Employee Performance and Productivity Analysis

A Comprehensive Data Analysis Using **Excel, Power BI, and MySQL**

Introduction to Employee Performance and Productivity Analysis

Employee Performance and Productivity Analysis is a data-driven approach to assess and understand workforce efficiency, satisfaction, and productivity. By analyzing factors like department distribution, work hours, training, salary, performance scores, and resignation rates, organizations gain insights into areas like employee engagement, workload, retention, and overall performance trends. This helps in making informed decisions to enhance productivity, support employee well-being, and align HR strategies with business goals.

Tools used for analysis

MySQL

Power BI

Data Description

An overview of the data collected from KAGGLE for analyzing employee performance and productivity

Column Name	Description
Employee_ID	Unique identifier for each employee.
Department	Department in which the employee works (e.g., Sales, IT, HR).
Gender	Gender of the employee (e.g., Male, Female, Other).
Age	Age of the employee in years.
Job_Title	Position or title held by the employee within the organization.
Hire_Date	Date when the employee joined the company.
Years_At_Company	Total years the employee has been with the company.
Education_Level	Highest education level attained by the employee (e.g., Bachelor's, Master's, PhD).
Performance_Score	Rating of the employee's performance based on company metrics, usually on a scale (e.g.,1-5).
Monthly_Salary	The monthly salary of the employee in currency units.

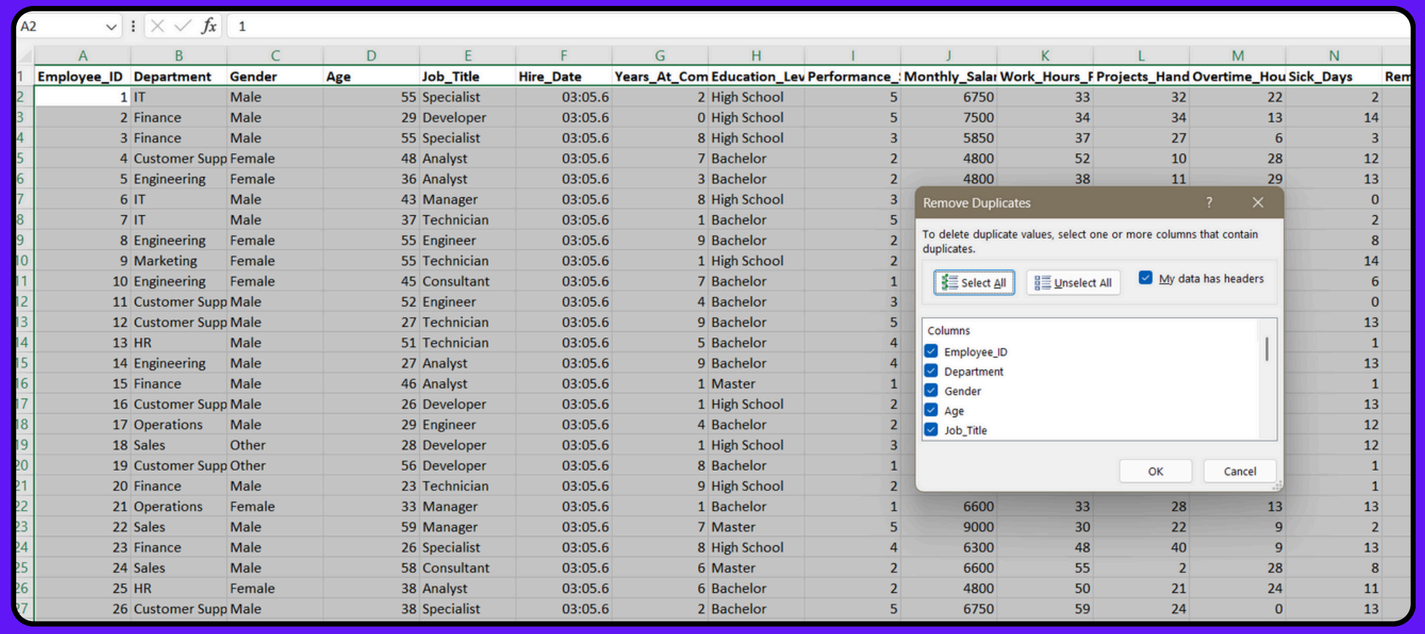
Work_Hours_Per_Week	Average number of hours the employee works per week.
Projects_Handled	Number of projects managed or contributed to by the employee.
Overtime_Hours	Total number of overtime hours worked by the employee.
Sick_Days	Number of sick days taken by the employee in a specified period.
Remote_Work_Frequency	Frequency of remote work (e.g., Daily, Weekly, Monthly).
Team_Size	Number of members in the employee's team.
Training_Hours	Total hours spent by the employee in training programs.
Promotions	Number of promotions the employee has received during their tenure.
Employee_Satisfaction_Score	Satisfaction score given by the employee, typically on a scale (e.g., 1-10).
Resigned	Indicates whether the employee has resigned (Yes/No).

Data Cleaning and Preparation with Excel

Essential Steps for Effective Employee Performance Analysis

Removing duplicate entries

Eliminating duplicate records ensures that each employee's performance is evaluated based on unique data points.



