Assignment

HR Employee Dataset

Create db

```
DECLARE @DatabaseName VARCHAR(128) = 'employee_db';
```

```
-- Test condition to check is database exist
IF NOT EXISTS(SELECT 1 FROM sys.databases WHERE name = @Database
--If the database doesn't exist
BEGIN
DECLARE @SQL NVARCHAR(MAX) = 'CREATE DATABASE '+ QUOTENAME(@Data
EXEC sp_executesql @SQL;
END
```

```
USE employee_db;
```

```
CREATE TABLE EmployeeData (
Attrition VARCHAR(3),
Business_Travel VARCHAR(20),
CF_age_band VARCHAR(10),
CF_attrition_label VARCHAR(20),
Department VARCHAR(20),
Education_Field VARCHAR(20),
emp_no VARCHAR(10),
Employee_Number INT,
Gender VARCHAR(6),
Job_Role VARCHAR(30),
Marital_Status VARCHAR(10),
Over_Time VARCHAR(3),
Over18 VARCHAR(1),
```

```
Training_Times_Last_Year INT,
Age INT,
CF_current_Employee INT,
Daily_Rate INT,
Distance_From_Home INT,
Education VARCHAR(20),
Employee_Count INT,
Environment_Satisfaction INT,
Hourly_Rate INT,
Job_Involvement INT,
Job_Level INT,
Job_Satisfaction INT,
Monthly_Income INT,
Monthly_Rate INT,
Num_Companies_Worked INT,
Percent_Salary_Hike INT,
Performance_Rating INT,
Relationship_Satisfaction INT,
Standard_Hours INT,
Stock_Option_Level INT,
Total_Working_Years INT,
Work_Life_Balance INT,
Years_At_Company INT,
Years_In_Current_Role INT,
Years_Since_Last_Promotion INT,
Years_With_Curr_Manager INT
);
```

Insert Bulk Data

```
BULK INSERT employeeData FROM 'D:/CSV/HR_Employee.csv'
WITH
(
FIELDTERMINATOR = ',',
ROWTERMINATOR = '\n',
```

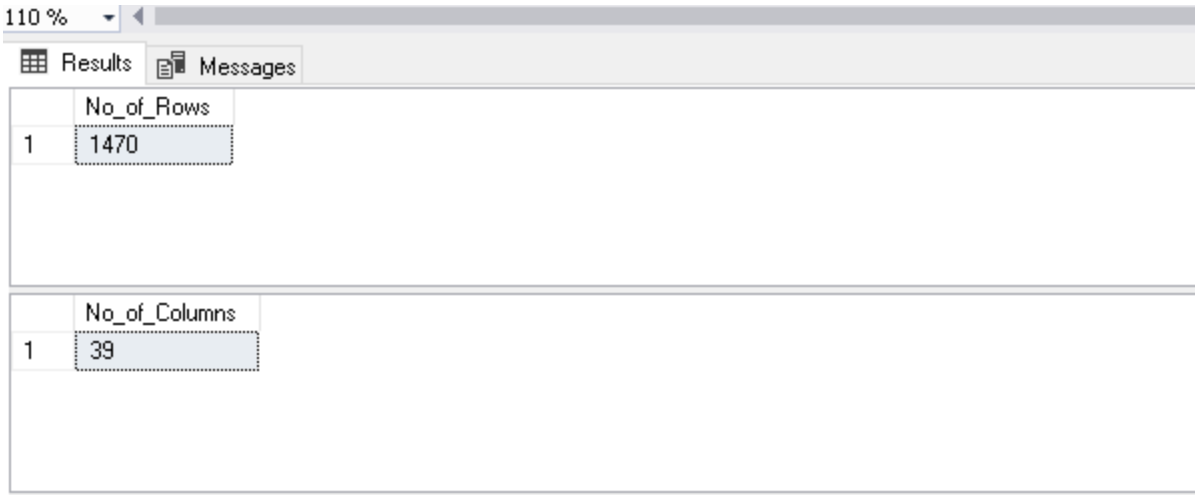
```
FIRSTROW = 2
);
```

💡 SELECT * FROM employeeData;

a) Return the shape of the table

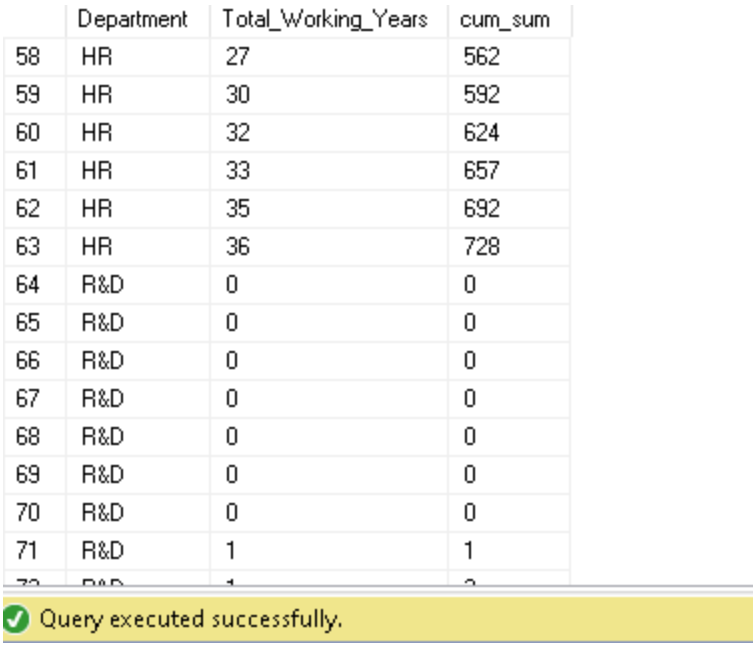
```
SELECT
COUNT(*) AS No_of_Rows
FROM
employeeData;
```

```
SELECT
COUNT(*) AS No_of_Columns
FROM
INFORMATION_SCHEMA.columns;
```



b) Calculate the cumulative sum of total working years for each department

```
SELECT
    Department,
    Total_Working_Years,
    SUM(Total_Working_Years) OVER(PARTITION BY Department ORDER
FROM
    employeeData;
```



