SQL PROJECT

HR ANALYTICS REPORT

PROBLEM STATEMENT:

In the contemporary business environment, the Human Resources (HR) department plays a pivotal role in maintaining workforce efficiency, employee satisfaction, and organizational growth. However, many HR departments struggle with fragmented data sources, lack of consolidated performance indicators, and limited visibility into key workforce metrics. This challenge often leads to inefficiencies in workforce planning, talent management, and attrition control.

This dashboard focuses on addressing core challenges, including:

- **Workforce Monitoring:** Gaining visibility into total number of employees, attrition, and average employee age.
- **Attrition Analysis:** Tracking attrition count and rate to measure employee turnover, satisfaction, and engagement.
- **Talent Strategy:** Providing insights into employee demographics (age, gender) to inform recruitment, retention, succession planning, and the organization's ability to attract and retain younger talent.

To address these challenges, the HR Analytics Dashboard was designed as a data-driven solution that consolidates employee data, monitors key metrics, and converts raw HR data into actionable insights. Through SQL-based queries and dynamic visualizations, the dashboard provides a holistic view of workforce performance, attrition trends, and demographic distributions. It enables strategic decision-making in recruitment, retention, and succession planning by identifying critical HR indicators.

The primary objectives of this HR Analytics Dashboard are to improve visibility in employee trends, enable predictive workforce planning, and assist HR managers in making evidence-based decisions. By tracking key metrics such as total employee count, attrition rate, job satisfaction, and departmental performance, the dashboard transforms HR management into a measurable, performance-oriented function.

KPIs	Objective and Insight
Total Employee Count	Measures the total size of the workforce, essential for assessing current staff levels and future planning.
Attrition Count	Tracks the total number of employees who have permanently left the organization. This is a standardized metric for tracking turnover.
Attrition Rate	Represents the overall turnover level, crucial for benchmarking and gauging general employee satisfaction.
Active Employees	The number of currently working employees, used to assess the current workforce's productivity and capacity.
Average Age	Provides insight into the age demographics, vital for succession planning and attracting/retaining talent.

IMPORT DATA IN TABLE USING QUERY

COPY hrdata FROM 'D:\hrdata.csv' DELIMITER ',' CSV HEADER;

```
1
2     ## CREATING DATABASE ##
3     CREATE DATABASE hr_database;
4     ------------------------------------------------------------------------------------
5     ## CREATING TABLES ##
6     CREATE TABLE hrdata (
7         emp_no  INT8 PRIMARY KEY,
8         gender VARCHAR(50) NOT NULL,
9         marital_status VARCHAR(50),
10        age_band VARCHAR(50),
11        age INT8,
12        department VARCHAR(50),
13        education VARCHAR(50),
14        education_field VARCHAR(50),
15        job_role VARCHAR(50),
16        business_travel VARCHAR(50),
17        employee_count INT8,
18        attrition VARCHAR(50),
19        attrition_label VARCHAR(50),
20        job_satisfaction INT8,
21        active_employee INT8
22    );
23    ------------------------------------------------------------------------------------
```

- **CREATE DATABASE**

```
CREATE DATABASE hr_database;
```

- **CREATE TABLE**

```
create table hrdata (
        emp_no int8 PRIMARY KEY,
        gender varchar(50) NOT NULL,
        marital_status varchar(50),
        age_band varchar(50),
        age int8,
        department varchar(50),
        education varchar(50),
        education_field varchar(50),
        job_role varchar(50),
        business_travel varchar(50),
        employee_count int8,
        attrition varchar(50),
        attrition_label varchar(50),
        job_satisfaction int8,
        active_employee int8
);
```

DASHBOARD 1: SUMMARY (KEY PERFORMANCE INDICATORS)

The Summary Dashboard presents an overview of the organization's workforce health and structure. It includes key performance indicators (KPIs) that track employee count, attrition, and demographic trends. Each metric was computed using SQL queries applied to the HR dataset (hrdata table). These KPIs provide critical insights into employee strength, attrition, engagement, and workforce demographics.