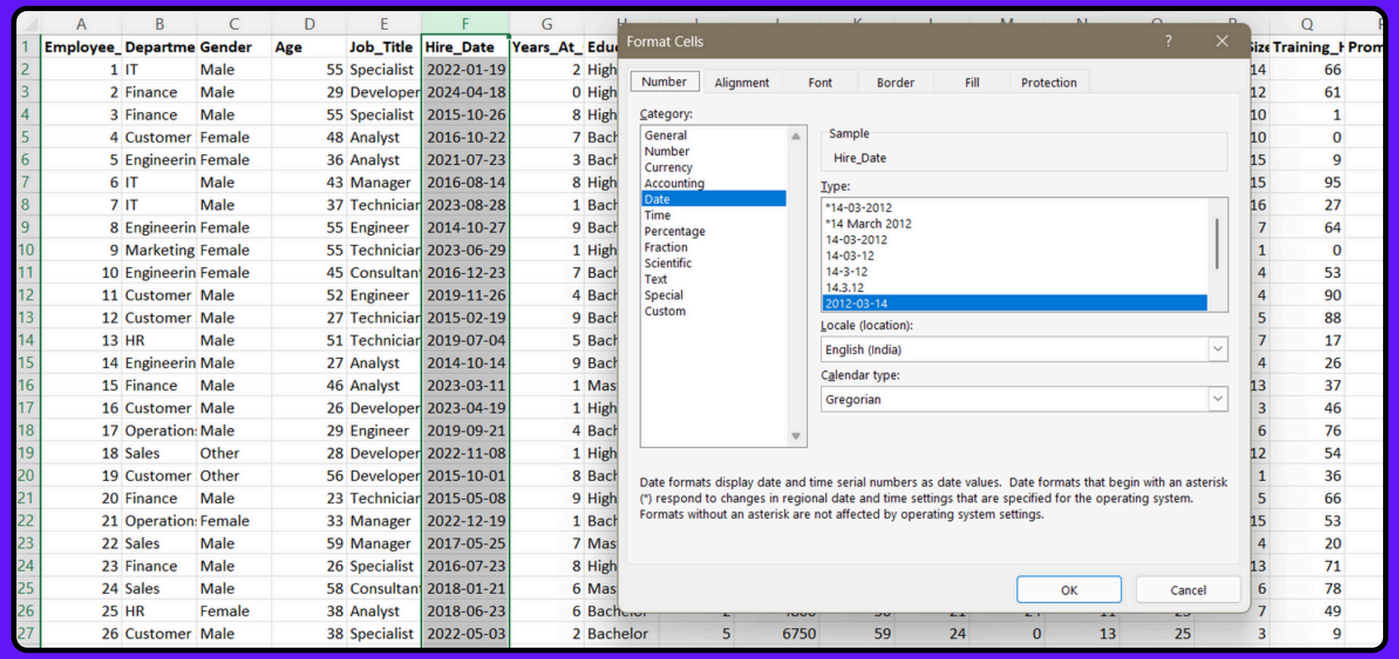
Employee_ID	Department	Gender	Age	Job_Title	Hire_Date	Years_At_Com	Education_Lev	Performance_	Monthly_Salar	Work_Hours_F	Projects_Hand	Overtime_Hou	Sick_Days	Rem
1	IT	Male	55	Specialist	03:05.6	2	High School	5	6750	33	32	22	2	
2	Finance	Male	29	Developer	03:05.6	0	High School	5	7500	34	34	13	14	
3	Finance	Male	55	Specialist	03:05.6	8	High School	3	5850	37	27	6	3	
4	Customer Supp	Female	48	Analyst	03:05.6	7	Bachelor	2	4800	52	10	28	12	
5	Engineering	Female	36	Analyst	03:05.6	3	Bachelor	2	4800	38	11	29	13	
6	IT	Male	43	Manager	03:05.6	8	High School	3					0	
7	IT	Male	37	Technician	03:05.6	1	Bachelor	5					2	
8	Engineering	Female	55	Engineer	03:05.6	9	Bachelor	2					8	
9	Marketing	Female	55	Technician	03:05.6	1	High School	2					14	
10	Engineering	Female	45	Consultant	03:05.6	7	Bachelor	1					6	
11	Customer Supp	Male	52	Engineer	03:05.6	4	Bachelor	3					0	
12	Customer Supp	Male	27	Technician	03:05.6	9	Bachelor	5					13	
13	HR	Male	51	Technician	03:05.6	5	Bachelor	4					1	
14	Engineering	Male	27	Analyst	03:05.6	9	Bachelor	4					13	
15	Finance	Male	46	Analyst	03:05.6	1	Master	1					1	
16	Customer Supp	Male	26	Developer	03:05.6	1	High School	2					13	
17	Operations	Male	29	Engineer	03:05.6	4	Bachelor	2					12	
18	Sales	Other	28	Developer	03:05.6	1	High School	3					12	
19	Customer Supp	Other	56	Developer	03:05.6	8	Bachelor	1					1	
20	Finance	Male	23	Technician	03:05.6	9	High School	2					1	
21	Operations	Female	33	Manager	03:05.6	1	Bachelor	1	6600	33	28	13	13	
22	Sales	Male	59	Manager	03:05.6	7	Master	5	9000	30	22	9	2	
23	Finance	Male	26	Specialist	03:05.6	8	High School	4	6300	48	40	9	13	
24	Sales	Male	58	Consultant	03:05.6	6	Master	2	6600	55	2	28	8	
25	HR	Female	38	Analyst	03:05.6	6	Bachelor	2	4800	50	21	24	11	
26	Customer Supp	Male	38	Specialist	03:05.6	2	Bachelor	5	6750	59	24	0	13	

Data Cleaning and Preparation with Excel

Essential Steps for Effective Employee Performance Analysis

Change Format of Hire_Date

A standard format ensures accurate calculations, such as years at the company or comparisons across different hire dates.