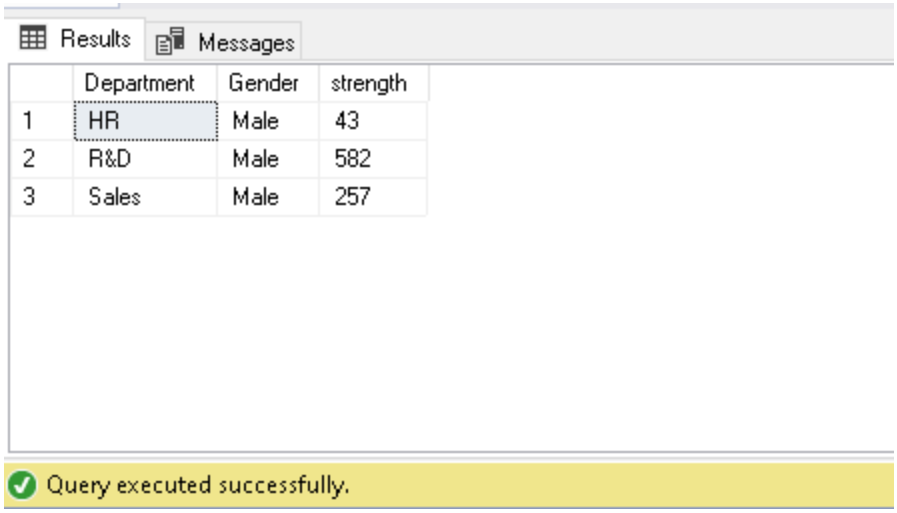
	Department	Total_Working_Years	cum_sum
58	HR	27	562
59	HR	30	592
60	HR	32	624
61	HR	33	657
62	HR	35	692
63	HR	36	728
64	R&D	0	0
65	R&D	0	0
66	R&D	0	0
67	R&D	0	0
68	R&D	0	0
69	R&D	0	0
70	R&D	0	0
71	R&D	1	1

Query executed successfully.

c) Which gender have higher strength as workforce in each department

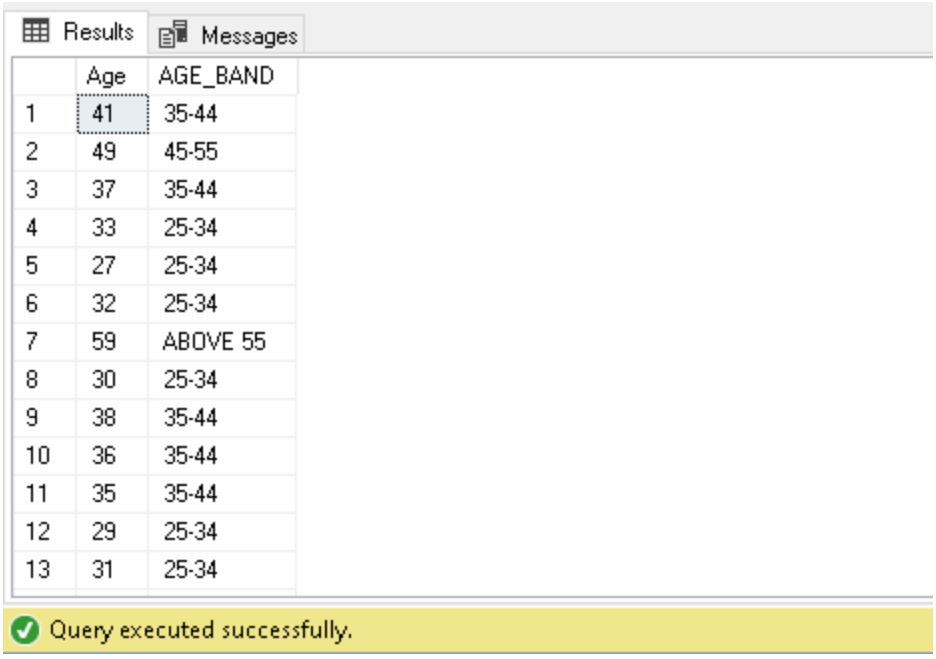
```
WITH GenderStrength AS (
    SELECT
        Department,
        Gender,
        COUNT(*) AS strength
    FROM
        EmployeeData
    GROUP BY
        Department,
        Gender
```

```
    ),
StrengthRankCTE AS(
SELECT
Department,
Gender,
strength,
DENSE_RANK() OVER(PARTITION BY Department ORDER BY strength) AS
FROM GenderStrength
)
SELECT
Department,
Gender,
strength
FROM
StrengthRankCTE
WHERE
gender_rank = 2;
```



d) Create a new column AGE_BAND and Show Distribution of Employee's Age band group (Below 25, 25-34, 35-44, 45-55. ABOVE 55).

```
SELECT
Age,
CASE
WHEN Age < 25 THEN 'Below 25'
WHEN Age Between 25 AND 34 THEN '25-34'
WHEN Age Between 35 AND 44 THEN '35-44'
WHEN Age Between 45 AND 55 THEN '45-55'
ELSE 'ABOVE 55'
END AS AGE_BAND
FROM
EmployeeData;
```

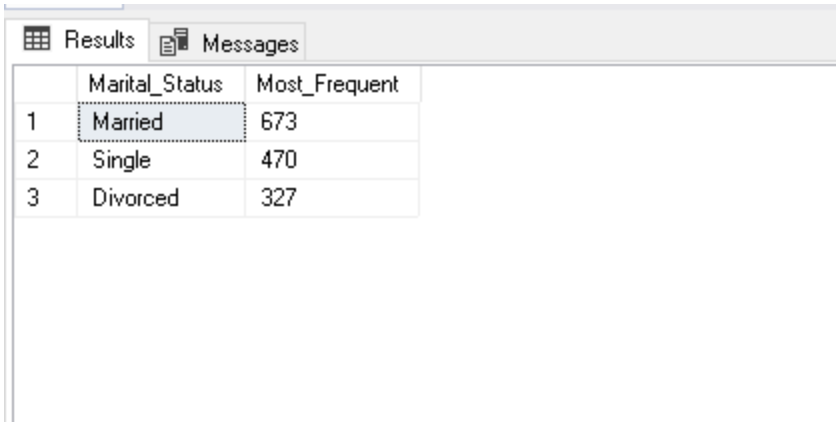


	Age	AGE_BAND
1	41	35-44
2	49	45-55
3	37	35-44
4	33	25-34
5	27	25-34
6	32	25-34
7	59	ABOVE 55
8	30	25-34
9	38	35-44
10	36	35-44
11	35	35-44
12	29	25-34
13	31	25-34

e) Compare all marital status of employee and find the most frequent marital status

```
SELECT
Marital_Status,
COUNT(Marital_Status) AS Most_Frequent
FROM
EmployeeData
```

```
GROUP BY Marital_Status
ORDER BY COUNT(Marital_Status) DESC;
```

