL GPA values are not covered in a query containing non-null conditions.*

7. **Display first and last name of all students as single column using concatenation operator "||".**
   The concatenation operator || was not working in this case. We used CONCAT command to get our desired output.

```
SELECT CONCAT([FirstName],' ',[LastName]) AS [COMPLETE NAME]
FROM student;
```

	COMPLETE NAME
1	Hashir Husnain
2	Shahzaib Rafi
3	Shakeel uni
4	Shahzaib Irfan
5	Ayesha Nadeem
6	Mahnoor Fatima
7	Afraz Butt
8	Muhammad Hamza
9	Fakham Chaudhry
10	Vishma Khurram
11	Mahnoor Ejaz

Figure 6: *Query output showing the concatenation/amalgamation of two separate attributes as one.*

8. **Your task is to write SQL statements corresponding to each operator using Northwind schema.**

```
SELECT *
FROM [Products]
WHERE ProductName LIKE 'A';
```

```
SELECT *
FROM [Products]
WHERE ProductName = 'Aniseed Syrup';
```

```
SELECT *
FROM [Products]
WHERE UnitPrice > 5.0 AND UnitsInStock > 30;
```

```
SELECT *
FROM
WHERE UnitPrice > 19.0 OR UnitsInStock > 30;
```

	ProductID	ProductName	SupplierID	CategoryID	QuantityPerUnit	UnitPrice	UnitsInStock	UnitsOnOrder	ReorderLevel	Discontinued
1	1	Chai	1	1	10 boxes x 20 bags	18.00	39	0	10	0
2	4	Chef Anton's Cajun Seasoning	2	2	48 - 6 oz jars	22.00	53	0	0	0
3	6	Grandma's Boysenberry Spr...	3	2	12 - 8 oz jars	25.00	120	0	25	0
4	10	Ikura	4	8	12 - 200 ml jars	31.00	31	0	0	0
5	12	Queso Manchego La Pastora	5	4	10 - 500 g pkgs.	38.00	86	0	0	0
6	14	Tofu	6	7	40 - 100 g pkgs.	23.25	35	0	0	0
7	15	Genen Shouyu	6	2	24 - 250 ml bottles	15.50	39	0	5	0
8	18	Carnarvon Tigers	7	8	16 kg pkg.	62.50	42	0	0	0
9	20	Sir Rodney's Marmalade	8	3	30 gift boxes	81.00	40	0	0	0
10	22	Gustaf's Knäckebröd	9	5	24 - 500 g pkgs.	21.00	104	0	25	0
11	23	Tunnbröd	9	5	12 - 250 g pkgs.	9.00	61	0	25	0
12	25	NuNuCa Nuß-Nougat-Creme	11	3	20 - 450 g glasses	14.00	76	0	30	0
13	27	Schoggi Schokolade	11	3	100 - 100 g pieces	43.90	49	0	30	0
14	34	Sasquatch Ale	16	1	24 - 12 oz bottles	14.00	111	0	15	0
15	36	Inlagd Sill	17	8	24 - 250 g jars	19.00	112	0	20	0
16	39	Chartreuse verte	18	1	750 cc per bottle	18.00	69	0	5	0
17	40	Boston Crab Meat	19	8	24 - 4 oz tins	18.40	123	0	30	0
18	41	Jack's New England Clam C...	19	8	12 - 12 oz cans	9.65	85	0	10	0
19	46	Spegesild	21	8	4 - 450 g glasses	12.00	95	0	0	0
20	47	Zaanse koeken	22	3	10 - 4 oz boxes	9.50	36	0	0	0
21	50	Valkoinen suklaa	23	3	12 - 100 g bars	16.25	65	0	30	0

Figure 7: *Query written against northwind schema*

9. **Identify at least one SQL statement in which precedence can affect the result of query.**

```
SELECT *
FROM [Products]
WHERE NOT CategoryID > (5) OR UnitPrice > 21.35;
```

10. **Identify how the result of a mathematical expression on null value affect the result of a query.**
It does'nt affect the result of the query. Basically, the SQL engine automatically *filters* out the irrelevant values. So they are not included. Consider the following query:

```
SELECT ([GPA] * 3) AS [Output]
FROM student;
```

	Output
1	12
2	NULL
3	NULL
4	10.89
5	10.35
6	10.65
7	10.95
8	9.33
9	NULL
10	NULL
11	9.9

]

Figure 8: *A query output showing the discarding of null values and multiplying all else by 3.*

11. **Use the distinct operator to eliminate the duplicates in your SQL statement.**

```
SELECT DISTINCT TOP (3)[FirstName]
FROM student;
```

	FirstName
1	Afraz
2	Ayesha
3	Fakham

Figure 9: *A query output showing the use of DISTINCT clause coupled with the TOP statement.*

12. **Write at least 3 SQL statements using Northwind schema which use ORDER BY clause.**

```
SELECT TOP(10) *
FROM Products
ORDER BY ProductName DESC;
```

```
SELECT TOP(10) *
FROM Products
ORDER BY QuantityPerUnit ASC;
```

```
SELECT TOP(10) *
FROM Products
ORDER BY ReorderLevel ASC;
```

13. **Limit the result of 3 ORDER BY queries to 10 rows.**
    Refer to query 12 for the answer to the query.