Assesment Skygeni

```
# Libraries used
from google.colab import drive
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remoun
```

Loading the data from CSV in drive

```
# added all the files from drive to this notebook.
industry_client_details=pd.read_csv('/content/drive/My Drive/assesment-skygeni/Copy_of_industry_client_details.csv')
industry_client_details.head(10)

finanical_information=pd.read_csv('/content/drive/My Drive/assesment-skygeni/Copy_of_finanical_information.csv')
finanical_information.head(10)

subscription_information=pd.read_csv('/content/drive/My Drive/assesment-skygeni/Copy_of_subscription_information.csv')
subscription_information.head(10)

payment_information=pd.read_csv('/content/drive/My Drive/assesment-skygeni/Copy_of_payment_information.csv')
payment_information.head(10)
```

	client_id	payment_date	amount_paid	payment_method
0	6292156167	9/16/2019	447.0	Bank Transfer
1	7462725203	5/21/2018	379.7	Bank Transfer
2	4698004907	9/11/2021	435.1	Check
3	3510240337	12/7/2020	413.1	Check
4	7501599785	3/4/2019	61.1	Bank Transfer
5	8719792472	2/10/2018	73.8	Credit Card
6	3325348894	7/9/2019	348.1	Credit Card
7	9031632460	7/6/2019	222.9	Check
8	5319487809	3/2/2019	90.7	Bank Transfer
9	4280387012	11/25/2022	77.1	Check

Next steps: Generate code with payment_information | View recommended plots | New interactive sheet

Displaying and Checking the given data

```
industry_client_details.head(5)
```

	client_id	company_size	industry	location
0	4280387012	Large	Finance Lending	Mumbai
1	2095513148	Small	Finance Lending	Chennai
2	7225516707	Medium	Finance Lending	New Delhi
3	8093537819	Large	Block Chain	Mumbai
4	4387541014	Medium	Hyper Local	Banglore

Next steps: Generate code with industry_client_details | View recommended plots | New interactive sheet

```
finanical_information.head(5)
```

	Unnamed: 0	start_date	end_date	inflation_rate	gdp_growth_rate
0	0	2018-01-01	2018-03-31	5.77	3.51
1	1	2018-04-01	2018-06-30	1.17	2.15
2	2	2018-07-01	2018-09-30	1.56	1.82
3	3	2018-10-01	2018-12-31	2.78	2.43
4	4	2019-01-01	2019-03-31	6.91	3.44

Next steps: Generate code with finanical_information View recommended plots New interactive sheet

```
subscription_information.head(5)
```

	client_id	subscription_type	start_date	end_date	renewed
0	1131383004	Yearly	2020-11-11	2021-11-11	False
1	4309371709	Monthly	2021-05-24	2021-06-23	True
2	3183675157	Yearly	2021-12-25	2022-12-25	True
3	5371694837	Monthly	2020-03-14	2020-04-13	True
4	5157113076	Monthly	2019-11-07	2019-12-07	False

Next steps: Generate code with subscription_information View recommended plots New interactive sheet

```
payment_information.head(5)
```

	client_id	payment_date	amount_paid	payment_method
0	6292156167	9/16/2019	447.0	Bank Transfer
1	7462725203	5/21/2018	379.7	Bank Transfer
2	4698004907	9/11/2021	435.1	Check
3	3510240337	12/7/2020	413.1	Check
4	7501599785	3/4/2019	61.1	Bank Transfer

Next steps: Generate code with payment_information View recommended plots New interactive sheet

Start coding or generate with AI.

