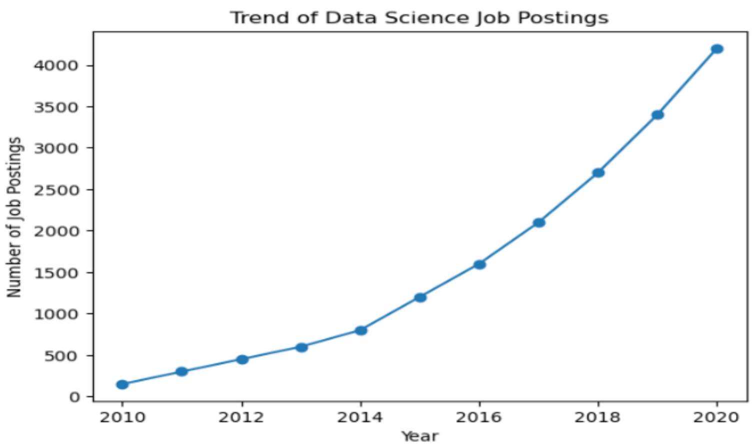
 # Basic Practice Experiments(1 to 4)

 # 230701016

 # M. Aishwarya

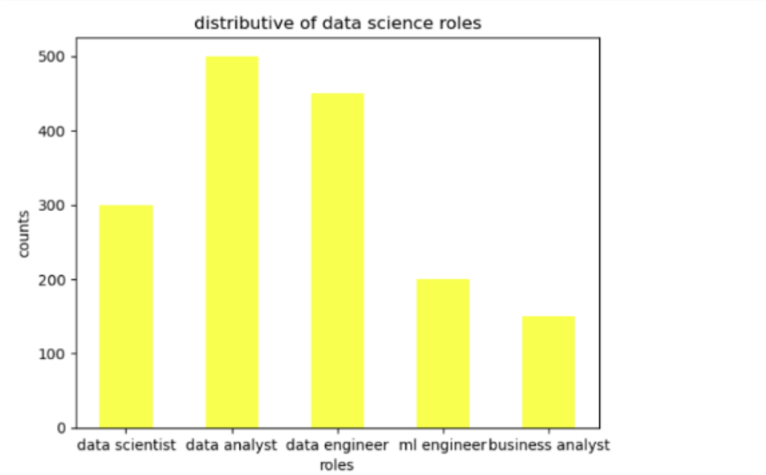
 # 30.07.2024

```
import pandas as pd

import matplotlib.pyplot as plt

data = {&#39;Year&#39;: list(range(2010, 2021)),

&#39;Job Postings&#39;: [150, 300, 450, 600, 800, 1200, 1600, 2100, 2700, 3400, 4200]}

df = pd.DataFrame(data)

plt.plot(df[&#39;Year&#39;], df[&#39;Job Postings&#39;], marker=&#39;o&#39;)

plt.title(&#39;Trend of Data Science Job Postings&#39;)

plt.xlabel(&#39;Year&#39;)

plt.ylabel(&#39;Number of Job Postings&#39;)

plt.show()
```




```
import pandas as pd

import matplotlib.pyplot as plt

roles=[&#39;data scientist&#39;,&#39;data analyst&#39;,&#39;data engineer&#39;,&#39;ml
engineer&#39;,&#39;business analyst&#39;]

counts=[300,500,450,200,150]

plt.bar(roles,counts,width=0.5,color=&#39;yellow&#39;)
```

```
plt.title(&#39;distributive of data science roles&#39;)

plt.xlabel(&#39;roles&#39;)

plt.ylabel(&#39;counts&#39;)

plt.show()
```




```
import pandas as pd

structured_data = pd. DataFrame ({'ID's [1, 2, 3], 'NAME': ['Aish', "Betty', 'Cathy'], 'AGE': [18, 20, 25], 'GRADE': ['O', 'A', 'B'],

'SKILL': ['Art', 'Music', 'Dance']})

print ("Structured Data: \n", structured_data)

unstructured_data = "This is an unstructured data. It can be text, an image, or a video"

print("unstructured data: \n", unstructured_data)

semistrictured_clata = {'ID': 1, 'NAME': 'Alice', 'ATTRIBUTES":

'HEIGHT': 170, 'WEIGHT: 45}}

print("Semistructured Data: \n", semistrictured_data)
```

