Termination Analysis FY23-24

Data Import and Preview

This section loads the cleaned termination dataset and displays the first few rows. Columns include:

- DEPARTMENTNAME: Department at time of termination
- Action_Name: Voluntary or involuntary exit
- Tenure_Years: Duration of employment before exit

```
import pandas as pd
term_data = "D:\CLEANED_Termination_FY23-24.xlsx"
termination_df = pd.read_excel(term_data)
print(termination_df.head())
```

```
<>:2: SyntaxWarning: invalid escape sequence '\C'
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C:\Users\cwkru\AppData\Local\Temp\ipykernel_17636\3703056456.py:2: SyntaxWarning: invalid escape sequence '\C'
  term_data = "D:\CLEANED_Termination_FY23-24.xlsx"
                DEPARTMENTNAME  Employee_ID       Full_Name  \
0  Budget & Management Services          534  Crews, Carolyn
1  Budget & Management Services        34614    Esler, Holly
2  Budget & Management Services        30191    Eres, Albert
3                      Building        34123   Gatlin, Cindy
4                      Building        20994      Polk, Lonn

                           Job_Title Action_Name       Reason  \
0  Senior Management and Budget Analyst   Voluntary          NaN
1     Management and Budget Analyst II   Voluntary  Another Job
2  Senior Management and Budget Analyst   Voluntary  Another Job
3                    Permit Technician   Voluntary     Personal
4        Driveway/Drainage Inspector II   Voluntary  Another Job

  Assignment_Status_Type Termination_Date Start_Date  Tenure_Days  \
0               INACTIVE       2024-05-31 1985-02-27        14338
1               INACTIVE       2023-10-23 2023-09-18           35
2               INACTIVE       2024-03-01 2022-02-14          746
3               INACTIVE       2024-01-12 2023-07-10          186
4               INACTIVE       2023-10-06 2014-09-29         3294

   Tenure_Years
0     39.282192
1      0.095890
2      2.043836
3      0.509589
4      9.024658
```

Employee Tenure at Exit (Histogram)

This histogram visualizes the distribution of employee tenure at the time of termination during FY23–24.

- The **X-axis** represents tenure in years.
- The **Y-axis** shows the number of employees who left within each tenure range.
- Employees with missing or invalid tenure data were excluded from this chart.

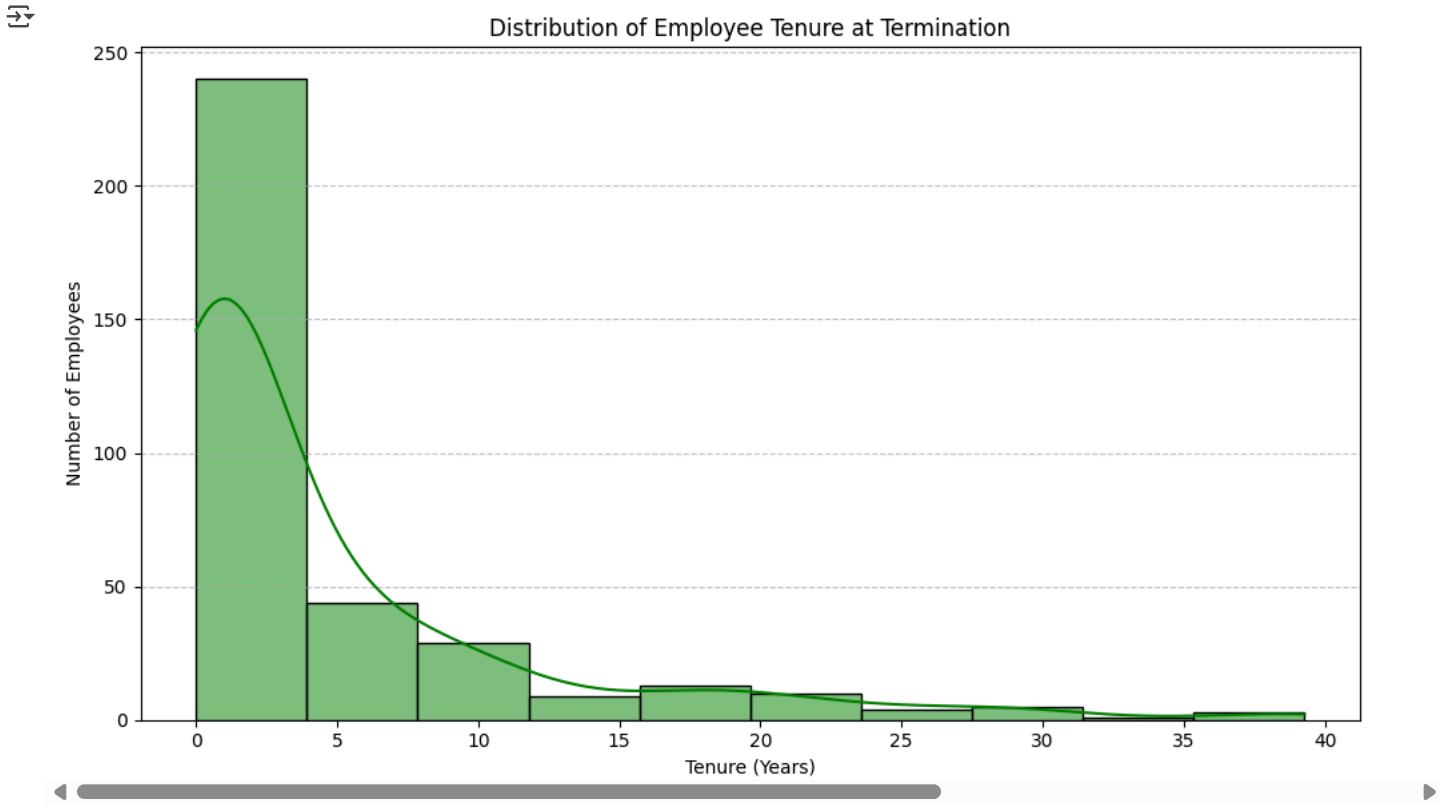
Key Observations:

- The distribution is **right-skewed**, indicating that a large number of employees exited early in their tenure.
- There is a visible **spike in terminations under 1 year**, suggesting early-stage turnover may be a concern.
- A smaller, long-tail group exited after 10+ years — likely retirees or late-career transitions.

This analysis provides a foundation for creating tenure "buckets" (e.g., <1 year, 1–3 years, 3–5 years, 5+) for further segmentation.

```
import matplotlib.pyplot as plt
import seaborn as sns
termination_df = termination_df.dropna(subset=["Tenure_Years"])
plt.figure(figsize=(10, 6))
sns.histplot(termination_df["Tenure_Years"], bins=10, kde=True, color="green", edgecolor="black")
```

```
plt.title("Distribution of Employee Tenure at Termination")
plt.xlabel("Tenure (Years)")
plt.ylabel("Number of Employees")
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```



Total Terminations

We count the total number of terminations during the period.

```
termination_df.shape[0]
```

```
358
```

Breakdown by Termination Type

We look at how many exits were voluntary versus involuntary.

```
termination_df['Action_Name'].value_counts()
```

```
Action_Name
Voluntary      281
Involuntary     73
Death            4
Name: count, dtype: int64
```

Top Departments by Termination Count

This chart shows the top 10 departments with the most terminations.

```
termination_df['DEPARTMENTNAME'].value_counts().head(10)
```

```
DEPARTMENTNAME
Fire Rescue                    88
Roads and Drainage             43
Parks and Natural Resources    37
Health & Human Services        32
Utilities                      32
Tourism/Sports Marketing       15
Solid Waste Division           15
Facilities Management          13
Building                       12
Court Services                 11
Name: count, dtype: int64
```

```
termination_by_dept_action = (
    termination_df
    .groupby(['DEPARTMENTNAME', 'Action_Name'])
    .size()
    .unstack(fill_value=0)  # Converts the 'Action_Name' values into columns
    .sort_values(by='Voluntary', ascending=False)  # Sort by most voluntary exits
    .head(10)
)

print(termination_by_dept_action)
```

```
Action_Name                 Death  Involuntary  Voluntary
DEPARTMENTNAME
Fire Rescue                     1           11         76
Parks and Natural Resources     0            3         34
Roads and Drainage              0           15         28
Utilities                       1            5         26
Health & Human Services         0           15         17
Facilities Management           0            1         12
Court Services                  0            0         11
Building                        0            2         10
Solid Waste Division            0            6          9
Tourism/Sports Marketing        0            7          8
```

Average Tenure by Exit Type

We calculate average tenure separately for voluntary and involuntary exits to compare patterns.

```
average_tenure = termination_df['Tenure_Years'].mean()
print(f"Average tenure at exit: {average_tenure:.2f} years")
```

```
Average tenure at exit: 4.80 years
```

```
average_tenure_bytype = termination_df.groupby('Action_Name')['Tenure_Years'].mean()
print(f"Average tenure by type: {average_tenure_bytype} years")
```

```
Average tenure by type: Action_Name
Death          13.316438
Involuntary     2.595159
Voluntary       5.257817
Name: Tenure_Years, dtype: float64 years
```

Key Insights and Recommendations

- A significant number of exits occurred **within the first year** of employment.
- Frontline departments like Fire Rescue and Roads & Drainage had higher voluntary turnover, suggesting a need to improve onboarding or early-stage support.

Recommendations:

- Conduct exit interviews focused on first-year employees.
- Review job previews, training, and supervisor relationships in high-turnover areas.