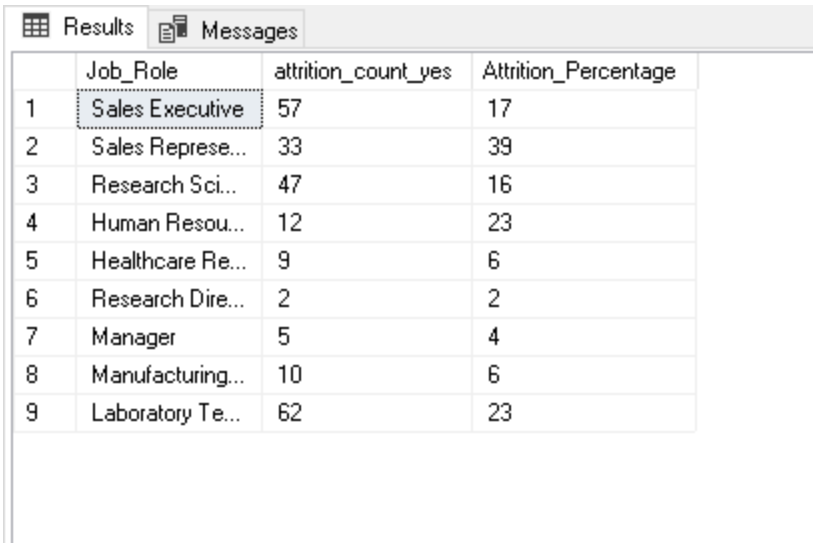


	Marital_Status	Most_Frequent
1	Married	673
2	Single	470
3	Divorced	327

💡 - Insight: The most frequent is Married

f) Show the Job Role with Highest Attrition Rate (Percentage)

```
SELECT
Job_Role,
SUM(
CASE
WHEN Attrition = 'Yes' THEN 1 ELSE 0
END) AS attrition_count_yes,
SUM(
CASE
WHEN Attrition = 'Yes' THEN 1 ELSE 0
END)*100/COUNT(Attrition) AS Attrition_Percentage
FROM
EmployeeData
GROUP BY
Job_Role;
```



Results | Messages

	Job_Role	attrition_count_yes	Attrition_Percentage
1	Sales Executive	57	17
2	Sales Represe...	33	39
3	Research Sci...	47	16
4	Human Resou...	12	23
5	Healthcare Re...	9	6
6	Research Dire...	2	2
7	Manager	5	4
8	Manufacturing...	10	6
9	Laboratory Te...	62	23

g) Show distribution of Employee's Promotion, Find the maximum chances of employee getting promoted.

```
SELECT
Years_Since_Last_Promotion,
Attrition,
AVG(Job_Involvement) AS Job_Involvement,
AVG(Performance_rating) AS avg_performance_rating,
AVG(Relationship_satisfaction) AS avg_relationship_satisfaction,
COUNT(*) AS no_of_employees
FROM
EmployeeData
GROUP BY Years_Since_Last_Promotion,Attrition
ORDER BY Years_Since_Last_Promotion ASC;
```

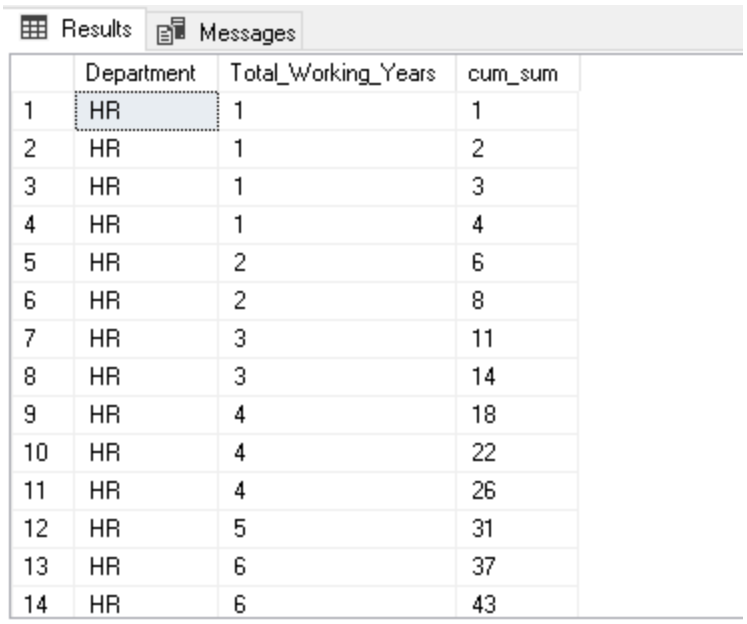
Results | Messages

	Years_Since_Last_Promotion	Attrition	Job_Involvement	avg_performance_rating	avg_relationship_satisfaction	no_of_employees
1	0	No	2	3	2	471
2	0	Yes	2	3	2	110
3	1	No	2	3	2	308
4	1	Yes	2	3	2	49
5	2	No	2	3	2	132
6	2	Yes	2	3	2	27
7	3	No	2	3	2	43
8	3	Yes	2	3	2	9
9	4	No	2	3	2	56
10	4	Yes	3	3	1	5
11	5	No	2	3	2	43
12	5	Yes	2	3	3	2
13	6	No	2	3	2	26
14	6	Yes	2	3	3	6
15	7	No	2	3	2	60
16	7	Yes	2	3	2	16
17	8	No	2	3	2	18
18	9	No	2	3	2	13
19	9	Yes	2	3	3	4

- - insight : if attrition is no there is higher chance of getting promoted

h) Show the cumulative sum of total working years for each department.

```
SELECT
Department,
Total_Working_Years,
SUM(Total_Working_Years)
OVER(PARTITION BY Department ORDER BY Total_Working_Years ROWS B
AS cum_sum
FROM
employeeData;
```

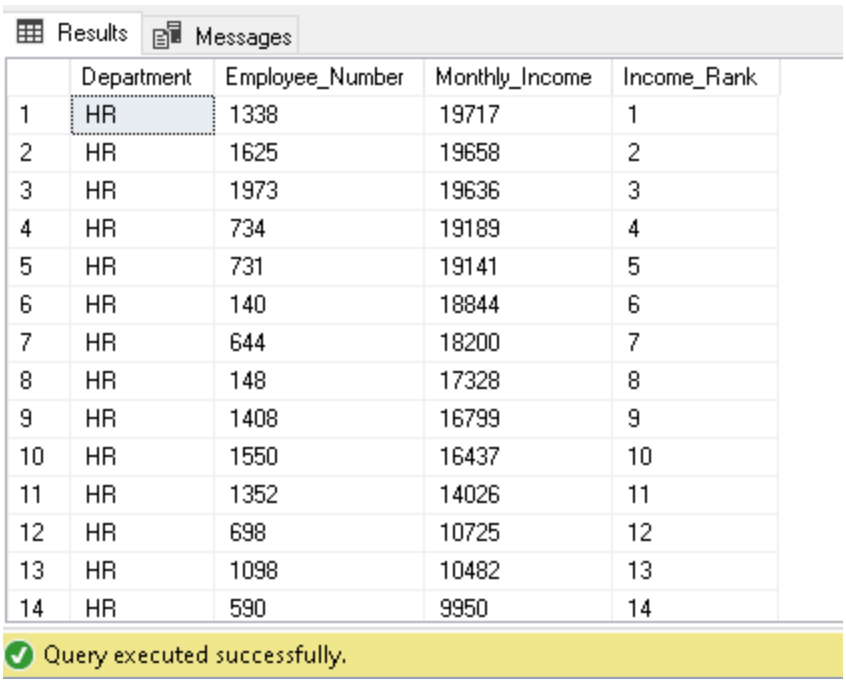


Results | Messages

	Department	Total_Working_Years	cum_sum
1	HR	1	1
2	HR	1	2
3	HR	1	3
4	HR	1	4
5	HR	2	6
6	HR	2	8
7	HR	3	11
8	HR	3	14
9	HR	4	18
10	HR	4	22
11	HR	4	26
12	HR	5	31
13	HR	6	37
14	HR	6	43

i) Find the rank of employees within each department based on their monthly income

```
SELECT
Department,
Employee_Number,
Monthly_Income,
DENSE_RANK() OVER(PARTITION BY Department ORDER BY Monthly_Incor
FROM
EmployeeData;
```