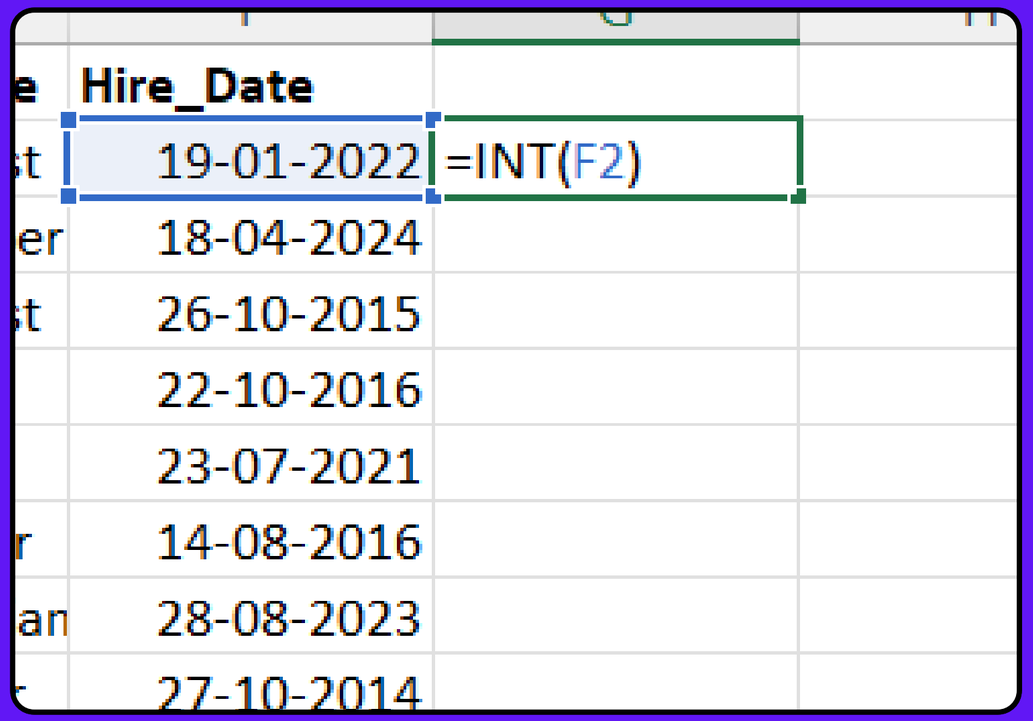
	A	B	C	D	E	F	G	Q
1	Employee_	Departme	Gender	Age	Job_Title	Hire_Date	Years_At_	Training_H
2	1	IT	Male	55	Specialist	2022-01-19	2	66
3	2	Finance	Male	29	Developer	2024-04-18	0	61
4	3	Finance	Male	55	Specialist	2015-10-26	8	1
5	4	Customer	Female	48	Analyst	2016-10-22	7	0
6	5	Engineerin	Female	36	Analyst	2021-07-23	3	9
7	6	IT	Male	43	Manager	2016-08-14	8	95
8	7	IT	Male	37	Technician	2023-08-28	1	27
9	8	Engineerin	Female	55	Engineer	2014-10-27	9	64
10	9	Marketing	Female	55	Technician	2023-06-29	1	0
11	10	Engineerin	Female	45	Consultan	2016-12-23	7	53
12	11	Customer	Male	52	Engineer	2019-11-26	4	90
13	12	Customer	Male	27	Technician	2015-02-19	9	88
14	13	HR	Male	51	Technician	2019-07-04	5	17
15	14	Engineerin	Male	27	Analyst	2014-10-14	9	26
16	15	Finance	Male	46	Analyst	2023-03-11	1	37
17	16	Customer	Male	26	Developer	2023-04-19	1	46
18	17	Operation	Male	29	Engineer	2019-09-21	4	76
19	18	Sales	Other	28	Developer	2022-11-08	1	54
20	19	Customer	Other	56	Developer	2015-10-01	8	36
21	20	Finance	Male	23	Technician	2015-05-08	9	66
22	21	Operation	Female	33	Manager	2022-12-19	1	53
23	22	Sales	Male	59	Manager	2017-05-25	7	20
24	23	Finance	Male	26	Specialist	2016-07-23	8	71
25	24	Sales	Male	58	Consultan	2018-01-21	6	78
26	25	HR	Female	38	Analyst	2018-06-23	6	49
27	26	Customer	Male	38	Specialist	2022-05-03	2	9

Data Cleaning and Preparation with Excel

Essential Steps for Effective Employee Performance Analysis

Separating Time from the Date Column

In Excel, create a new column to extract the date by using the formula =INT([cell]) (e.g., =INT(A2)) to remove the time component, leaving only the date in a clean, standardized format. Alternatively, use Text to Columns under Data, selecting Space or Custom as the delimiter to separate date and time values into distinct columns.



Analyzing Employee Performance Using MySQL

Insights into productivity factors and performance metrics

Workforce Demographics and Distribution

This examines employee distribution across departments, age groups, and education levels, giving a clearer picture of workforce composition and diversity.

Compensation, Benefits, and Satisfaction

Here, the analysis reviews salary distribution, employee satisfaction levels, and turnover rates across departments to understand how compensation and job satisfaction affect retention and morale.

Performance and Productivity

This area focuses on department-wise performance scores, the impact of training hours, and how factors like work hours influence productivity, helping to identify high-performing departments and areas for potential improvement.

Workload and Overtime

This assesses average overtime and project workload per department, highlighting departments with higher demands, which could point to workload imbalances or staffing needs.

Workforce Demographics and Distribution

What is the distribution of employees across departments?

(This question looks at where employees are most concentrated across different departments.)

```sql
SELECT
    Department, COUNT(Employee_ID) AS Total_Employees
FROM
    eppanalysis
GROUP BY Department;
```