Question1 How many finance lending and blockchain clients does the organization have?

```
# Counting the number of Finanical Lending clients
Finance = industry_client_details[industry_client_details['industry'].isin(['Finance Lending'])]
f1=Finance['client_id'].value_counts().sum()
print("Finance Lending:",f1)
```

```
Finance Lending: 22
```

```
# Counting the number of Block chain Lending clients
Blockchain = industry_client_details[industry_client_details['industry'].isin(['Block Chain'])]
b1=Blockchain['client_id'].value_counts().sum()
print("Block chain lending:",b1)
```

```
Block chain lending: 25
```

```
# Total number of finance lending and block chain clients
Finance_blockchain = industry_client_details[industry_client_details['industry'].isin(['Finance Lending', 'Block Chain'])]

# Count occurrences of each client
industry_count = Finance_blockchain['client_id'].value_counts().sum()

print("The total number  finance lending and blockchain clients :",industry_count)
```

```
The total number  finance lending and blockchain clients : 47
```

Question2 Which industry in the organization has the highest renewal rate?

```
# To answer the question 2 we need to combine bothe industryclient details and subscription information details
merged_industry_client_subscription_details = pd.merge(industry_client_details, subscription_information, on='client_id', hc
print(merged_industry_client_subscription_details)
```

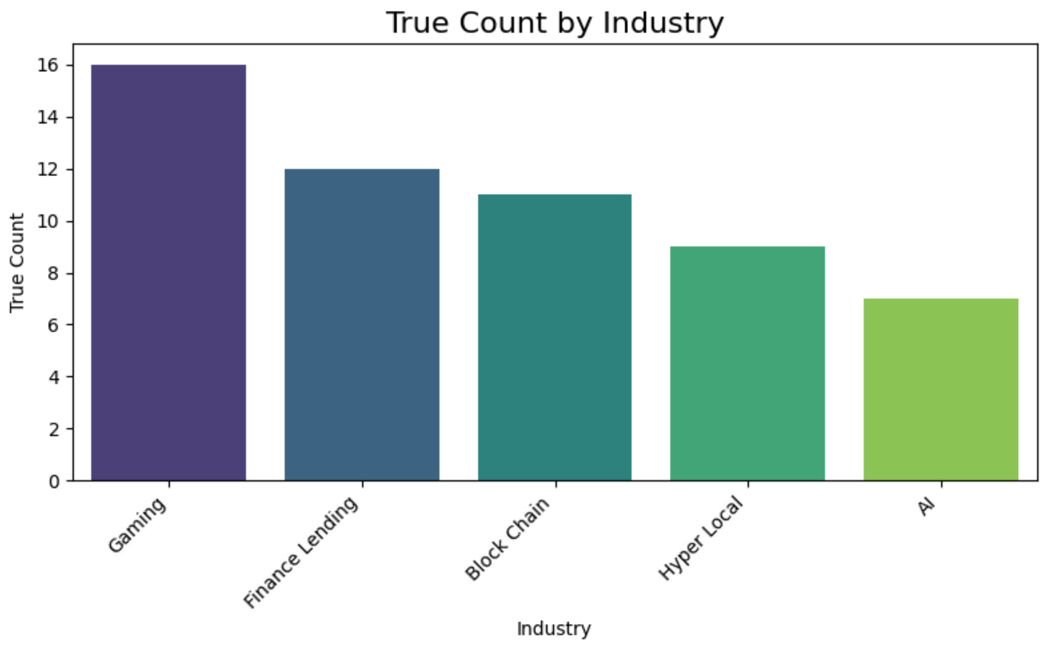
```
     client_id company_size         industry   location subscription_type  \
0   4280387012        Large  Finance Lending     Mumbai            Yearly
1   2095513148        Small  Finance Lending    Chennai           Monthly
2   7225516707       Medium  Finance Lending  New Delhi            Yearly
3   8093537819        Large      Block Chain     Mumbai           Monthly
4   4387541014       Medium      Hyper Local   Banglore           Monthly
..         ...          ...              ...        ...               ...
95  9159056053       Medium           Gaming  New Delhi            Yearly
96  1077708772        Small      Block Chain     Mumbai            Yearly
97  4361672518        Small               AI  New Delhi           Monthly
98  6751372012        Large      Hyper Local     Mumbai           Monthly
99  6209923307       Medium           Gaming    Chennai           Monthly

    start_date    end_date  renewed
0   2022-11-25  2023-11-25     True
1   2021-11-03  2021-12-03    False
2   2021-01-19  2022-01-19     True
3   2019-09-14  2019-10-14    False
4   2018-11-08  2018-12-08    False
..         ...         ...      ...
95  2022-05-28  2023-05-28    False
96  2019-07-06  2020-07-05    False
97  2019-01-24  2019-02-23    False
98  2018-05-29  2018-06-28     True
99  2021-07-05  2021-08-04     True

[100 rows x 8 columns]
```

```
True_counts = merged_industry_client_subscription_details[
    # Filtering the dataset to include only rows where the 'renewed' column is True
merged_industry_client_subscription_details['renewed'] == True # Group the filtered dataset by the 'industry'
    #column and count the number of occurrences in each industry
    ].groupby('industry').size().reset_index(#Sort the results in descending order making true_count as column_name
        name='true_count').sort_values(
    by='true_count', ascending=False)

print(True_counts)
```

```
          industry  true_count
3           Gaming          16
2  Finance Lending          12
1      Block Chain          11
4      Hyper Local           9
0               AI           7
```

```
import matplotlib.pyplot as plt
import seaborn as sns
#BARGRAPH showcasing number of renewals
plt.figure(figsize=(8, 5))
sns.barplot(x='industry', y='true_count', data=True_counts, palette='viridis')

# Title and labels
plt.title("True Count by Industry", fontsize=16)
plt.xlabel("Industry", fontsize=10)
plt.ylabel("True Count", fontsize=10)
plt.xticks(rotation=45, ha="right")
plt.tight_layout()

# Show the plot
plt.show()
```

```
<ipython-input-170-f99dce4f5034>:5: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue`

  sns.barplot(x='industry', y='true_count', data=True_counts, palette='viridis')
```



