Call Center Dataset Analysis with Python

```
#connect drive with colab
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
#change path directory
%cd /content/drive/MyDrive/Intern
```

```
/content/drive/MyDrive/Intern
```

```
#call pandas library
import pandas as pd
df=pd.read_csv('/content/drive/MyDrive/Intern/01 Call-Center-Dataset.csv', encoding='latin-1')
```

```
df #print data frame (csv file)
```

	Call Id	Agent	Date	Time	Topic	Answered (Y/N)	Resolved	Speed of answer in seconds	AvgTalkDuration	Satisfaction rating
0	ID0002	Becky	01-01-2021	09:12:58	Technical Support	Y	N	70.0	00:04:02	3.0
1	ID0005	Becky	01-01-2021	10:00:29	Payment related	Y	Y	95.0	00:01:00	3.0
2	ID0015	Becky	01-01-2021	11:55:41	Admin Support	Y	Y	48.0	00:03:47	4.0
3	ID0016	Becky	01-01-2021	11:55:41	Admin Support	Y	Y	63.0	00:05:26	2.0
4	ID0018	Becky	01-01-2021	11:57:07	Admin Support	N	N	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...
4995	ID4956	Stewart	30-03-2021	12:30:14	Admin Support	N	N	NaN	NaN	NaN
4996	ID4983	Stewart	31-03-2021	11:32:38	Payment related	Y	Y	81.0	00:04:49	1.0

1. Total number of calls

```
call_counts = df['Call Id'].value_counts()

# Display the total call
print('No of calls:',len(call_counts))
```

```
No of calls: 5000
```

2. No of calls answered

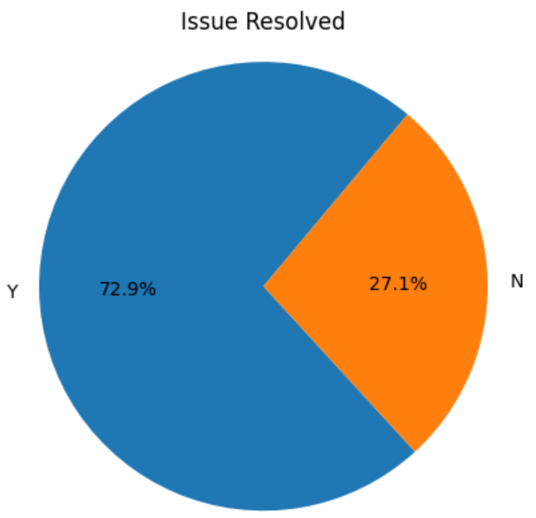
```
# Count answered calls
ans_counts = df['Answered (Y/N)'].value_counts()

# Display the Answered & Unanswered calls
print('Number of Answered Calls:', ans_counts['Y'])
print('Number of Unanswered Calls:', ans_counts['N'])
```

```
Number of Answered Calls: 4054
Number of Unanswered Calls: 946
```

3. No of issue resolved

```
import matplotlib.pyplot as plt

res_counts = df['Resolved'].value_counts()
# Display the calls are resolved or not
print('Number of Issue Resolved Calls:', res_counts['Y'])
print('Number of Issue Not Resolved Calls:', res_counts['N'])

# Plotting the pie chart
plt.pie(res_counts, labels=res_counts.index, autopct='%1.1f%%', startangle=50)
plt.axis('equal')  # Equal aspect ratio ensures that the pie chart is circular.

# Adding title
plt.title('Issue Resolved')

# Display the pie chart
plt.show()
```

```
Number of Issue Resolved Calls: 3646
Number of Issue Not Resolved Calls: 1354
```



4. Avg answer Speed

```
# Count Speed of answer
ans_speed = df['Speed of answer in seconds']
avgans_speed=ans_speed.mean()
# Display average Call Speed
print('Avg Call Speed:', avgans_speed)
ans_call_sd=df[df['Answered (Y/N)'] == 'Y'].groupby('Speed of answer in seconds')['Answered (Y/N)'].count()
unans_call_sd=df[df['Answered (Y/N)'] == 'N'].groupby('Speed of answer in seconds')['Answered (Y/N)'].count()
print('Avg answered Call Speed:',ans_call_sd.mean())
print('Avg unanswered Call Speed:',unans_call_sd.mean())
```

```
Avg Call Speed: 67.52072027627035
Avg answered Call Speed: 34.94827586206897
Avg unanswered Call Speed: nan
```