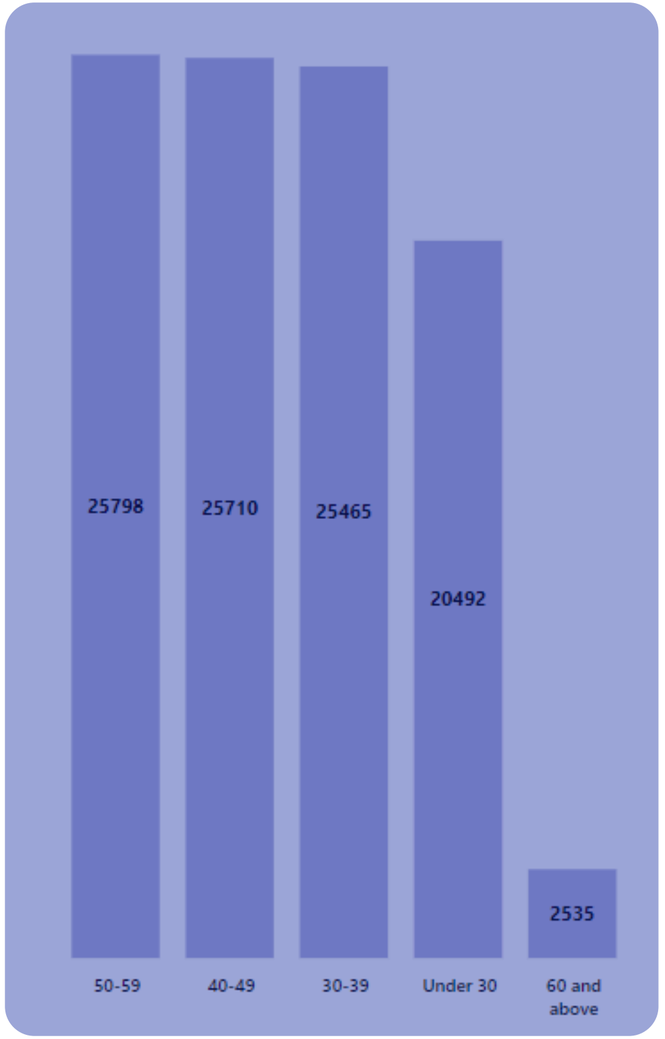
Department	Total_Employees
IT	11131
Finance	11200
Customer Support	11116
Engineering	10956
Marketing	11216
HR	10960
Operations	11181
Sales	11122
Legal	11118

What is the age distribution of employees?

(This question examines the age demographics within the workforce to understand the overall age structure.)

```sql
SELECT
    CASE
        WHEN Age < 30 THEN 'Under 30'
        WHEN Age BETWEEN 30 AND 39 THEN '30-39'
        WHEN Age BETWEEN 40 AND 49 THEN '40-49'
        ELSE '50 and above'
    END AS Age_Group,
    COUNT(Employee_ID) AS Total_Employees
FROM eppanalysis
GROUP BY Age_Group
ORDER BY Age_Group;
```

Age_Group	Total_Employees
30-39	25465
40-49	25710
50 and above	28333
Under 30	20492

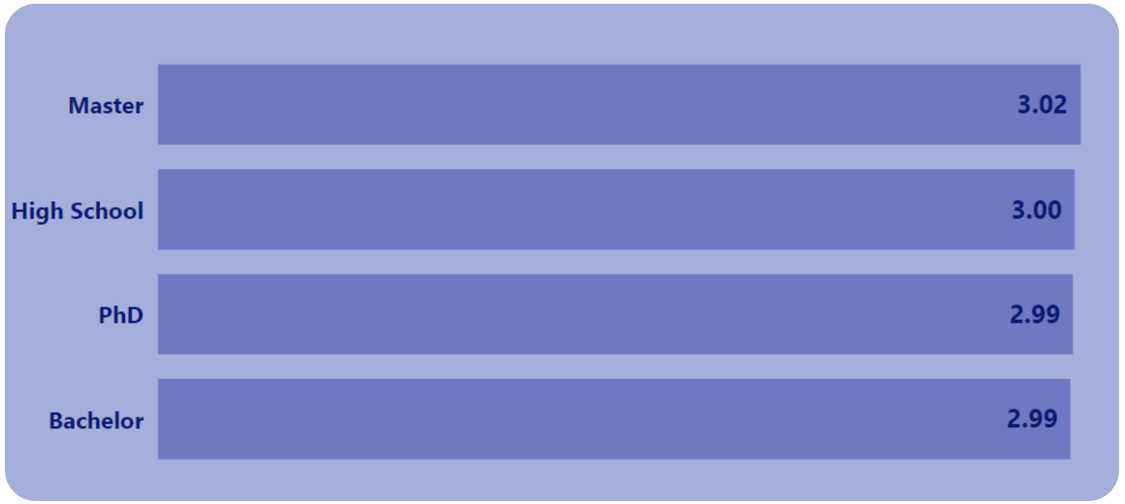


Does education level affect performance?

(This question explores if employees with different education levels show varied performance scores.)

```sql
SELECT
    Education_Level,
    ROUND(AVG(performance_Score), 2) AS Avg_Performance_Score
FROM
    eppanalysis
GROUP BY Education_Level
ORDER BY Avg_Performance_Score DESC;
```

Education_Level	Avg_Performance_Score
Master	3.02
High School	3.00
Bachelor	2.99
PhD	2.99



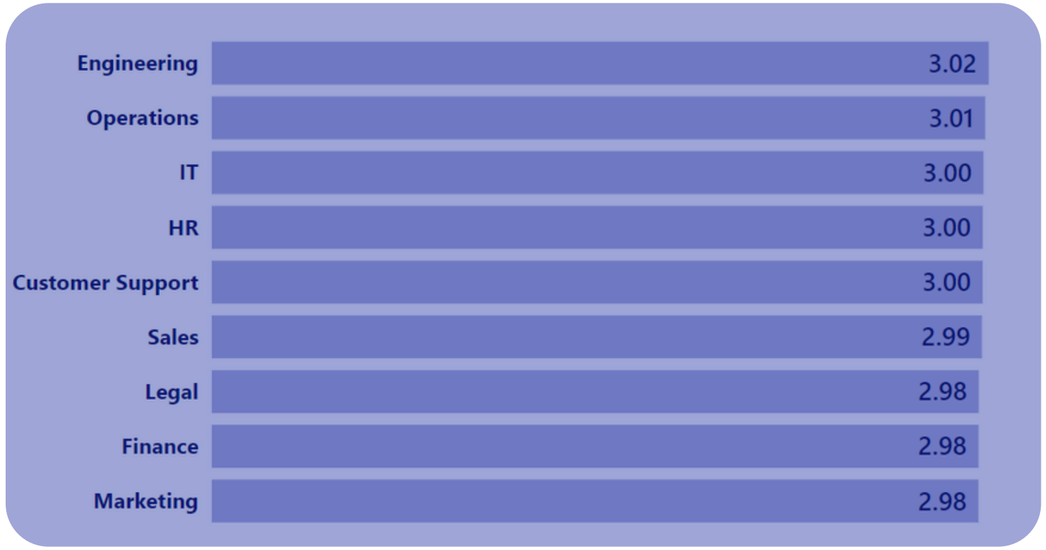
Performance and Productivity

How does the average performance score vary by department?