Key Performance Indicators (KPIs) Requirements:

1. **Total Employee Count**
   - ✓ **Objective:** To determine the total number of employees currently part of the organization.
   - ✓ **SQL Query:** SELECT sum(employee_count) FROM hrdata;
   - ✓ **Output:** 1,470
   - ✓ **Insight:** The organization employs 1,470 individuals, reflecting a moderately sized workforce suitable for scalable HR operations and future planning.

Employee_Count:

```
23      ---------------------------------------------------------------------------------------
24
25      ## Employee Count ##
26 •    SELECT sum(employee_count) AS Employee_Count FROM hrdata
27      -- WHERE education = 'High School'
28      -- WHERE department = 'Sales' ;
29      -- WHERE department = 'R&D';
30      WHERE education_field = 'Medical';
31
32      ---------------------------------------------------------------------------------------
33
```

SELECT sum(employee_count) AS Employee_Count FROM hrdata;

-- WHERE education = 'High School'

-- WHERE department = 'Sales' ;

-- WHERE department = 'R&D';

-- WHERE education_field = 'Medical'

OUTPUT:

Employee_Count	1470

2. Attrition Count

- ✓ **Objective:** To quantify the number of employees who have left the organization permanently.
- ✓ **SQL Query:** SELECT count(attrition) FROM hrdata WHERE attrition='Yes';
- ✓ **Output:** 237
- ✓ **Insight:** A total of 237 employees have left, signaling potential issues with job satisfaction or compensation that require further exploration.

Attrition_Count:

```
32    ------------------------------------------------------------------------------------------
33
34    ## Attrition Count ##
35    SELECT count(attrition) FROM hrdata
36    WHERE attrition='Yes'
37    AND education = 'Doctoral Degree'
38    AND department = 'R&D'
39    AND education_field = 'Medical';
40
41    ------------------------------------------------------------------------------------------
```

SELECT count(attrition) FROM hrdata

WHERE attrition='Yes'

AND education = 'Doctoral Degree'

AND department = 'R&D'

AND education_field = 'Medical';

OUTPUT:

Attrition_Count	237

---

3. Attrition Rate

- ✓ **Objective:** To measure the percentage of employee turnover relative to the total workforce.
- ✓ **SQL Query:** SELECT round(((SELECT count(attrition) FROM hrdata WHERE attrition='Yes')/ sum(employee_count)) * 100,2) FROM hrdata;
- ✓ **Output:** 16.12%
- ✓ **Insight:** A 16.12% attrition rate is moderately high, suggesting the organization should strengthen its employee engagement and retention strategies.

Attrition_Rate:

```
41  -------------------------------------------------------------------------------------
42
43  ## Attrition Rate ##
44  SELECT
45  round (((SELECT count(attrition) FROM hrdata WHERE attrition='Yes')/
46  sum(employee_count)) * 100,2) FROM hrdata
47  WHERE department = 'Sales';
48
49  -------------------------------------------------------------------------------------
```

SELECT

round (((SELECT count(attrition) FROM hrdata WHERE attrition='Yes')/

sum(employee_count)) * 100,2) FROM hrdata

WHERE department = 'Sales';

OUTPUT:

Attrition_Rate	16.12 %

---

4. Active Employees

- ✓ **Objective:** To identify the number of employees who are currently active in the organization.
- ✓ **SQL Query:** SELECT sum(employee_count) - (SELECT count(attrition) FROM hrdata WHERE attrition='Yes') FROM hrdata;
- ✓ **Output:** 1,233
- ✓ **Insight:** With 1,233 active employees, the organization maintains a strong base of operational staff, essential for sustaining productivity levels.

