Report on Server Downtime Analysis

Introduction

This report presents an analysis of server downtime based on data extracted from the "Server Downtime.xlsx" file. Various visualizations, including frequency distributions, bar charts, histograms, and pie charts, are utilized to provide insights into the causes and durations of server downtime incidents.

Methodology

Data analysis

1.0. Loading the data

```
[6] import pandas as pd
    import matplotlib.pyplot as plt

    # Load the Excel file
    file_path = ("/content/Server Downtime.xlsx")  # Ensure the file is uploaded to your Colab session
    df = pd.read_excel(file_path)
```

1.1. Frequency Distribution

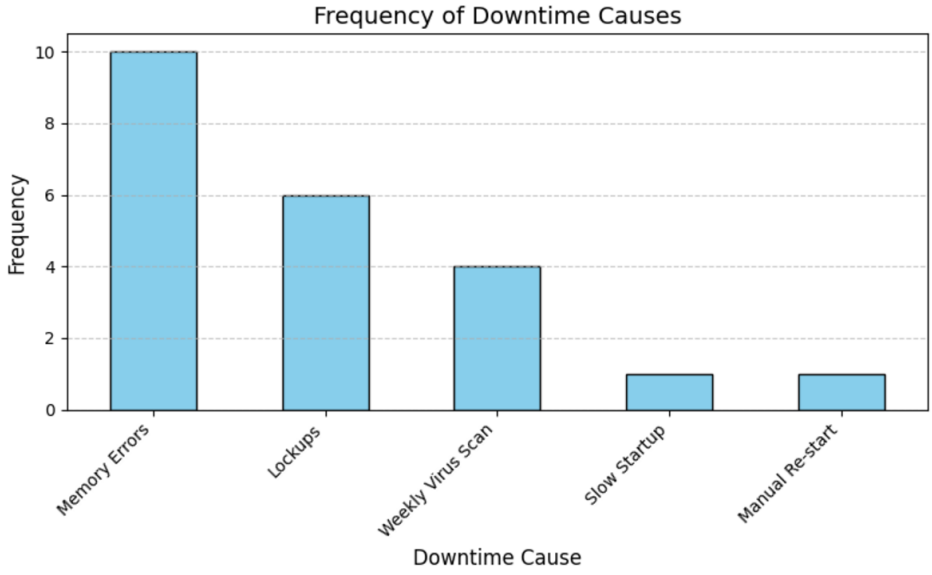
```
from tabulate import tabulate

# Task (a): Frequency Distribution
frequency_distribution = df['Problem Experienced'].value_counts()

# Convert the frequency distribution to a DataFrame
frequency_distribution_df = frequency_distribution.reset_index()
frequency_distribution_df.columns = ['Problem Experienced', 'Frequency']

# Tabulate the results
print("Frequency Distribution:")
print(tabulate(frequency_distribution_df, headers='keys', tablefmt='grid', showindex=False))
```

```
Frequency Distribution:
+------------------------+-------------+
| Problem Experienced    |   Frequency |
+========================+=============+
| Memory Errors          |          10 |
+------------------------+-------------+
| Lockups                |           6 |
+------------------------+-------------+
| Weekly Virus Scan      |           4 |
+------------------------+-------------+
| Slow Startup           |           1 |
+------------------------+-------------+
| Manual Re-start        |           1 |
+------------------------+-------------+
```

The frequency distribution of the "Problem Experienced" column highlights the count of occurrences for each identified problem. The analysis reveals the most common causes of server downtime, enabling identification of critical areas needing attention.

1.2. Bar Chart

```
# Task (b): Bar Chart
plt.figure(figsize=(8, 5))
frequency_distribution.plot(kind='bar', color='skyblue', edgecolor='black')
plt.title("Frequency of Downtime Causes", fontsize=14)
plt.xlabel("Downtime Cause", fontsize=12)
plt.ylabel("Frequency", fontsize=12)
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```



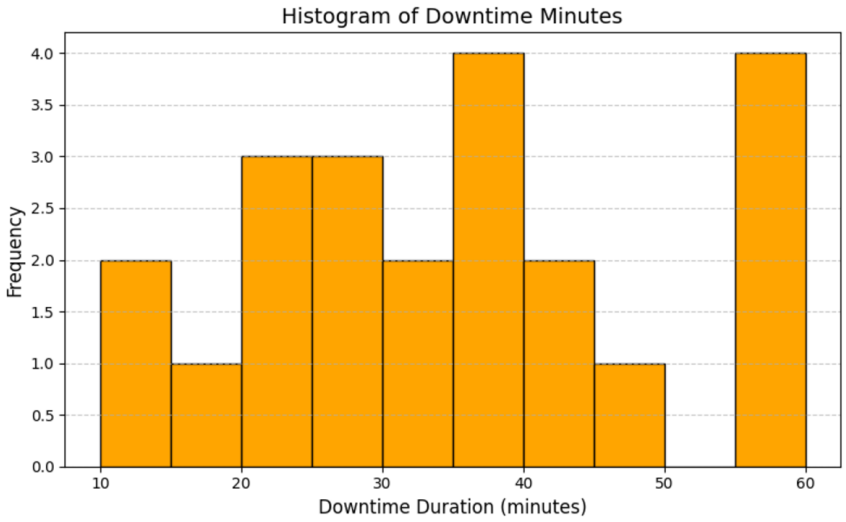
The bar chart visualizes the frequency of each downtime cause, making it easier to compare the impact of various issues at a glance. Each bar represents the count of incidents related to specific problems experienced.

The bar chart clearly shows that the majority of incidents are attributable to Memory Errors, which stands out significantly compared to the other causes. This visualization serves to prioritize focus areas for improvements and preventive measures.

1.3. **Histogram**