5. Avg answer call duration

```
from datetime import datetime, timedelta
#count call duration for answered calls
time_string = df[df['Answered (Y/N)'] == 'Y']['AvgTalkDuration']

time_values = time_string
time_in_seconds=[]
for time_value in time_values:
    # Parse the time value into a timedelta object
    time_delta = datetime.strptime(time_value, "%H:%M:%S") - datetime.strptime("00:00:00", "%H:%M:%S")

    # Convert timedelta to seconds (float)
    time_in_seconds.append(time_delta.total_seconds())

# Perform your desired operations with the time in seconds
print(time_in_seconds)
```

```
[242.0, 60.0, 227.0, 326.0, 91.0, 194.0, 79.0, 293.0, 208.0, 262.0, 53.0, 205.0, 297.0, 152.0, 56.0, 326.0, 59.0, 380.0, 75.0, 337.
```

```
import numpy as np, statistics
avgans_dur=statistics.mean(time_in_seconds)
# Display Avg answered Call Duration
print('Avg answered Call Duration (Seconds):', avgans_dur)
```

```
Avg answered Call Duration (Seconds): 224.92279230389738
```

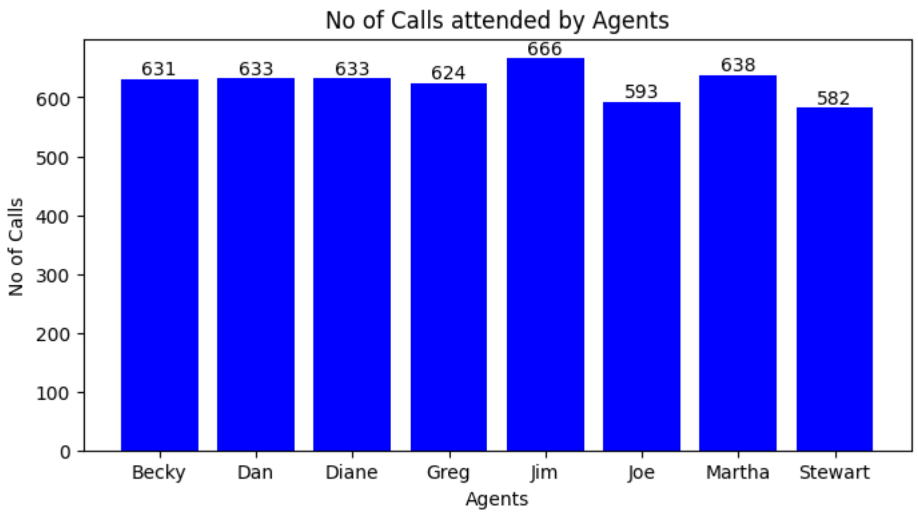
6. Overall customer certification

```
# Count Overall customer certification
cs_rat = df['Satisfaction rating']
cs_ratings=cs_rat.mean()
# Display the avg customer certification
print('Overall customer certification:', cs_ratings)
```

```
Overall customer certification: 3.4035520473606313
```