(This question evaluates which departments have higher or lower productivity.)

```sql
SELECT
    Department,
    ROUND(AVG(Performance_Score), 1) AS Avg_Performance_Score
FROM
    eppanalysis
GROUP BY Department
ORDER BY Avg_Performance_Score DESC;
```

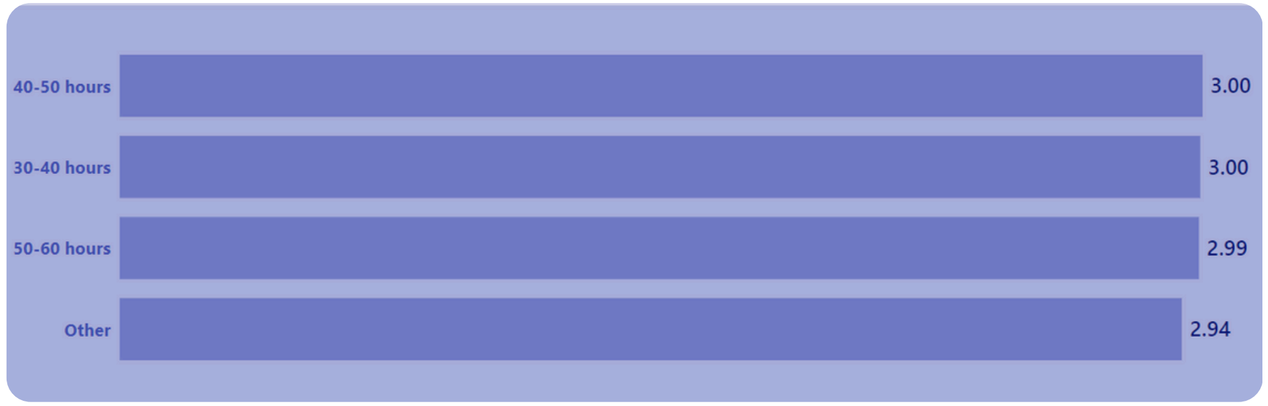
Department	Avg_Performance_Score
Engineering	3.02
Operations	3.01
IT	3.00
Customer Support	3.00
HR	3.00
Sales	2.99
Finance	2.98
Marketing	2.98
Legal	2.98



Is there a connection between the number of work hours per week and performance scores?

(This question investigates if employees who work more hours perform better or worse.)

```sql
SELECT
    CASE
        WHEN Work_Hours_Per_Week BETWEEN 30 AND 40 THEN '30-40 hours'
        WHEN Work_Hours_Per_Week BETWEEN 40 AND 50 THEN '40-50 hours'
        WHEN Work_Hours_Per_Week BETWEEN 50 AND 60 THEN '50-60 hours'
        ELSE 'Other'
    END AS Work_Hour_Range,
    ROUND(AVG(Performance_Score), 2) AS Avg_Performance_Score,
    COUNT(*) AS Employee_Count
FROM
    eppanalysis
GROUP BY
    Work_Hour_Range
ORDER BY
    Work_Hour_Range;
```



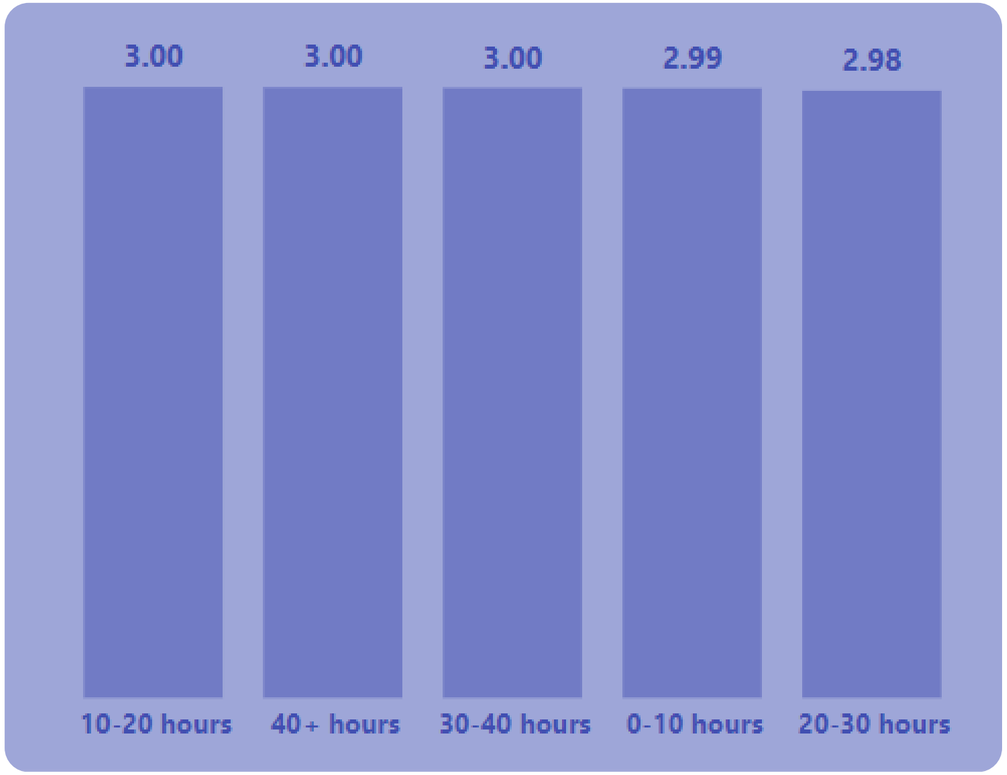
Work_Hour_Range	Avg_Performance_Score	Employee_Count
30-40 hours	3.00	35776
40-50 hours	3.00	32090
50-60 hours	2.99	32134

How do training hours affect performance scores?