Active_Employee:

```
51  ## Active Employee ##
52  SELECT sum(employee_count) - (SELECT count(attrition) FROM hrdata
53  WHERE attrition='Yes') FROM hrdata;
54  -- OR
55  SELECT (SELECT sum(employee_count) FROM hrdata) - count(attrition) AS active_employee
56  FROM hrdata
57  WHERE attrition='Yes';
58
```

SELECT sum(employee_count) - (SELECT count(attrition) FROM hrdata

WHERE attrition='Yes') FROM hrdata;

-- OR

SELECT (SELECT sum(employee_count) FROM hrdata) - count(attrition) AS active_employee

FROM hrdata

WHERE attrition='Yes';

OUTPUT:

Active_Employees	1233

---

5. Average Age

- ✓ **Objective:** To determine the average age of the workforce, which helps analyze generational balance and succession planning needs.
- ✓ **SQL Query:** SELECT round(AVG(age),0) FROM hrdata;
- ✓ **Output:** 37
- ✓ **Insight:** The average age of 37 indicates a mid-career workforce, ideal for balancing experience with adaptability in a dynamic business environment.

Average_Age:

```
56  ------------------------------------------------------------------------------------------
57
58  ## Average Age ##
59  SELECT round(AVG(age),0) AS Avg_age FROM hrdata;
60
61  ------------------------------------------------------------------------------------------
62
```

SELECT round(AVG(age),0) AS Avg_age FROM hrdata;

OUTPUT:

Avg_Age	37

DASHBOARD 2: OVERVIEW (VISUALIZATIONS & TRENDS)

The Overview Dashboard offers a visual representation of key workforce trends. It helps HR professionals identify patterns in attrition, age distribution, and job satisfaction across various organizational dimensions.

1. **Attrition by Gender**
   - **Chart Type:** Line Chart
   - **Objective:** To analyze gender-specific attrition patterns and detect disparities.
   - **SQL Query:** SELECT gender, count(attrition) AS attrition_count FROM hrdata WHERE attrition='Yes' GROUP BY gender ORDER BY count(attrition) DESC;
   - **Insight:** Male attrition (150) nearly doubles that of females (87), suggesting that male employees may experience higher job-related stress or lack of engagement.

Attrition_by_Gender

```
61  -------------------------------------------------------------------------------------
62
63  ## Attrition by Gender ##
64  SELECT gender, count(attrition) AS attrition_count FROM hrdata
65  WHERE attrition='Yes'
66  GROUP BY gender
67  ORDER BY count(attrition) DESC;
68
69  -------------------------------------------------------------------------------------
```

SELECT gender, count(attrition) AS attrition_count FROM hrdata

WHERE attrition='Yes'

GROUP BY gender

ORDER BY count(attrition) DESC;

OUTPUT:

Attrition_By_Gender	
Gender	**Attrition_count**
Female	87
Male	150

---

2. **Department-wise Attrition**
   - **Chart Type:** Pie Chart
   - **Objective:** To evaluate department-level attrition trends for identifying high-risk divisions.
   - **SQL Query:** SELECT department, COUNT(*) AS total_attritions FROM hrdata WHERE attrition='Yes' GROUP BY department ORDER BY total_attritions DESC;
   - **Insight:** The R&D department accounts for over 56% of attrition, indicating burnout or limited career advancement opportunities in this area.

Department_wise_Attrition:

```
69  ------------------------------------------------------------------------------------------
70
71  ## Department wise Attrition ##
72  SELECT
73      department,
74      COUNT(*) AS total_attritions,
75      ROUND(
76          (SUM(CASE WHEN gender = 'Female' THEN 1 ELSE 0 END) /
77           (SELECT COUNT(*) FROM hrdata WHERE attrition = 'Yes')) * 100,
78          2
79      ) AS female_attrition_pct_of_total
80  FROM hrdata
81  WHERE attrition = 'Yes'
82  GROUP BY department
83  ORDER BY total_attritions DESC;
84  ------------------------------------------------------------------------------------------
```

```
SELECT
   department,
   COUNT(*) AS total_attritions,
   ROUND(
      (SUM(CASE WHEN gender = 'Female' THEN 1 ELSE 0 END) /
       (SELECT COUNT(*) FROM hrdata WHERE attrition = 'Yes')) * 100,
      2
   ) AS female_attrition_pct_of_total
FROM hrdata
WHERE attrition = 'Yes'
GROUP BY department
ORDER BY total_attritions DESC;
```