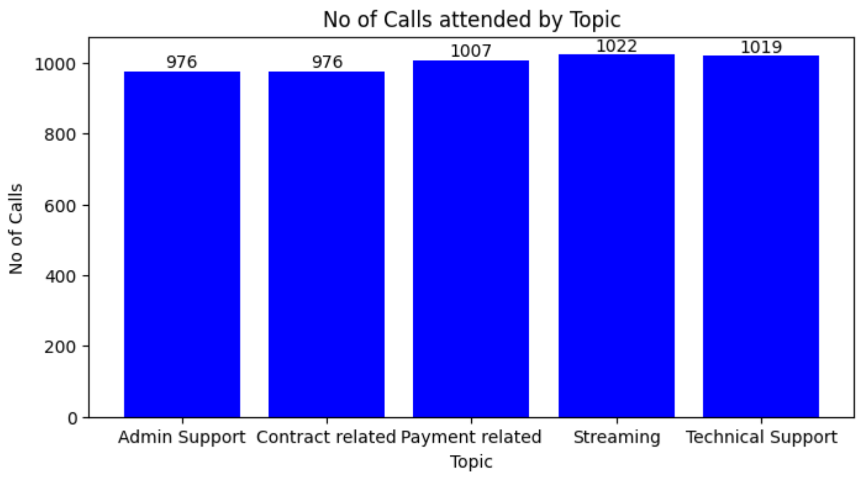
7. Count of call by agent

```
import pandas as pd
import matplotlib.pyplot as plt

# Group by 'Agent' and count the unique Call Id
Agent_counts = df.groupby('Agent')['Call Id'].nunique()
# Set the size of the figure
plt.figure(figsize=(8, 4))

# Plotting the bar chart
bars = plt.bar(Agent_counts.index, Agent_counts.values, color='Blue')
# Adding labels and title
plt.xlabel('Agents')
plt.ylabel('No of Calls')
plt.title('No of Calls attended by Agents')
# Adding data labels
for bar in bars:
    yval = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, yval, round(yval, 2), ha='center', va='bottom')

# Display the bar chart
plt.show()
```



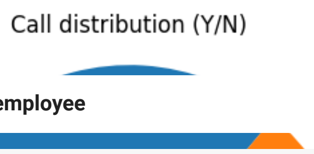
8. Count of calls by Topic

```
import pandas as pd
import matplotlib.pyplot as plt


# Group by 'Topic' and count the unique Call Id
Topic_counts = df.groupby('Topic')['Call Id'].nunique()
# Set the size of the figure
plt.figure(figsize=(8, 4))

# Plotting the bar chart
bars = plt.bar(Topic_counts.index, Topic_counts.values, color='Blue')
# Adding labels and title
plt.xlabel('Topic')
plt.ylabel('No of Calls')
plt.title('No of Calls attended by Topic')
# Adding data labels
for bar in bars:
    yval = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, yval, round(yval, 2), ha='center', va='bottom')

# Display the bar chart
plt.show()
```



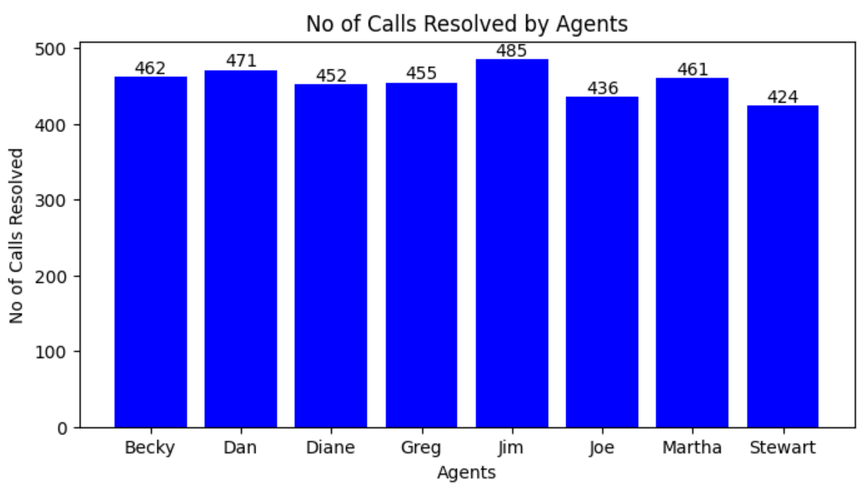
9. Call distribution (Y/N)

```
import matplotlib.pyplot as plt

#count answered calls
anscall_counts = df['Answered (Y/N)'].value_counts()

# Plotting the pie chart
plt.pie(anscall_counts, labels=anscall_counts.index, autopct='%1.1f%%', startangle=50)
plt.axis('equal')  # Equal aspect ratio ensures that the pie chart is circular.

# Adding title
plt.title('Call distribution (Y/N)')

# Display the pie chart
plt.show()
```