(This question assesses whether more training hours lead to better performance.)

```sql
SELECT
    CASE
        WHEN Training_Hours < 10 THEN 'Low (0-10)'
        WHEN Training_Hours BETWEEN 10 AND 20 THEN 'Medium (10-20)'
        ELSE 'High (20+)'
    END AS Training_Level,
    Round(AVG(Performance_Score),1) AS Avg_Performance_Score
FROM
    eppanalysis
GROUP BY Training_Level
ORDER BY Training_Level;
```

Training_Level	Avg_Performance_Score
High (20+)	3.0
Low (0-10)	3.0
Medium (10-20)	3.0



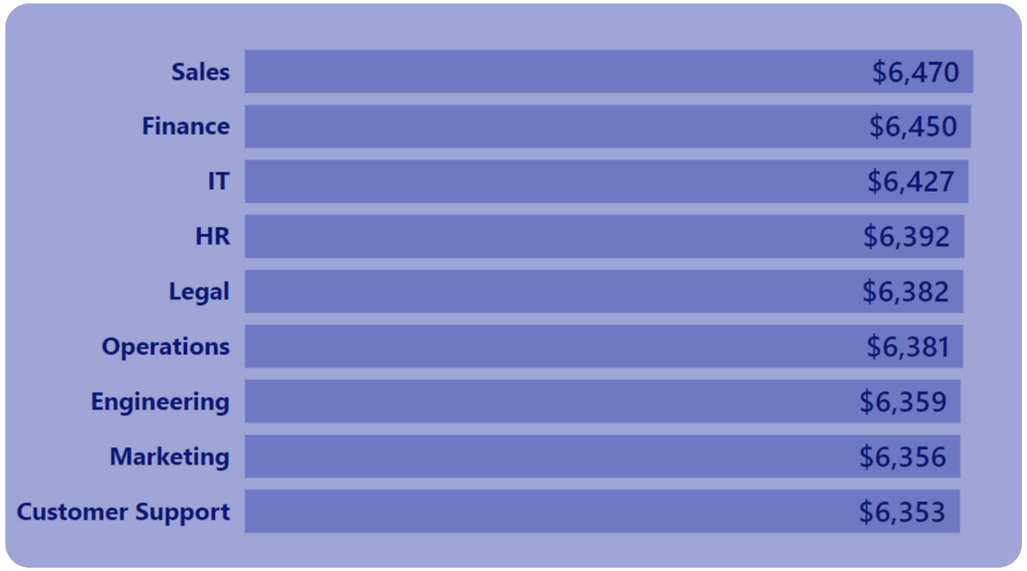
Compensation, Benefits, and Satisfaction

What is the average salary across different departments?

(This question examines how salaries are distributed among departments.)

```sql
SELECT
    Department,
    CONCAT('$', ROUND(AVG(Monthly_Salary), 0)) AS Avg_Salary
FROM
    eppanalysis
GROUP BY Department
ORDER BY Avg_Salary DESC;
```

Department	Avg_Salary
Engineering	$6417
IT	$6415
Sales	$6413
Operations	$6412
Customer Support	$6404
HR	$6400
Finance	$6399
Legal	$6391
Marketing	$6378

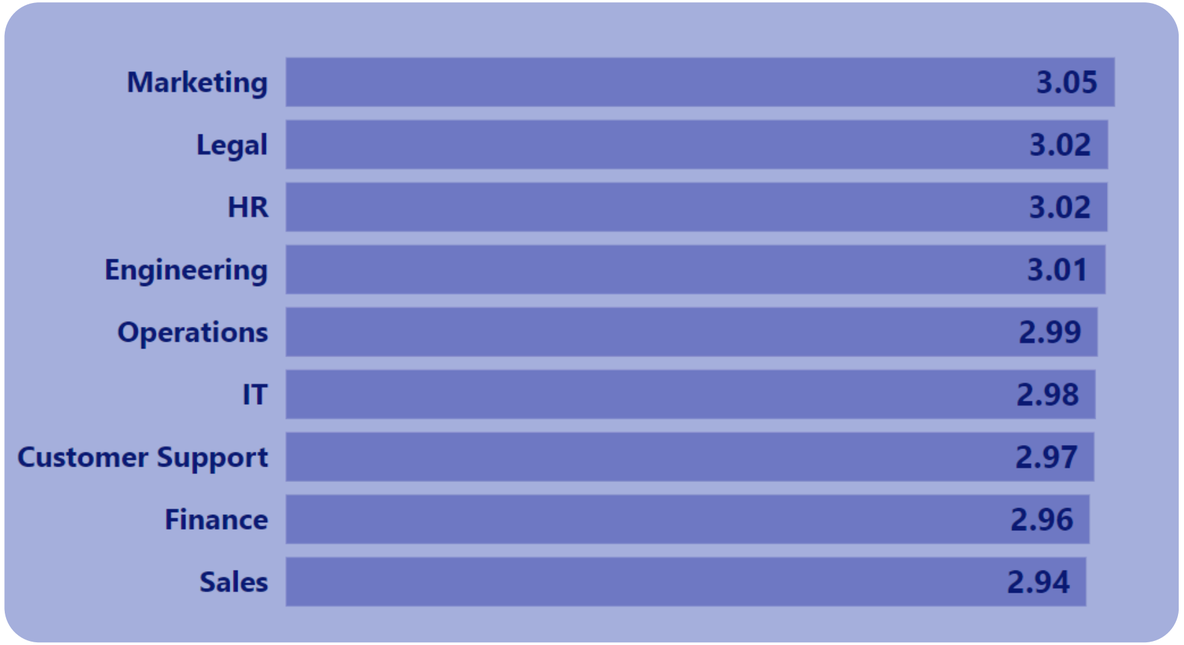


How does employee satisfaction vary by department?