OUTPUT:

Department_Wise_Attrition		
Department	**total_attritions**	**female_attrition_pct_of_total**
R&D	133	18.14
Sales	92	16.03
HR	12	2.53

---

3. Number of Employees by Age Group

- **Chart Type:** Histogram
- **Objective:** To examine workforce composition across various age brackets.
- **SQL Query:** SELECT age, sum(employee_count) AS employee_count FROM hrdata GROUP BY age ORDER BY age;
- **Insight:** Employees aged 30–33 form the largest age group, highlighting a predominantly mid-level workforce that requires leadership development opportunities.

No._of_Employee_by_Age_Group

```
85    ------------------------------------------------------------------------------------------
86
87    ## No of Employee by Age Group ##
88 •  SELECT age,  sum(employee_count) AS employee_count FROM hrdata
89    GROUP BY age
90    ORDER BY age;
91
92    ------------------------------------------------------------------------------------------
```

SELECT age, sum(employee_count) AS employee_count FROM hrdata

GROUP BY age

ORDER BY age;

OUTPUT:

No._of_Employees_by_Age_Group	
Age	**Employee_count**
18	8
19	9
20	11
21	13

22	16
23	14
24	26
25	26
26	39
27	48
28	48
29	68
30	60
31	69
32	61
33	58
34	77
35	78
36	69
37	50
38	58
39	42
40	57
41	40
42	46
43	32
44	33
45	41
46	33
47	24
48	19
49	24
50	30
51	19
52	18
53	19
54	18
55	22
56	14
57	4
58	14
59	10
60	5

4. **Job Satisfaction Rating**
   - **Chart Type:** Cross-tab Table
   - **Objective:** To measure engagement levels across different job roles.
   - **SQL Query:** SELECT job_role, SUM(CASE WHEN job_satisfaction = 1 THEN employee_count ELSE 0 END) AS 'Rating 1', SUM(CASE WHEN job_satisfaction = 4 THEN employee_count ELSE 0 END) AS 'Rating 4' FROM hrdata GROUP BY job_role;
   - **Insight:** Sales Representatives and Laboratory Technicians report the highest satisfaction levels, with most employees rating 4 out of 5.

Job_Satisfaction_Rating

```
113     -------------------------------------------------------------------------------------
114
115     ## Job Satisfaction Rating ##
116 •   SELECT
117       job_role AS 'Job Role',
118       SUM(CASE WHEN job_satisfaction = 1 THEN employee_count ELSE 0 END) AS 'Rating 1',
119       SUM(CASE WHEN job_satisfaction = 2 THEN employee_count ELSE 0 END) AS 'Rating 2',
120       SUM(CASE WHEN job_satisfaction = 3 THEN employee_count ELSE 0 END) AS 'Rating 3',
121       SUM(CASE WHEN job_satisfaction = 4 THEN employee_count ELSE 0 END) AS 'Rating 4'
122     FROM hrdata
123     GROUP BY job_role
124     ORDER BY job_role;
125
126     -------------------------------------------------------------------------------------
```

```
SELECT
  job_role AS 'Job Role',
  SUM(CASE WHEN job_satisfaction = 1 THEN employee_count ELSE 0 END) AS 'Rating 1',
  SUM(CASE WHEN job_satisfaction = 2 THEN employee_count ELSE 0 END) AS 'Rating 2',
  SUM(CASE WHEN job_satisfaction = 3 THEN employee_count ELSE 0 END) AS 'Rating 3',
  SUM(CASE WHEN job_satisfaction = 4 THEN employee_count ELSE 0 END) AS 'Rating 4'
FROM hrdata
GROUP BY job_role
ORDER BY job_role;
```