10.Most issue resolved by employee

```
import pandas as pd
import matplotlib.pyplot as plt

# Count occurrences of each resolved calls
res_counts = df['Resolved'].value_counts()

# Group by 'Agent' and count the resolved call
Agent_res = df[df['Resolved'] == 'Y'].groupby('Agent')['Resolved'].count()
# Set the size of the figure
plt.figure(figsize=(8, 4))

# Plotting the bar chart
bars = plt.bar(Agent_res.index, Agent_res.values, color='Blue')
# Adding labels and title
plt.xlabel('Agents')
plt.ylabel('No of Calls Resolved')
plt.title('No of Calls Resolved by Agents')
# Adding data labels
for bar in bars:
    yval = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, yval, round(yval, 2), ha='center', va='bottom')

# Display the bar chart
plt.show()
```



11.Most rated employee

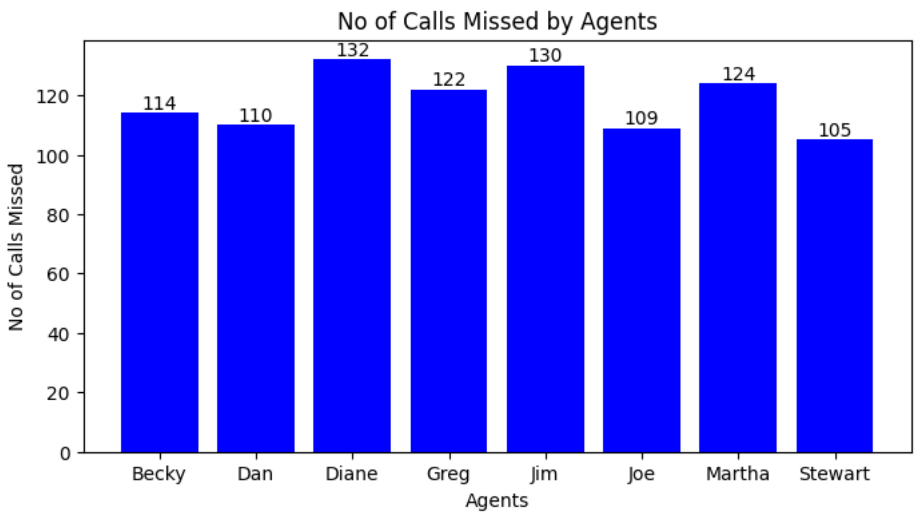
```
import pandas as pd
import matplotlib.pyplot as plt

# Count occurrences of each Satisfaction rating
ratings_counts = df['Satisfaction rating'].value_counts()

# Group by 'Agent' and count the Satisfaction rating
Agent_rate = df.groupby('Agent')['Satisfaction rating'].mean()

print(Agent_rate)
# Agent_rate is a Pandas Series
max_rate_index = Agent_rate.idxmax()
max_rate_value = Agent_rate[max_rate_index]

print(f"The maximum rate is {max_rate_value} for the agent: {max_rate_index}")
```

```
Agent
Becky      3.371373
Dan        3.447419
Diane      3.405190
Greg       3.404382
Jim        3.393657
Joe        3.330579
Martha     3.470817
Stewart    3.400419
```

```
Name: Satisfaction rating, dtype: float64
The maximum rate is 3.470817120622568 for the agent: Martha
```

12.Employee who has missed more number of calls

```
import pandas as pd
import matplotlib.pyplot as plt

# Group by 'Agent' and count the missed calls by agents
Agent_misscall = df[df['Answered (Y/N)'] == 'N'].groupby('Agent')['Answered (Y/N)'].count()
# Set the size of the figure
plt.figure(figsize=(8, 4))

# Plotting the bar chart
bars = plt.bar(Agent_misscall.index, Agent_misscall.values, color='Blue')
# Adding labels and title
plt.xlabel('Agents')
plt.ylabel('No of Calls Missed')
plt.title('No of Calls Missed by Agents')
# Adding data labels
for bar in bars:
    yval = bar.get_height()
    plt.text(bar.get_x() + bar.get_width()/2, yval, round(yval, 2), ha='center', va='bottom')

# Display the bar chart
plt.show()
```



```
max_misscall_index = Agent_misscall.idxmax()
max_misscall_value = Agent_misscall[max_misscall_index]

print(f"The maximum missed call is {max_misscall_value} for the agent: {max_misscall_index}")
```

```
The maximum missed call is 132 for the agent: Diane
```