OUTPUT-

Structured Data:

'ID's [1, 2, 3], 'NAME': ['Aish', "Betty', 'Cathy'], 'AGE': [18, 20, 25], 'GRADE': ['O', 'A', 'B'],

'SKILL': ['Art', 'Music', 'Dance']

unstructured data:

This is an unstructured data. It can be text, an image, or a video

Semistructured Data:

'ID': 1, 'NAME': 'Alice', 'ATTRIBUTES":

'HEIGHT': 170, 'WEIGHT: 45}

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

df=pd.read_csv (‘sales_data.csv’);

print(df.head());

print (df.isnull().sum())

df ['Sales ']. fillna(df ['Sales']. mean(), inplace = True)

df. dropna (subset = ['Product', 'Quantity', 'Region'], inplace = True)

print (df. describe())

prodsummary= df.groupby ('Product'). agg ({'sales': 'sum', 'Quantity': 'sum'}).reset_index()

print (prodsummary)

```
         Date    Product  Sales  Quantity Region
0  01-01-2023  Product A    200         4  North
1  02-01-2023  Product B    150         3  South
2  03-01-2023  Product A    220         5  North
3  04-01-2023  Product C    300         6   East
4  05-01-2023  Product B    180         4   West
Date        0
Product     0
Sales       0
Quantity    0
Region      0
dtype: int64
```