OUTPUT:

Job_Satisfaction_Rate

Job Role	Rating 1	Rating 2	Rating 3	Rating 4
Healthcare Representative	26	19	43	43
Human Resources	10	16	13	13
Laboratory Technician	56	48	75	80
Manager	21	21	27	33

Manufacturing Director	26	32	49	38
Research Director	15	16	27	22
Research Scientist	54	53	90	95
Sales Executive	69	54	91	112
Sales Representative	12	21	27	23

DASHBOARD 3: DETAILS (ATTRITION BREAKDOWN)

The Details Dashboard provides in-depth analysis of attrition based on educational background, gender, and age groups. These insights help HR professionals identify vulnerable employee segments and design focused retention programs.

5. **Education Field-wise Attrition**
   - **Chart Type:** Bar Chart
   - **Objective:** To evaluate which educational fields show higher attrition rates.
   - **SQL Query:** SELECT education_field, count(attrition) AS attrition_count FROM hrdata WHERE attrition='Yes' GROUP BY education_field ORDER BY count(attrition) DESC;
   - **Insight:** Employees from Life Sciences and Medical fields exhibit higher attrition (89 and 83 respectively), possibly due to external job market demand.

Education_Field_wise_Attrition:

```
92   ------------------------------------------------------------------------------------------
93
94   ## Education Field wise Attrition ##
95   SELECT education_field, count(attrition) AS attrition_count FROM hrdata
96   WHERE attrition='Yes'
97   GROUP BY education_field
98   ORDER BY count(attrition) DESC;
99
100  ------------------------------------------------------------------------------------------
```

SELECT education_field, count(attrition) AS attrition_count FROM hrdata

WHERE attrition='Yes'

GROUP BY education_field

ORDER BY count(attrition) DESC;

OUTPUT:

Education_Field_wise_Attrition	
Education_field	**Attrition_count**
Life Sciences	89
Medical	63
Marketing	35
Technical Degree	32
Other	11
Human Resources	7

6. **Attrition Rate by Gender for Different Age Groups**
   - **Chart Type:** Donut Chart
   - **Objective:** To assess attrition patterns across gender-age combinations for targeted interventions.
   - **SQL Query:** SELECT age_band, gender, COUNT(*) AS attrition, ROUND((CAST(COUNT(*) AS DECIMAL(10,4)) / (SELECT COUNT(*) FROM hrdata WHERE attrition='Yes')) * 100, 2) AS pct FROM hrdata WHERE attrition='Yes' GROUP BY age_band, gender ORDER BY age_band, gender DESC;
   - **Insight:** The 25–34 age group experiences the highest attrition (29.11%), suggesting early-career disengagement that should be addressed through mentorship and career growth programs.

Attrition_Rate_by_Gender_for_different_Age_Group

```
100     -------------------------------------------------------------------------------------
101
102     ## Attrition Rate by Gender for different Age Group ##
103 •     SELECT age_band, gender,
104       COUNT(*) AS attrition,
105       ROUND(
106         (CAST(COUNT(*) AS DECIMAL(10,4)) /
107          (SELECT COUNT(*) FROM hrdata WHERE attrition = 'Yes')) * 100, 2) AS pct
108     FROM hrdata
109     WHERE attrition = 'Yes'
110     GROUP BY age_band, gender
111     ORDER BY age_band, gender DESC;
112
113     -------------------------------------------------------------------------------------
```

```
SELECT age_band, gender,
COUNT(*) AS attrition,
ROUND(
  (CAST(COUNT(*) AS DECIMAL(10,4)) /
   (SELECT COUNT(*) FROM hrdata WHERE attrition = 'Yes')) * 100, 2) AS pct
FROM hrdata
WHERE attrition = 'Yes'
GROUP BY age_band, gender
ORDER BY age_band, gender DESC;
```