(This question compares employee satisfaction levels in each department.)

```sql
SELECT
    Department,
    Round(AVG(Employee_Satisfaction_Score),1) AS Avg_Employee_Satisfaction_Score
FROM
    eppanalysis
GROUP BY Department
ORDER BY Avg_Employee_Satisfaction_Score DESC;
```

Department	Avg_Employee_Satisfaction_Score
IT	3
Finance	3
Customer Support	3
Engineering	3
Marketing	3
HR	3
Operations	3
Sales	3
Legal	3

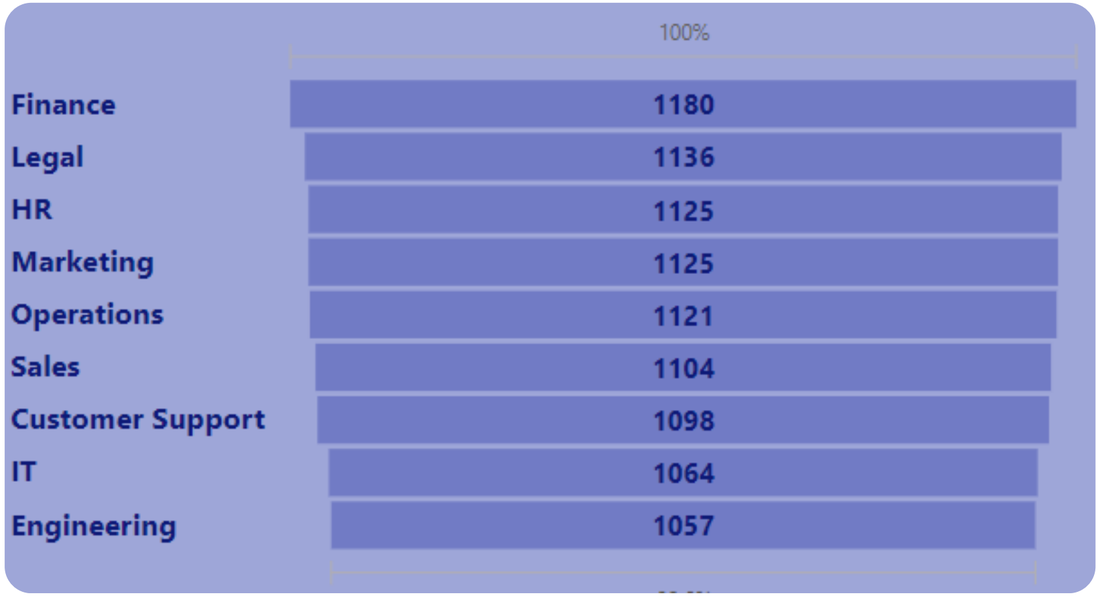


Which departments have the highest and lowest resignation rates?

(This question analyzes turnover rates to identify which departments experience more resignations.)

```sql
SELECT Department,
       COUNT(CASE WHEN Resigned = 'TRUE' THEN 1 END) AS Resignations,
       COUNT(Employee_ID) AS Total_Employees,
       ROUND((COUNT(CASE WHEN Resigned = 'TRUE' THEN 1 END) / COUNT(Employee_ID)) * 100, 1) AS Resignation_Rate
FROM eppanalysis
GROUP BY Department
ORDER BY Resignation_Rate DESC;
```

Department	Resignations	Total_Employees	Resignation_Rate
Finance	1180	11200	10.5
HR	1125	10960	10.3
Legal	1136	11118	10.2
Marketing	1125	11216	10.0
Operations	1121	11181	10.0
Customer Support	1098	11116	9.9
Sales	1104	11122	9.9
IT	1064	11131	9.6
Engineering	1057	10956	9.6



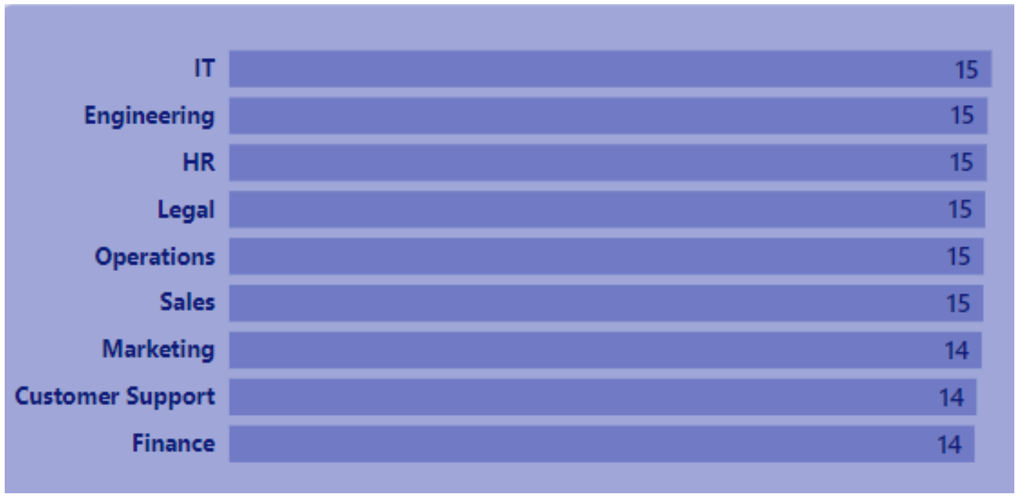
Workload and Overtime

Which departments have the highest average overtime hours?