 # Pandas Buit in function; Numpy Buit in fuction- Array slicing, Ravel,Reshape,ndim

 # 230701016

 # M. Aishwarya

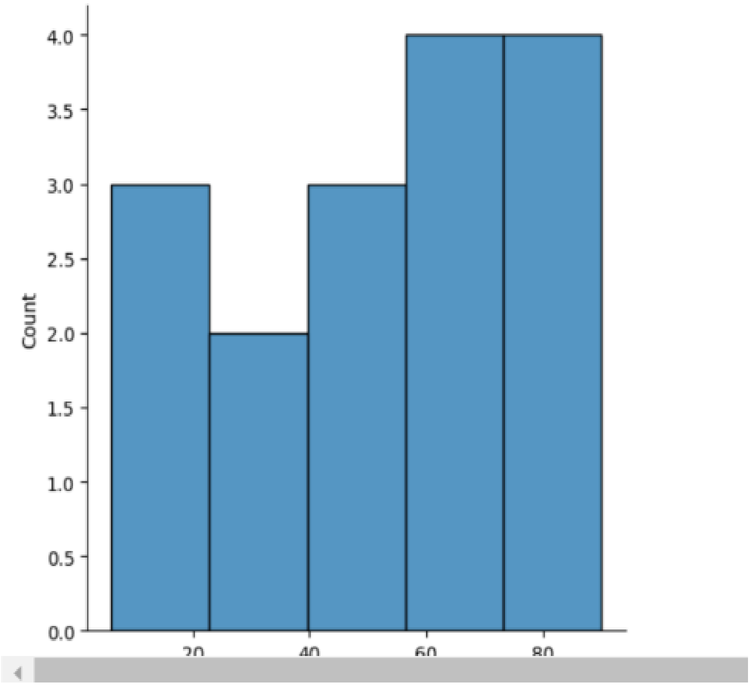
 # 06.08.2024

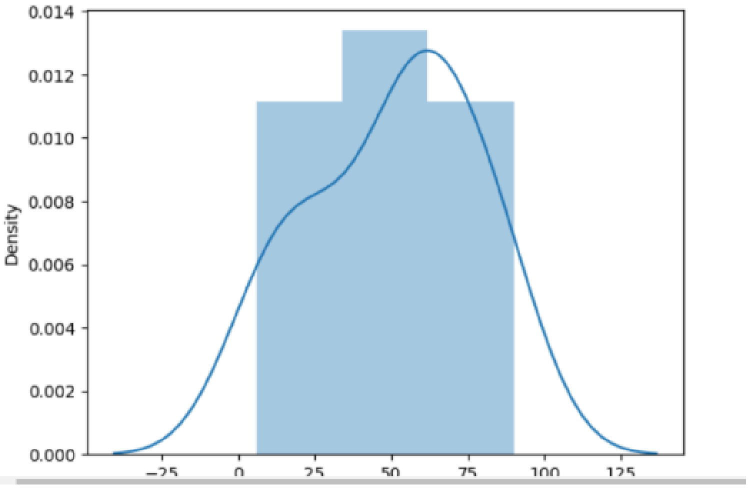
```
import numpy as np

array = np.random.randint(1, 100, 9)

np.sqrt(array)

array.ndim

new_array = array.reshape(3, 3)

new_array.ndim

new_array.ravel()

newm = new_array.reshape(3, 3)

newm[2, 1:3]

newm[1:2, 1:3]

new_array[0:3, 0:0]

new_array[0:2, 0:1]

new_array[0:3, 0:1]

new_array[1:3]
```

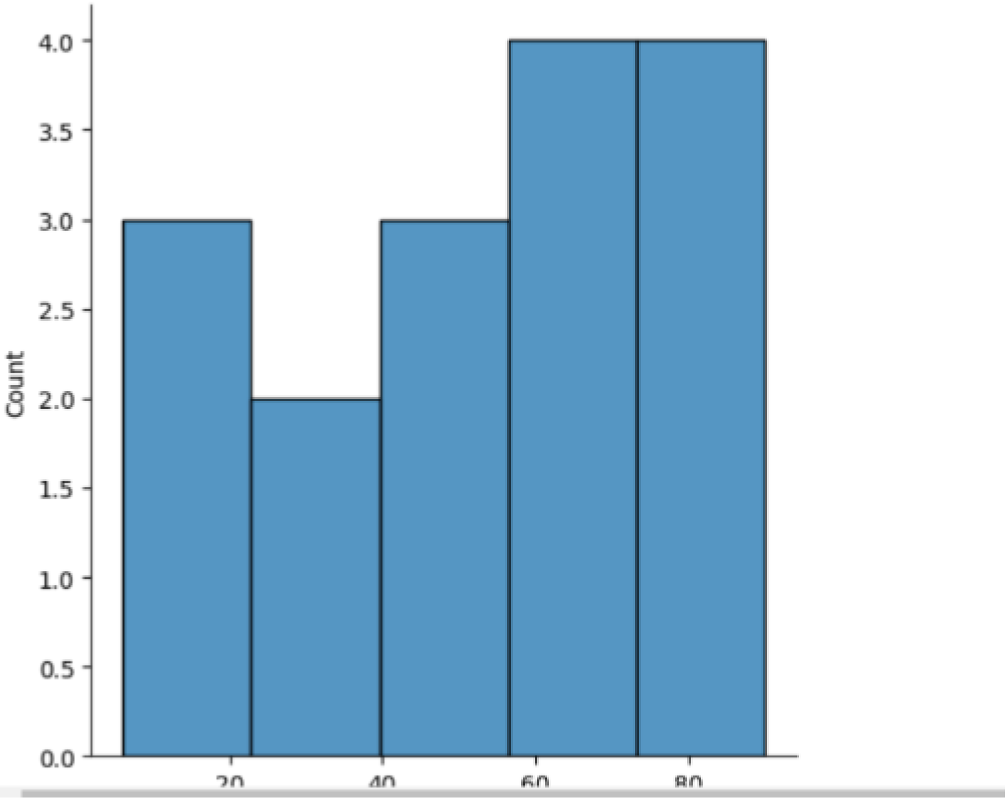
```
newm[2,1:3]
    array([39, 51])

newm[1:2,1:3]
    array([[62, 15]])

new_array[0:3,0:0]
    array([], shape=(3, 0), dtype=int64)

new_array[0:2,0:1]
    array([[83],
           [47]])

new_array[0:3,0:1]
    array([[83],
           [47],
           [96]])

new_array[1:3]
    array([[47, 62, 15],
           [96, 39, 51]])
```