OUTPUT:

Attrition_Rate_By_Gender_For_Different_Age_Group			
age_band	**gender**	**attrition**	**pct**
25 - 34	Male	69	29.11
25 - 34	Female	43	18.14
35 - 44	Male	37	15.61
35 - 44	Female	14	5.91
45 - 54	Male	16	6.75
45 - 54	Female	9	3.8
Over 55	Male	8	3.38
Over 55	Female	3	1.27
Under 25	Male	20	8.44
Under 25	Female	18	7.59

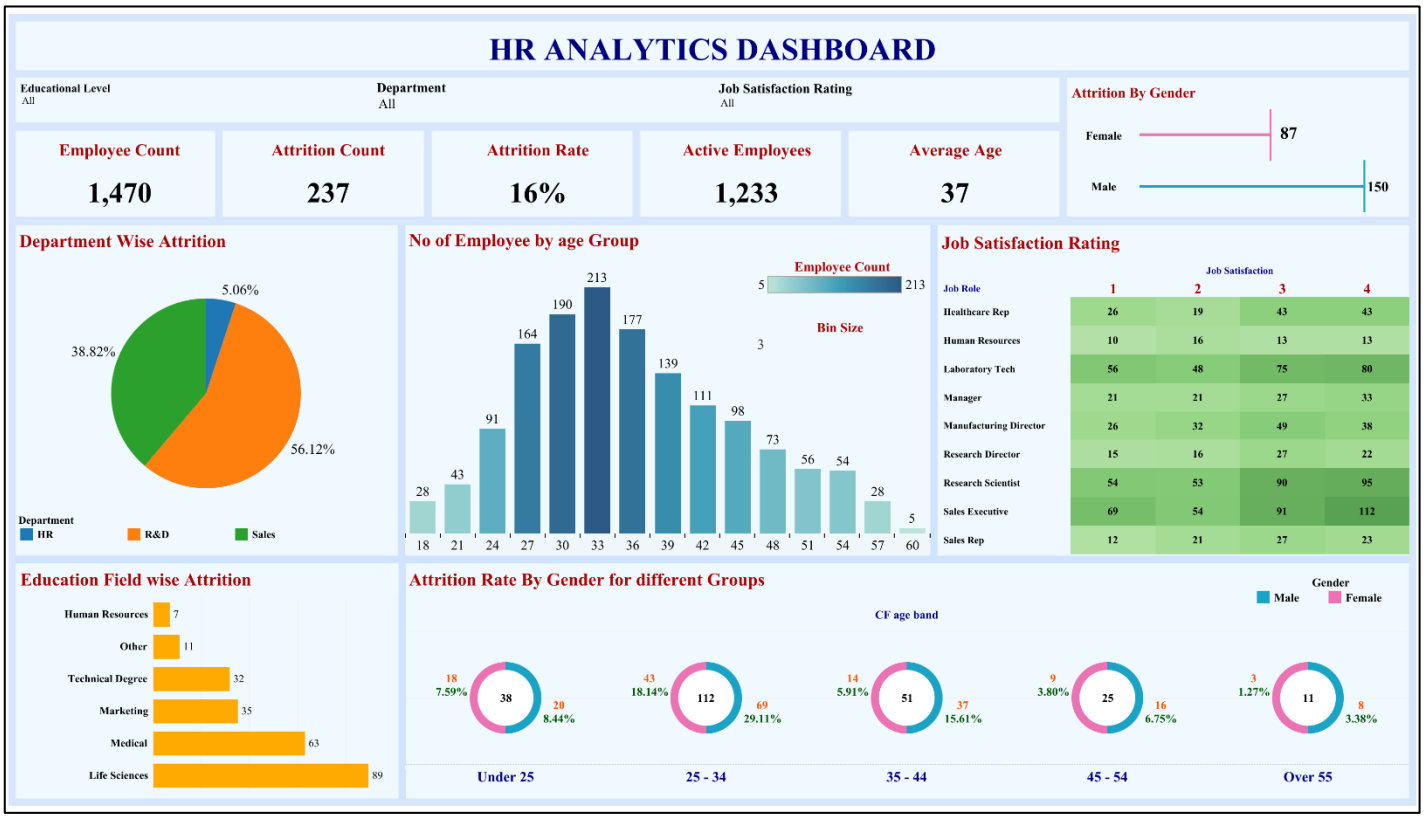
CONCLUSION

The HR Analytics Dashboard serves as a comprehensive decision-support tool for modern HR management. By leveraging SQL-based data analysis, it provides clarity on workforce structure, attrition trends, and employee satisfaction. This structured approach transforms HR from a reactive function into a proactive, strategy-driven department.

Through actionable insights, HR teams can now focus on key retention areas, identify demographic risks, and implement targeted development programs. In the long term, the dashboard enhances data visibility, supports performance management, and promotes organizational resilience through data-driven HR practices.

TESTING TABLEAU REPORT IN SQL

TABLEAU DASHBOARD



TEST DOCUMENT

Client Name	ZS COMPANY
Report Name	HR Analytics Dashboard
Developer Name	Anuj Shrivastava
Tester Name	Anuj Shrivastava
Project Manager	Anuj Shrivastava
Development Tool	**Tableau Desktop**

Test No.	Sheet Name	Query	Test Result	QA Remark
1	KPI- Employee Count	select sum(employee_count) as Employee_Count from hrdata;	Pass	Exact match
2	KPI- Attrition Count	select count(attrition) from hrdata where attrition='Yes';	Pass	Exact match
3	KPI- Attrition Rate	select round (((select count(attrition) from hrdata where attrition='Yes')/ sum(employee_count)) * 100,2) from hrdata;	Pass	Exact match