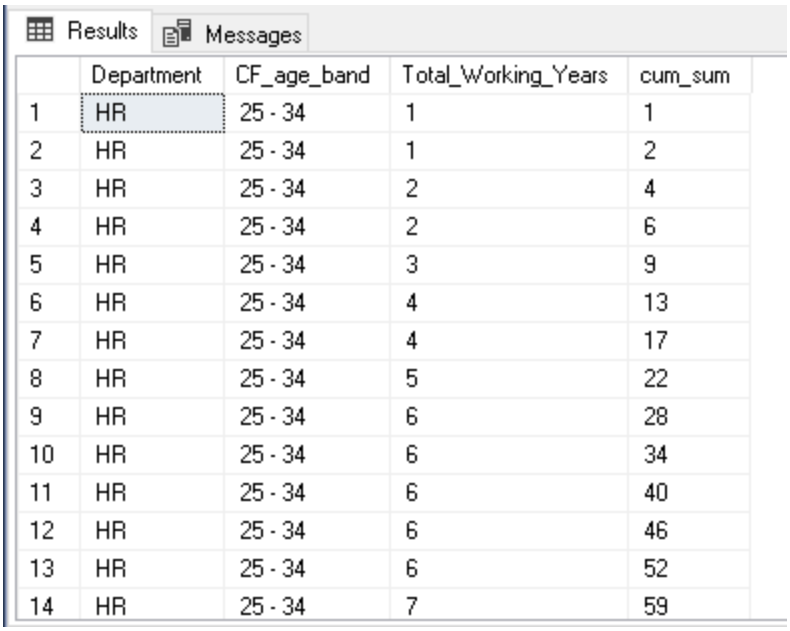
Results | Messages

	Department	Employee_Number	Monthly_Income	Income_Rank
1	HR	1338	19717	1
2	HR	1625	19658	2
3	HR	1973	19636	3
4	HR	734	19189	4
5	HR	731	19141	5
6	HR	140	18844	6
7	HR	644	18200	7
8	HR	148	17328	8
9	HR	1408	16799	9
10	HR	1550	16437	10
11	HR	1352	14026	11
12	HR	698	10725	12
13	HR	1098	10482	13
14	HR	590	9950	14

Query executed successfully.

j) Calculate the running total of 'Total Working Years' for each employee within each department and age band.

```
SELECT
Department,
CF_age_band,
Total_Working_Years,
SUM(Total_Working_Years)
OVER(PARTITION BY Department, CF_age_band ORDER BY Total_Working
AS cum_sum
FROM
employeeData;
```



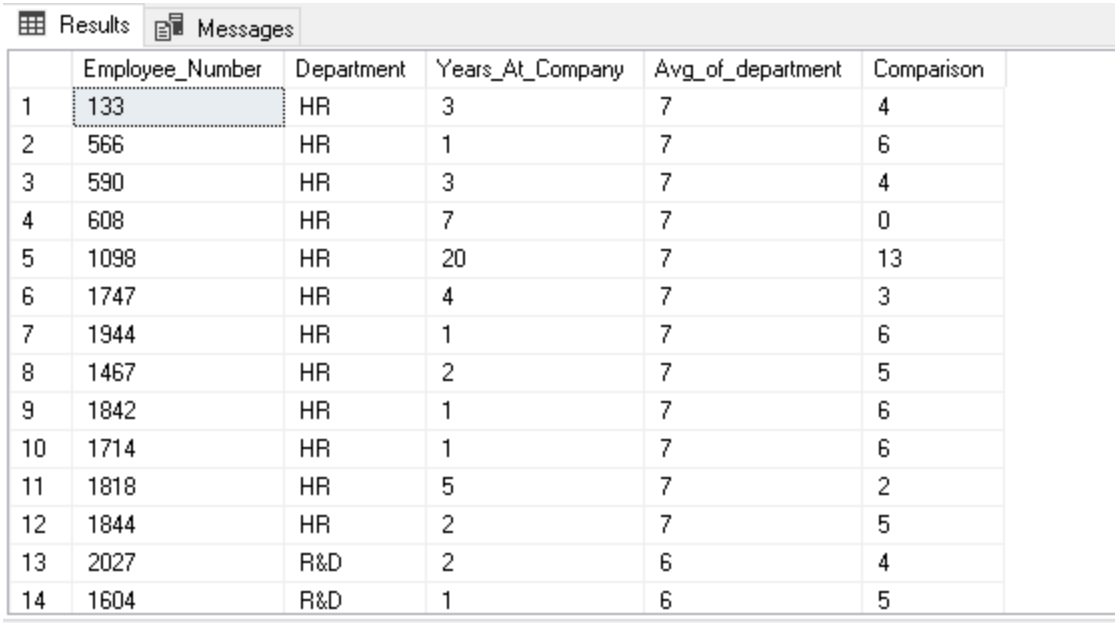
Results | Messages

	Department	CF_age_band	Total_Working_Years	cum_sum
1	HR	25 - 34	1	1
2	HR	25 - 34	1	2
3	HR	25 - 34	2	4
4	HR	25 - 34	2	6
5	HR	25 - 34	3	9
6	HR	25 - 34	4	13
7	HR	25 - 34	4	17
8	HR	25 - 34	5	22
9	HR	25 - 34	6	28
10	HR	25 - 34	6	34
11	HR	25 - 34	6	40
12	HR	25 - 34	6	46
13	HR	25 - 34	6	52
14	HR	25 - 34	7	59

k) Foreach employee who left, calculate the number of years they worked before leaving and compare it with the average years worked by employees in the same department.

```
SELECT
e.Employee_Number,
e.Department,
e.Years_At_Company,
-- Average years of employees worked at each department mapping
(SELECT
AVG(Years_At_Company)
FROM
EmployeeData
WHERE
Department = e.Department) AS Avg_of_department,
-- Find the difference between current working years and average
ABS(e.Years_At_Company - (SELECT
AVG(Years_At_Company)
FROM
EmployeeData
WHERE
Department = e.Department)) AS Comparison
```

```
FROM
EmployeeData as e
WHERE
CF_current_Employee = 0
ORDER BY
Department;
```