```
# Task (c): Histogram
plt.figure(figsize=(8, 5))
df['Downtime Minutes'].plot(kind='hist', bins=10, color='orange', edgecolor='black')
plt.title("Histogram of Downtime Minut
plt.xlabel("Downtime Duration (minutes)", fontsize=12)
plt.ylabel("Frequency", fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```

Loading...



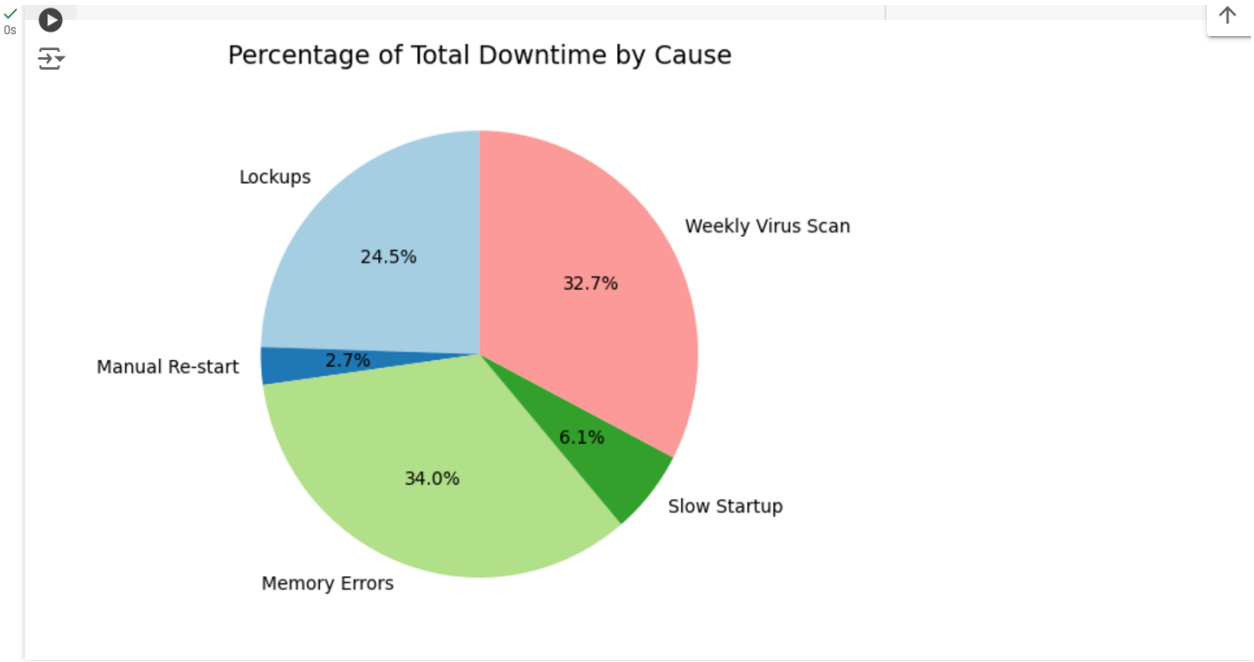
The histogram of downtime minutes provides insights into the distribution of downtime durations across incidents.

Analysis The histogram reveals that:

Most downtime incidents lasted between 20 and 40 minutes, indicating a tendency towards shorter, more frequent outages. There may be a few extreme cases with significantly longer durations (outliers), which could require further investigation to understand the contributing factors

1.4. **Pie Chart**

```
# Task (d): Pie Chart
total_downtime = df.groupby('Problem Experienced')['Downtime Minutes'].sum()
plt.figure(figsize=(6, 6))
total_downtime.plot(kind='pie', autopct='%1.1f%%', startangle=90, colors=plt.cm.Paired.colors)
plt.title("Percentage of Total Downtime by Cause", fontsize=14)
plt.ylabel("")  # Hide y-axis label
plt.tight_layout()
plt.show()
```



The pie chart illustrates the percentage of total downtime attributed to each cause, providing a clear visual representation of how downtime is distributed.

Key Insights The largest portion of downtime is attributed to Memory Errors followed closely by Weekly Virus Scan, which accounts for 34.0% and 32.7% respectively of the total downtime. This indicates that addressing these two issues may improve overall uptime considerably.

Conclusion

In summary, the analysis highlights that the predominant cause of server downtime is Memory Errors, with 10 occurrences. The pie chart further emphasizes that this cause is responsible for 34.0% of the total downtime, making it a critical area for management focus.