4	KPI- Active Employee	select sum(employee_count) - (select count(attrition) from hrdata where attrition='Yes') from hrdata;	Pass	Exact match
5	KPI- Average Age	select round(avg(age),0) from hrdata;	Pass	Exact match
6	Attrition by Gender	select gender, count(attrition) as attrition_count from hrdata where attrition='Yes' group by gender order by count(attrition) desc;	Pass	Exact match
7	Department wise Attrition	select department, count(attrition), round((cast (count(attrition) as numeric) / (select count(attrition) from hrdata where attrition= 'Yes')) * 100, 2) as pct from hrdata where attrition='Yes' group by department order by count(attrition) desc;	Pass	Exact match
8	No of Employee by Age Group	SELECT age, sum(employee_count) AS employee_count FROM hrdata GROUP BY age order by age;	Pass	Exact match

9	Education Field wise Attrition	select education_field, count(attrition) as attrition_count from hrdata where attrition='Yes' group by education_field order by count(attrition) desc;	Pass	Exact match
10	Attrition Rate by Gender for different Age group	select age_band, gender, count(attrition) as attrition, round((cast(count(attrition) as numeric) / (select count(attrition) from hrdata where attrition = 'Yes')) * 100,2) as pct from hrdata where attrition = 'Yes' group by age_band, gender order by age_band desc;	Pass	Exact match
11	Job Satisfaction Rating	SELECT * FROM crosstab('SELECT job_role, job_satisfaction, sum(employee_count) FROM hrdata GROUP BY job_role, job_satisfaction ORDER BY job_role, job_satisfaction') AS ct(job_role varchar(50), one numeric, two numeric, three numeric, four numeric) ORDER BY job_role;	Pass	Exact match

Test Result:

Total Tests	11
Pass	11
Fail	00
Blocked	00
Not Executed	00

END