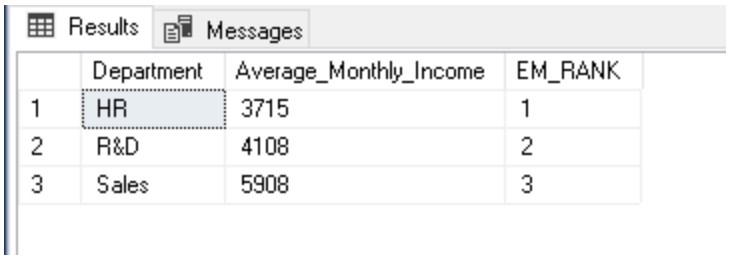


Results | Messages

	Employee_Number	Department	Years_At_Company	Avg_of_department	Comparison
1	133	HR	3	7	4
2	566	HR	1	7	6
3	590	HR	3	7	4
4	608	HR	7	7	0
5	1098	HR	20	7	13
6	1747	HR	4	7	3
7	1944	HR	1	7	6
8	1467	HR	2	7	5
9	1842	HR	1	7	6
10	1714	HR	1	7	6
11	1818	HR	5	7	2
12	1844	HR	2	7	5
13	2027	R&D	2	6	4
14	1604	R&D	1	6	5

l) Rank the departments by the average monthly income of employees who have left

```
SELECT
Department,
AVG(Monthly_Income) AS Average_Monthly_Income,
DENSE_RANK() OVER(ORDER BY AVG(Monthly_Income)) AS EM_RANK
FROM
EmployeeData
WHERE
CF_current_Employee = 0
GROUP BY Department;
```

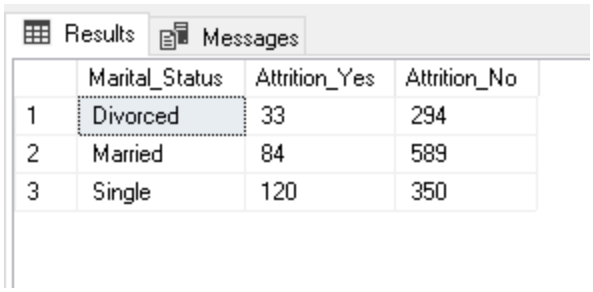


Results | Messages

	Department	Average_Monthly_Income	EM_RANK
1	HR	3715	1
2	R&D	4108	2
3	Sales	5908	3

m) Find the if there is any relation between Attrition Rate and Marital Status of Employee.

```
SELECT
Marital_Status,
SUM(CASE WHEN Attrition = 'Yes' THEN 1 ELSE 0 END) AS Attrition_
SUM(CASE WHEN Attrition = 'No' THEN 1 ELSE 0 END) AS Attrition_N
FROM
EmployeeData
GROUP BY
Marital_Status
ORDER BY Attrition_Yes;
```



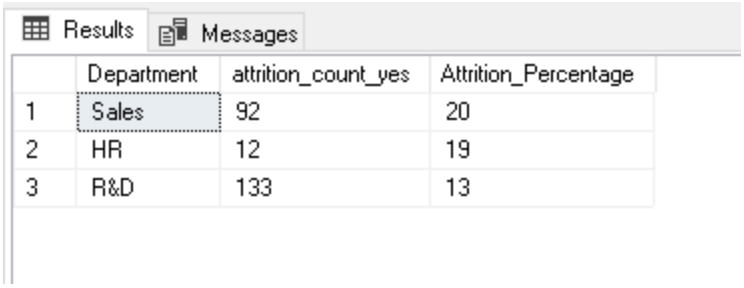
Results | Messages

	Marital_Status	Attrition_Yes	Attrition_No
1	Divorced	33	294
2	Married	84	589
3	Single	120	350

n) Show the Department with Highest Attrition Rate (Percentage)

```
SELECT
Department,
SUM(
CASE
WHEN Attrition = 'Yes' THEN 1 ELSE 0
END) AS attrition_count_yes,
SUM(
```

```
CASE
WHEN Attrition = 'Yes' THEN 1 ELSE 0
END)*100/COUNT(Attrition) AS Attrition_Percentage
FROM
EmployeeData
GROUP BY
Department;
```

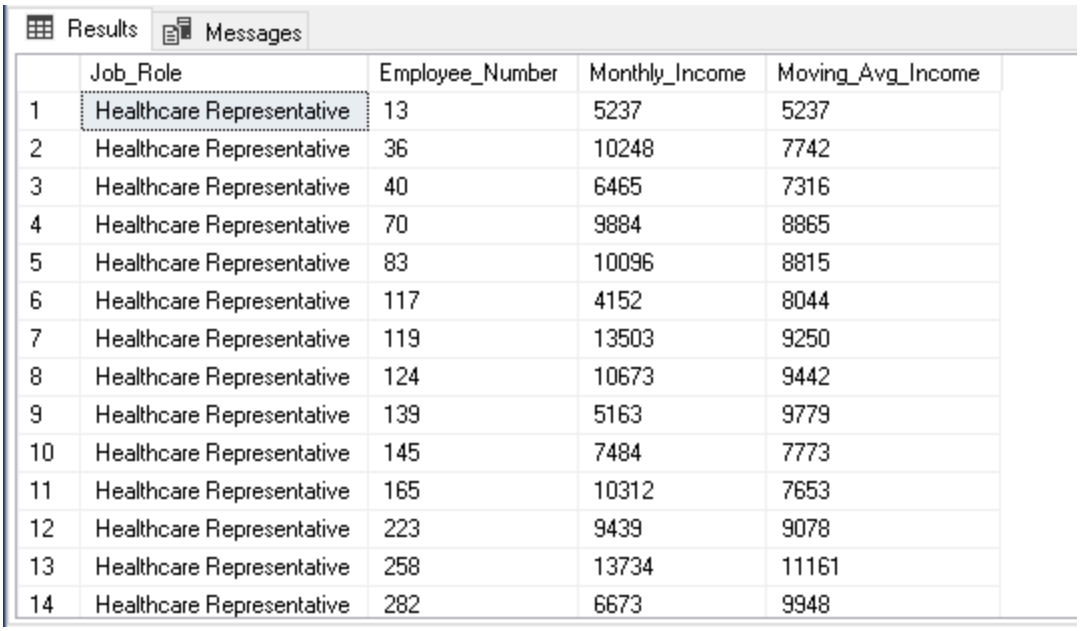


Results | Messages

	Department	attrition_count_yes	Attrition_Percentage
1	Sales	92	20
2	HR	12	19
3	R&D	133	13

o) Calculate the moving average of monthly income over the past 3 employees for each job role.

```
SELECT
Job_Role,
Employee_Number,
Monthly_Income,
AVG(Monthly_Income) OVER (PARTITION BY Job_Role ORDER BY Employe
FROM
EmployeeData
ORDER BY
Job_Role, Employee_Number;
```