(This question highlights departments where employees work the most overtime.)

```sql
SELECT
    Department,
    ROUND(AVG(Overtime_Hours), 0) AS Avg_Overtime_Hours
FROM
    eppanalysis
GROUP BY Department
ORDER BY Avg_Overtime_Hours DESC;
```

Department	Avg_Overtime_Hours
IT	15
Engineering	15
HR	15
Operations	15
Sales	15
Legal	15
Finance	14
Customer Support	14
Marketing	14

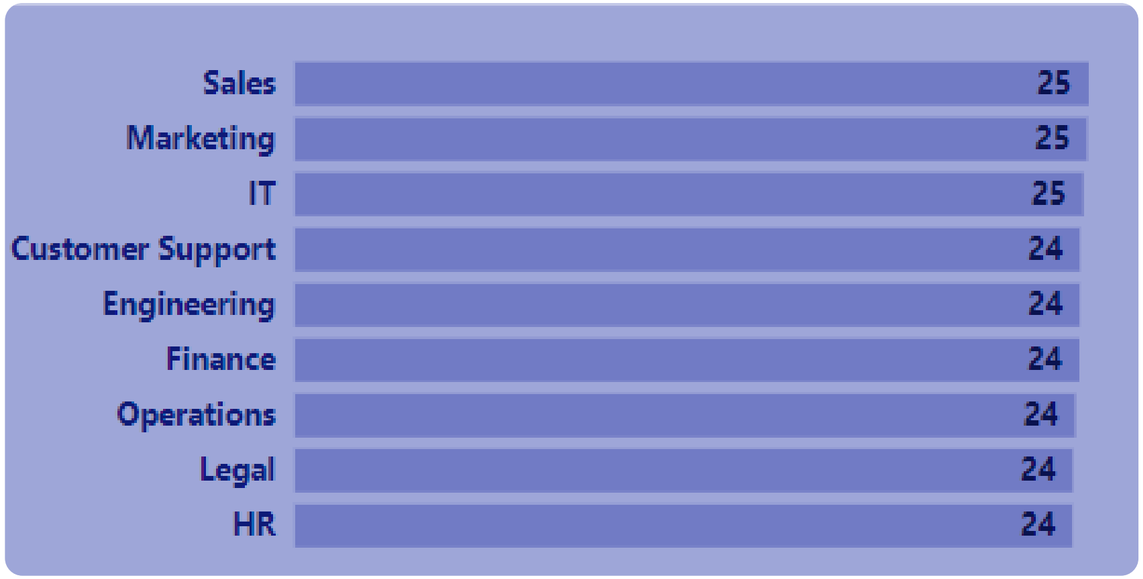


What is the average number of projects handled per employee in each department?

(This question looks at the typical workload per employee across departments.)

```sql
SELECT
    Department, Round(AVG(Projects_Handled),0) AS Avg_Projects_Handled
FROM
    eppanalysis
GROUP BY Department
ORDER BY Avg_Projects_Handled DESC;
```

Department	Avg_Projects_Handled
IT	25
Marketing	25
Sales	25
Finance	24
Customer Support	24
Engineering	24
HR	24
Operations	24
Legal	24



Insights

- The company has 100,000 employees with an average age of 41, indicating a seasoned workforce.
- Finance (11,200) and Marketing (11,216) have the highest employee counts, highlighting their strategic importance.
- Departments like IT (11,131), Customer Support (11,116), and Operations (11,181) show consistent staffing, ensuring operational efficiency.
- Workforce distribution is balanced, with no significant gaps across departments, supporting stability and strategic priorities.
- The workforce is diverse in age, with the majority of employees falling in the 40-49 (25,710) and 50 and above (28,333) age brackets.
- Younger employees under 30 years represent a smaller segment (20,492), suggesting opportunities to attract and retain early-career talent.
- The performance scores across education levels are relatively consistent, with Master's holders slightly leading (3.02) compared to High School graduates (3.00) and PhD/Bachelor's holders (2.99).
- This indicates that education level has minimal impact on performance, emphasizing that other factors (experience, training, etc.) might play a more significant role.
- Engineering, Operations, and IT lead in productivity with scores ~3.02, while Sales, Finance, and Marketing are slightly lower at ~2.98.
- Performance is consistent for 30–50 hours/week (3.00), but slightly drops to 2.99 for 50–60 hours, showing long hours may not boost productivity.
- Training hours (low, medium, or high) do not significantly impact performance, with all groups averaging a score of 3.0.
- Resignation Rate: 10,000 employees have resigned, highlighting a significant turnover.
- Average Salary: Salaries are similar across departments, with Engineering offering the highest average salary at $6417 and Marketing the lowest at $6378.
- Employee Satisfaction: Satisfaction is consistent across departments, all with a rating of 3/5, indicating potential for improvement.
- Resignation Rates by Department:
- Finance (10.5%) and HR (10.3%) have the highest resignation rates.
- Engineering (9.6%) and IT (9.6%) have the lowest resignation rates
- Overtime Hours: All departments (IT, Engineering, HR, Operations, Sales, Legal) have an average of 15 overtime hours, indicating high workloads and potential strain on employees.
- Projects Handled: Employees in IT, Marketing, Sales, and Finance handle the most projects (25 per employee), while other departments manage 24 projects on average, showing a consistent but demanding workload across departments.

Conclusion

This analysis provides a detailed look at employee performance, productivity, and satisfaction within the organization. Insights gathered can guide better resource allocation, enhance training programs, and improve overall employee satisfaction and retention. Future analyses can focus on incorporating additional datasets like employee feedback or skill assessments for a more comprehensive understanding of employee needs and organizational impact.

Thank You!!!!!