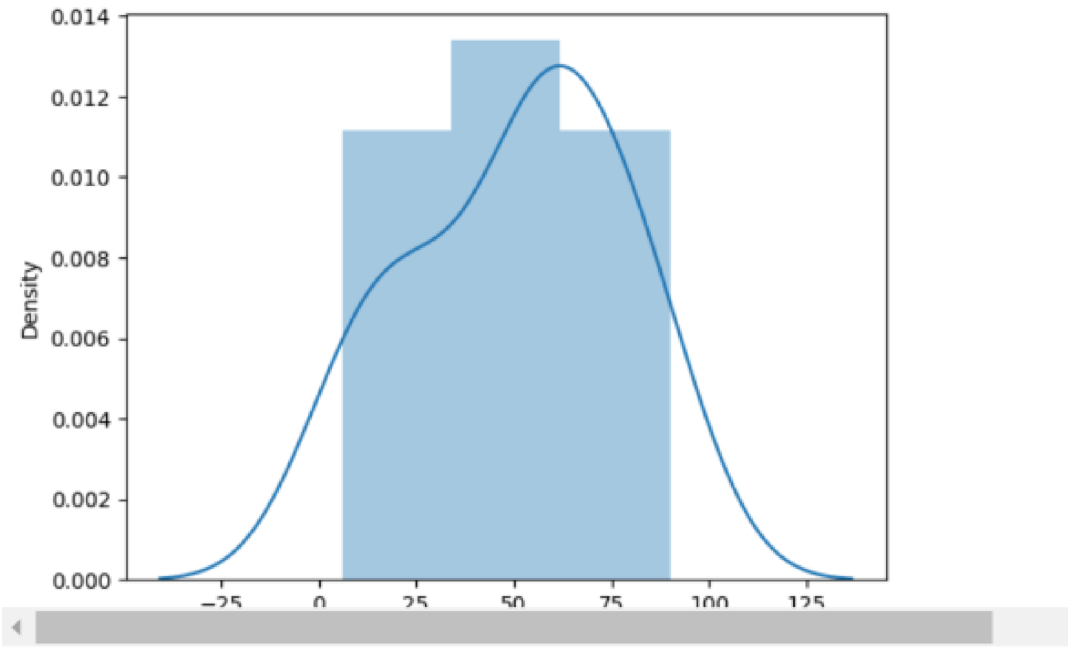
```
# Outlier detection
# 230701016
# M. Aishwarya
# 13.08.2024

import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
array = np.random.randint(1, 100, 16)
print(array)
print(array.mean())
print(np.percentile(array, 25))
print(np.percentile(array, 50))
print(np.percentile(array, 75))
print(np.percentile(array, 100))
def outDetection(array):
    sorted_array = sorted(array)
    Q1, Q3 = np.percentile(array, [25, 75])
    IQR = Q3 - Q1

    lr = Q1 - (1.5 * IQR)
    ur = Q3 + (1.5 * IQR)

    return lr, ur

lr, ur = outDetection(array)
print(f"Lower Range: {lr}, Upper Range: {ur}")

sns.displot(array)
plt.show()

new_array = array[(array > lr) & (array < ur)]
```

```
print("Array after outlier removal:", new_array)



sns.displot(new_array)
plt.show()
lr1, ur1 = outDetection(new_array)
print(f"New Lower Range: {lr1}, New Upper Range: {ur1}")
final_array = new_array[(new_array > lr1) & (new_array < ur1)]
print("Final array after second outlier removal:", final_array)
sns.displot(final_array)
plt.show()
```