NOTE: Based on above output we can infer that Gaming industry has highest renewals.

Question3 What was the average inflation rate when their subscriptions were renewed?

```
subscription_information.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 5 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   client_id          100 non-null    int64
 1   subscription_type  100 non-null    object
 2   start_date         100 non-null    object
 3   end_date           100 non-null    object
 4   renewed            100 non-null    bool
dtypes: bool(1), int64(1), object(3)
memory usage: 3.4+ KB
```

```
#converting object type date columns in both industry client subscription details and financial information tables .
merged_industry_client_subscription_details['end_date']=pd.to_datetime(merged_industry_client_subscription_details['end_date
merged_industry_client_subscription_details['start_date']=pd.to_datetime(merged_industry_client_subscription_details['start_

finanical_information['start_date']=pd.to_datetime(finanical_information['start_date'])
finanical_information['end_date']=pd.to_datetime(finanical_information['end_date'])
```

```
# checking if the dtypes are changed successfully
merged_industry_client_subscription_details.info()
finanical_information.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 8 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   client_id          100 non-null    int64
 1   company_size       100 non-null    object
 2   industry           100 non-null    object
 3   location           100 non-null    object
 4   subscription_type  100 non-null    object
 5   start_date         100 non-null    datetime64[ns]
 6   end_date           100 non-null    datetime64[ns]
 7   renewed            100 non-null    bool
dtypes: bool(1), datetime64[ns](2), int64(1), object(4)
memory usage: 5.7+ KB
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21 entries, 0 to 20
Data columns (total 5 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   Unnamed: 0       21 non-null     int64
 1   start_date       21 non-null     datetime64[ns]
 2   end_date         21 non-null     datetime64[ns]
 3   inflation_rate   21 non-null     float64
 4   gdp_growth_rate  21 non-null     float64
dtypes: datetime64[ns](2), float64(2), int64(1)
memory usage: 972.0 bytes
```