Results | Messages

	Job_Role	Employee_Number	Monthly_Income	Moving_Avg_Income
1	Healthcare Representative	13	5237	5237
2	Healthcare Representative	36	10248	7742
3	Healthcare Representative	40	6465	7316
4	Healthcare Representative	70	9884	8865
5	Healthcare Representative	83	10096	8815
6	Healthcare Representative	117	4152	8044
7	Healthcare Representative	119	13503	9250
8	Healthcare Representative	124	10673	9442
9	Healthcare Representative	139	5163	9779
10	Healthcare Representative	145	7484	7773
11	Healthcare Representative	165	10312	7653
12	Healthcare Representative	223	9439	9078
13	Healthcare Representative	258	13734	11161
14	Healthcare Representative	282	6673	9948

p) Identify employees with outliers in monthly income within each job role.
[Condition : Monthly_Income < Q1 - (Q3 - Q1) * 1.5 OR Monthly_Income > Q3 + (Q3 - Q1)]

```
WITH Quartiles AS (
SELECT
Job_Role,
Monthly_Income,
NTILE(4) OVER (PARTITION BY Job_Role ORDER BY Monthly_Income) AS
FROM
EmployeeData
),
Q1ANDQ3 AS (
SELECT
Job_Role,
MIN(CASE WHEN Quartile = 1 THEN Monthly_Income END) AS Q1,
MIN(CASE WHEN Quartile = 3 THEN Monthly_Income END) AS Q3
FROM
Quartiles
GROUP BY
Job_Role
```

```
)
SELECT
e.Job_Role,
e.Employee_Number,
e.Monthly_Income,
Q1,
Q3,
(Q3 - Q1) AS IQR,
(Q1 - (Q3 - Q1) * 1.5) AS Left_Outlier,
(Q3 + (Q3 - Q1)) AS Right_Outlier
FROM
EmployeeData e
JOIN
Q1ANDQ3  ON e.Job_Role = Q1ANDQ3.Job_Role
WHERE
e.Monthly_Income < Q1 - (Q3 - Q1) * 1.5
OR e.Monthly_Income > Q3 + (Q3 - Q1)
ORDER BY
e.Job_Role, e.Employee_Number;
```

Results Messages

	Job_Role	Employee_Number	Monthly_Income	Q1	Q3	IQR	Left_Outlier	Right_Outlier
1	Healthcare Representative	36	10248	4000	6812	2812	-218.0	9624
2	Healthcare Representative	70	9884	4000	6812	2812	-218.0	9624
3	Healthcare Representative	83	10096	4000	6812	2812	-218.0	9624
4	Healthcare Representative	119	13503	4000	6812	2812	-218.0	9624
5	Healthcare Representative	124	10673	4000	6812	2812	-218.0	9624
6	Healthcare Representative	165	10312	4000	6812	2812	-218.0	9624
7	Healthcare Representative	258	13734	4000	6812	2812	-218.0	9624
8	Healthcare Representative	343	10938	4000	6812	2812	-218.0	9624
9	Healthcare Representative	372	13496	4000	6812	2812	-218.0	9624
10	Healthcare Representative	431	13964	4000	6812	2812	-218.0	9624
11	Healthcare Representative	451	9985	4000	6812	2812	-218.0	9624
12	Healthcare Representative	491	10496	4000	6812	2812	-218.0	9624
13	Healthcare Representative	499	10965	4000	6812	2812	-218.0	9624
14	Healthcare Representative	587	9824	4000	6812	2812	-218.0	9624

q) Gender distribution within each job role, show each job role with its gender domination. [Male_Domination or Female_Domination]

```
WITH GenderCTE AS(
SELECT
Job_Role,
Gender,
COUNT(Gender) AS Gender_count,

DENSE_RANK() OVER(PARTITION BY Job_Role ORDER BY Gender) AS g
ender_rank
FROM
EmployeeData
GROUP BY
Job_Role, Gender
)
SELECT
Job_Role,
CASE
    WHEN gender_rank = 2 THEN 'Male_Domination'
    ELSE 'Female_Domination'
END AS Domination
FROM
GenderCTE
WHERE
gender_rank = 2
ORDER BY
Job_Role, Gender ASC;
```

Results | Messages

	Job_Role	Domination
1	Healthcare Representative	Male_Domination
2	Human Resources	Male_Domination
3	Laboratory Technician	Male_Domination
4	Manager	Male_Domination
5	Manufacturing Director	Male_Domination
6	Research Director	Male_Domination
7	Research Scientist	Male_Domination
8	Sales Executive	Male_Domination
9	Sales Representative	Male_Domination

r) Percent rank of employees based on training times last year

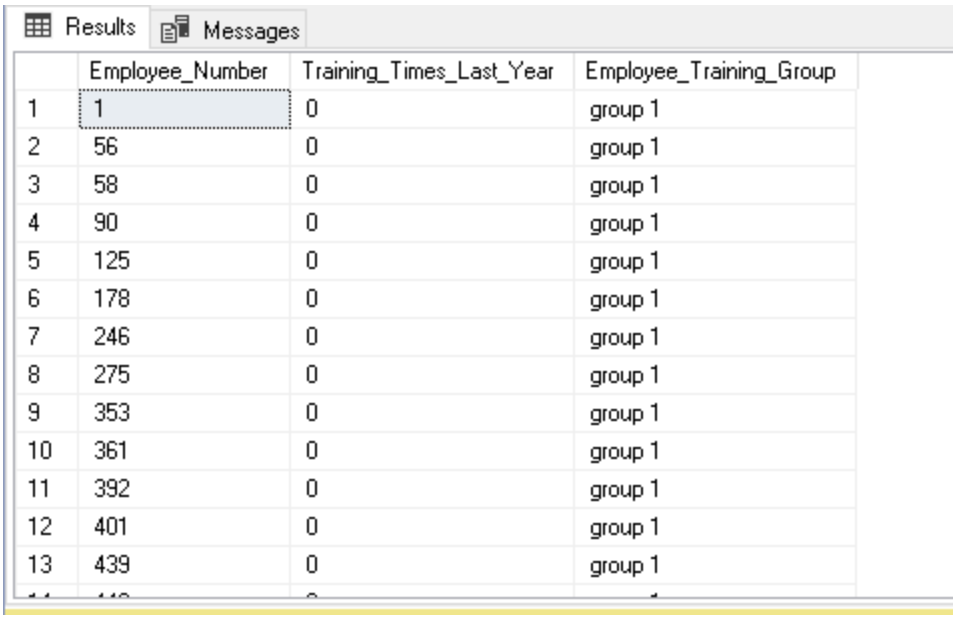
```
SELECT
Employee_Number,
Training_Times_Last_Year,
PERCENT_RANK() OVER (ORDER BY Training_Times_Last_Year) AS Perce
FROM
EmployeeData
ORDER BY
Percent_Rank;
```

Results | Messages

	Employee_Number	Training_Times_Last_Year	Percent_Rank
1	1	0	0
2	56	0	0
3	58	0	0
4	90	0	0
5	125	0	0
6	178	0	0
7	246	0	0
8	275	0	0
9	353	0	0
10	361	0	0
11	392	0	0
12	401	0	0
13	439	0	0

s) Divide employees into 5 groups based on training times last year [Use NTILE ()]

```
WITH groupCTE AS(
SELECT
Employee_Number,
Training_Times_Last_Year,
NTILE(5) OVER(ORDER BY Training_Times_Last_Year) AS group_tile
FROM
EmployeeData
)
SELECT
Employee_Number,
Training_Times_Last_Year,
CASE
WHEN group_tile = 1 THEN 'group 1'
WHEN group_tile = 2 THEN 'group 2'
WHEN group_tile = 3 THEN 'group 3'
WHEN group_tile = 4 THEN 'group 4'
ELSE 'group 5'
END AS Employee_Training_Group
FROM
groupCTE;
```