Generate a slider using jupyter widgets Close

```
# adding seperate column for merged_industry_client_subscription_details and finanical_information to take quarter start dat
merged_industry_client_subscription_details['quarter_start_date'] = merged_industry_client_subscription_details['start_date'

print(merged_industry_client_subscription_details['quarter_start_date'].nunique)


finanical_information['quarter_start_date'] = finanical_information['start_date'].dt.to_period('Q').dt.start_time

print(finanical_information['quarter_start_date'].nunique)
```

```
<bound method IndexOpsMixin.nunique of 0    2022-10-01
1    2021-10-01
2    2021-01-01
3    2019-07-01
4    2018-10-01
        ...
95   2022-04-01
96   2019-07-01
97   2019-01-01
98   2018-04-01
99   2021-07-01
Name: quarter_start_date, Length: 100, dtype: datetime64[ns]>
<bound method IndexOpsMixin.nunique of 0    2018-01-01
1    2018-04-01
2    2018-07-01
3    2018-10-01
4    2019-01-01
5    2019-04-01
6    2019-07-01
7    2019-10-01
8    2020-01-01
9    2020-04-01
10   2020-07-01
11   2020-10-01
12   2021-01-01
13   2021-04-01
14   2021-07-01
15   2021-10-01
16   2022-01-01
17   2022-04-01
18   2022-07-01
19   2022-10-01
20   2023-01-01
Name: quarter_start_date, dtype: datetime64[ns]>
```

```
# Since the inflation data is split into quarters to look up inflation rate for each client we are using the start date as j
#merging merged_industry_client_subscription_details
merged_df = pd.merge(merged_industry_client_subscription_details, finanical_information, on='quarter_start_date', how='left'


merged_df
```

	client_id	company_size	industry	location	subscription_type	start_date_x	end_date_x	renewed	quarter_start_date
0	4280387012	Large	Finance Lending	Mumbai	Yearly	2022-11-25	2023-11-25	True	2022-10-01
1	2095513148	Small	Finance Lending	Chennai	Monthly	2021-11-03	2021-12-03	False	2021-10-01
2	7225516707	Medium	Finance Lending	New Delhi	Yearly	2021-01-19	2022-01-19	True	2021-01-01
3	8093537819	Large	Block Chain	Mumbai	Monthly	2019-09-14	2019-10-14	False	2019-07-01
97	4361672518	Small	AI	New Delhi	Monthly	2019-01-24	2019-02-23	False	2019-01-01
98	6751372012	Large	Hyper Local	Mumbai	Monthly	2018-05-29	2018-06-28	True	2018-04-01

100 rows × 14 columns

Next steps: Generate code with merged_df View recommended plots New interactive sheet

```
# filtering the data frame based on only renewals
filtered_df = merged_df[merged_df['renewed'] == True]
filtered_df
# calculating average inlfation rate on filtered_df
average_inflation_rate = filtered_df['inflation_rate'].mean()
print("Average inflation rate:",average_inflation_rate)
```

```
Average inflation rate: 4.444545454545455
```

Question4 What is the median amount paid each year for all payment methods?

```
payment_information.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 4 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   client_id       100 non-null    int64  
 1   payment_date    100 non-null    object 
 2   amount_paid     100 non-null    float64
 3   payment_method  100 non-null    object 
dtypes: float64(1), int64(1), object(2)
memory usage: 3.3+ KB
```

```
#convert date and year to appropriate data types and extract year from the column
payment_information['payment_date'] = pd.to_datetime(payment_information['payment_date'])
payment_information['year'] = payment_information['payment_date'].dt.year
# finding median amount paid per year by grouping payments according to year
median_amount_paid_per_year = payment_information.groupby('year')['amount_paid'].median()
print("Printing median amount of all payment methods based on year:")
print(median_amount_paid_per_year)
```

```
Printing median amount of all payment methods based on year:
year
2018    235.7
2019    360.9
2020    284.5
2021    306.8
2022    288.0
Name: amount_paid, dtype: float64
```

```
#Below unstack() Moves industry from index to columns, making year the index
x=payment_information.groupby(['payment_method', 'year'])['amount_paid'].median().unstack()
print("Printing all payment methods median amount for each year individually:")
print(x)
```

```
Printing all payment methods median amount for each year individually:
year              2018    2019    2020    2021    2022
payment_method                                       
Bank Transfer   281.65   184.2  225.10   255.3   196.5
```