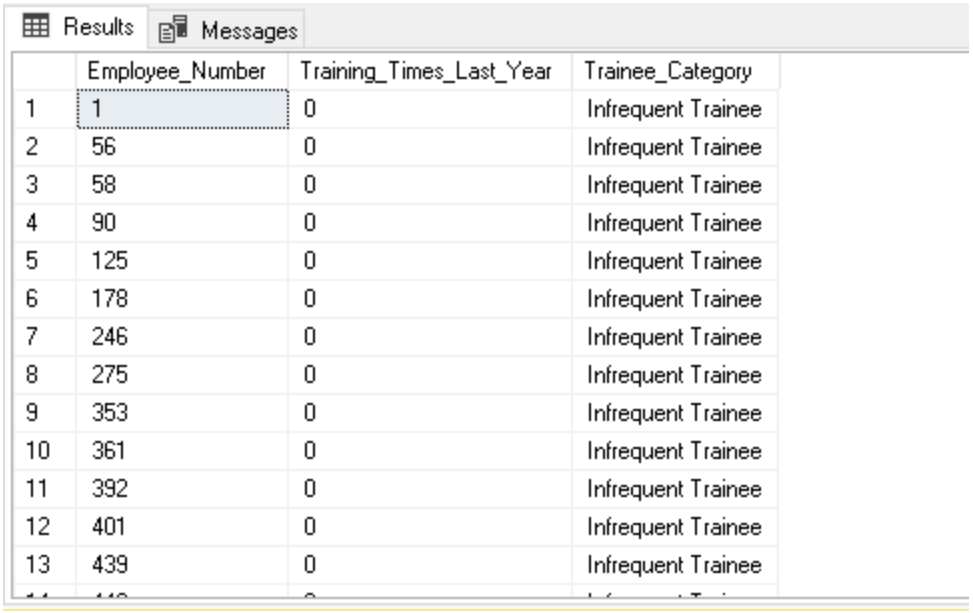
Results | Messages

	Employee_Number	Training_Times_Last_Year	Employee_Training_Group
1	1	0	group 1
2	56	0	group 1
3	58	0	group 1
4	90	0	group 1
5	125	0	group 1
6	178	0	group 1
7	246	0	group 1
8	275	0	group 1
9	353	0	group 1
10	361	0	group 1
11	392	0	group 1
12	401	0	group 1
13	439	0	group 1

t) Categorize employees based on training times last year as - Frequent Trainee, Moderate Trainee, Infrequent Trainee

```
WITH TrainingStats AS (
SELECT
Employee_Number,
Training_Times_Last_Year,
PERCENT_RANK() OVER (ORDER BY Training_Times_Last_Year ) AS Perc
FROM
EmployeeData
)
SELECT
Employee_Number,
Training_Times_Last_Year,
CASE
WHEN Percent_Rank >= 0.75 THEN 'Frequent Trainee'
WHEN Percent_Rank >= 0.50 THEN 'Moderate Trainee'
ELSE 'Infrequent Trainee'
END AS Trainee_Category
FROM
TrainingStats
```

```
ORDER BY
Training_Times_Last_Year;
```



Results | Messages

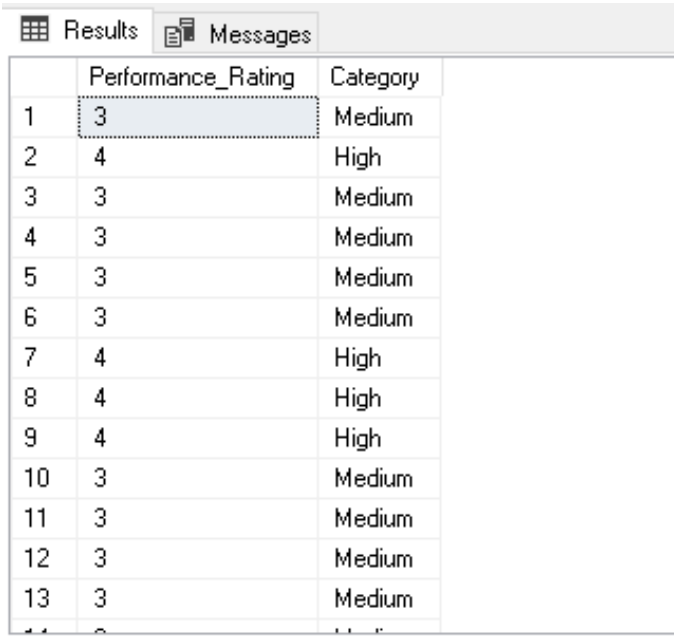
	Employee_Number	Training_Times_Last_Year	Trainee_Category
1	1	0	Infrequent Trainee
2	56	0	Infrequent Trainee
3	58	0	Infrequent Trainee
4	90	0	Infrequent Trainee
5	125	0	Infrequent Trainee
6	178	0	Infrequent Trainee
7	246	0	Infrequent Trainee
8	275	0	Infrequent Trainee
9	353	0	Infrequent Trainee
10	361	0	Infrequent Trainee
11	392	0	Infrequent Trainee
12	401	0	Infrequent Trainee
13	439	0	Infrequent Trainee

u) Categorize employees as 'High', 'Medium', or 'Low' performers based on their performance rating, using a CASE WHEN statement.

```
SELECT
PERCENTILE_CONT(0.5) WITHIN GROUP (ORDER BY Performance_Rating)
FROM
EmployeeData
```

```
SELECT
Performance_Rating,
CASE
WHEN Performance_Rating >3 THEN 'High'
WHEN Performance_Rating <3 THEN 'low'
ELSE 'Medium'
END AS Category
```

```
FROM
EmployeeData
```



Results | Messages

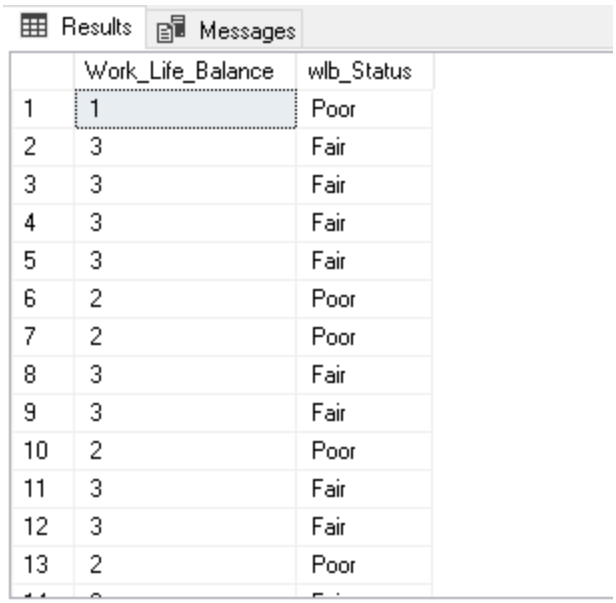
	Performance_Rating	Category
1	3	Medium
2	4	High
3	3	Medium
4	3	Medium
5	3	Medium
6	3	Medium
7	4	High
8	4	High
9	4	High
10	3	Medium
11	3	Medium
12	3	Medium
13	3	Medium

v) Use a CASE WHEN statement to categorize employees into 'Poor', 'Fair', 'Good', or 'Excellent' work-life balance based on their work-life balance score.

```
SELECT
DISTINCT
Work_Life_Balance
FROM
EmployeeData
```

```
SELECT
Work_Life_Balance,
CASE
WHEN Work_Life_Balance > 4 THEN 'Excellent'
WHEN Work_Life_Balance > 3 THEN 'Good'
WHEN Work_Life_Balance > 2 THEN 'Fair'
ELSE 'Poor'
```

```
END AS wlb_Status
FROM
EmployeeData;
```

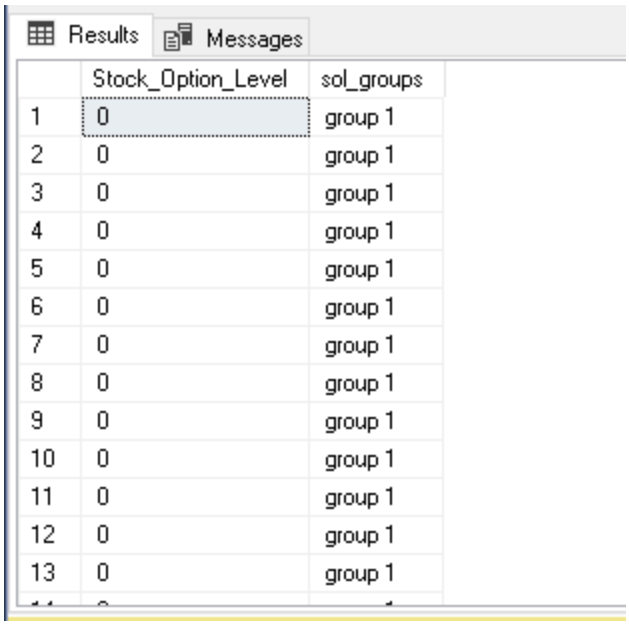


Results | Messages

	Work_Life_Balance	wlb_Status
1	1	Poor
2	3	Fair
3	3	Fair
4	3	Fair
5	3	Fair
6	2	Poor
7	2	Poor
8	3	Fair
9	3	Fair
10	2	Poor
11	3	Fair
12	3	Fair
13	2	Poor

w) Group employees into 3 groups based on their stock option level using the [NTILE] function.

```
SELECT
Stock_Option_Level,
CASE
WHEN SOL_dist = 1 THEN 'group 1'
WHEN SOL_dist = 2 THEN 'group 2'
ELSE 'group 3'
END As sol_groups
FROM(
SELECT
Stock_Option_Level,
NTILE(3) OVER(ORDER BY Stock_Option_Level) AS SOL_dist
FROM
EmployeeData) AS _
```

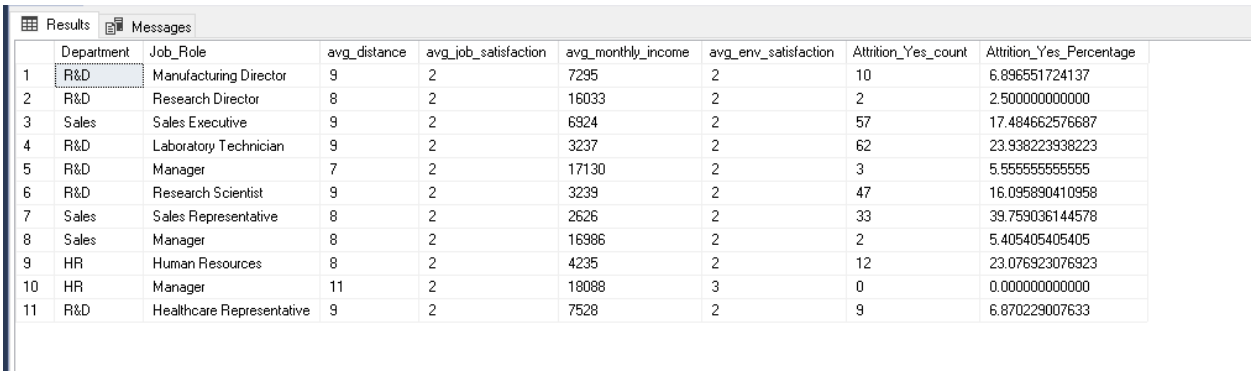


Results | Messages

	Stock_Option_Level	sol_groups
1	0	group 1
2	0	group 1
3	0	group 1
4	0	group 1
5	0	group 1
6	0	group 1
7	0	group 1
8	0	group 1
9	0	group 1
10	0	group 1
11	0	group 1
12	0	group 1
13	0	group 1

x) Find key reasons for Attrition in Company

```
SELECT
Department,
Job_Role,
AVG(Distance_From_Home) AS avg_distance,
AVG(Job_Satisfaction) AS avg_job_satisfaction,
AVG(Monthly_Income) AS avg_monthly_income,
AVG(Environment_Satisfaction) AS avg_env_satisfaction,
SUM(CASE WHEN Attrition = 'Yes' THEN 1 ELSE 0 END) AS Attrition_
(SUM(CASE WHEN Attrition = 'Yes' THEN 1 ELSE 0 END)*100.0/COUNT(
FROM
EmployeeData
GROUP BY Department, Job_Role
```



Results | Messages

	Department	Job_Role	avg_distance	avg_job_satisfaction	avg_monthly_income	avg_env_satisfaction	Attrition_Yes_count	Attrition_Yes_Percentage
1	R&D	Manufacturing Director	9	2	7295	2	10	6.896551724137
2	R&D	Research Director	8	2	16033	2	2	2.500000000000
3	Sales	Sales Executive	9	2	6924	2	57	17.484662576687
4	R&D	Laboratory Technician	9	2	3237	2	62	23.938223938223
5	R&D	Manager	7	2	17130	2	3	5.555555555555
6	R&D	Research Scientist	9	2	3239	2	47	16.095890410958
7	Sales	Sales Representative	8	2	2626	2	33	39.759036144578
8	Sales	Manager	8	2	16986	2	2	5.405405405405
9	HR	Human Resources	8	2	4235	2	12	23.076923076923
10	HR	Manager	11	2	18088	3	0	0.000000000000
11	R&D	Healthcare Representative	9	2	7528	2	9	6.870229007633