0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Density


4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Count


Density
0.000
0.002
0.004
0.006
0.008
0.010
0.012
0.014
−25
0
25
50
75
100
125

```python
# Missing and inappropriate data
# 230701016
# M. Aishwarya
# 20.08.2024

import numpy as np
import pandas as pd
df = pd.read_csv("Hotel_Dataset.csv")
df
df.duplicated()
df.info()
df.drop_duplicates(inplace=True)
df
len(df)
index = np.array(list(range(0, len(df))))
df.set_index(index, inplace=True)
index

df.drop(['Age_Group.1'], axis=1, inplace=True)
df



df.CustomerID.loc[df.CustomerID < 0] = np.nan
df.Bill.loc[df.Bill < 0] = np.nan
df.EstimatedSalary.loc[df.EstimatedSalary < 0] = np.nan
df

df['NoOfPax'].loc[(df['NoOfPax'] < 1) | (df['NoOfPax'] > 20)] = np.nan
df

df.Age_Group.unique()
df.Hotel.unique()
```

```
df.Hotel.replace(['Ibys'], 'Ibis', inplace=True)

df.FoodPreference.unique()

df.FoodPreference.replace(['Vegetarian', 'veg'], 'Veg', inplace=True)
df.FoodPreference.replace(['non-Veg'], 'Non-Veg', inplace=True)

df.EstimatedSalary.fillna(round(df.EstimatedSalary.mean()), inplace=True)
df.NoOfPax.fillna(round(df.NoOfPax.median()), inplace=True)
df['Rating(1-5)'].fillna(round(df['Rating(1-5)'].median()), inplace=True)
df.Bill.fillna(round(df.Bill.mean()), inplace=True)
df
```

	CustomerID	Age_Group	Rating(1-5)	Hotel	FoodPreference	Bill	NoOfPax	EstimatedSalary	Age_Group.1
0	1	20-25	4	Ibis	veg	1300	2	40000	20-25
1	2	30-35	5	LemonTree	Non-Veg	2000	3	59000	30-35
2	3	25-30	6	RedFox	Veg	1322	2	30000	25-30
3	4	20-25	-1	LemonTree	Veg	1234	2	120000	20-25
4	5	35+	3	Ibis	Vegetarian	989	2	45000	35+
5	6	35+	3	Ibys	Non-Veg	1909	2	122220	35+
6	7	35+	4	RedFox	Vegetarian	1000	-1	21122	35+
7	8	20-25	7	LemonTree	Veg	2999	-10	345673	20-25
8	9	25-30	2	Ibis	Non-Veg	3456	3	-99999	25-30
9	9	25-30	2	Ibis	Non-Veg	3456	3	-99999	25-30
10	10	30-35	5	RedFox	non-Veg	-6755	4	87777	30-35

```
0      False
1      False
2      False
3      False
4      False
5      False
6      False
7      False
8      False
9       True
10     False
dtype: bool
```

	CustomerID	Age_Group	Rating(1-5)	Hotel	FoodPreference	Bill	NoOfPax	EstimatedSalary	Age_Group.1
0	1	20-25	4	Ibis	veg	1300	2	40000	20-25
1	2	30-35	5	LemonTree	Non-Veg	2000	3	59000	30-35
2	3	25-30	6	RedFox	Veg	1322	2	30000	25-30
3	4	20-25	-1	LemonTree	Veg	1234	2	120000	20-25
4	5	35+	3	Ibis	Vegetarian	989	2	45000	35+
5	6	35+	3	Ibys	Non-Veg	1909	2	122220	35+
6	7	35+	4	RedFox	Vegetarian	1000	-1	21122	35+
7	8	20-25	7	LemonTree	Veg	2999	-10	345673	20-25
8	9	25-30	2	Ibis	Non-Veg	3456	3	-99999	25-30
10	10	30-35	5	RedFox	non-Veg	-6755	4	87777	30-35

	CustomerID	Age_Group	Rating(1-5)	Hotel	FoodPreference	Bill	NoOfPax	EstimatedSalary
0	1	20-25	4	Ibis	veg	1300	2	40000
1	2	30-35	5	LemonTree	Non-Veg	2000	3	59000
2	3	25-30	6	RedFox	Veg	1322	2	30000
3	4	20-25	-1	LemonTree	Veg	1234	2	120000
4	5	35+	3	Ibis	Vegetarian	989	2	45000
5	6	35+	3	Ibys	Non-Veg	1909	2	122220
6	7	35+	4	RedFox	Vegetarian	1000	-1	21122
7	8	20-25	7	LemonTree	Veg	2999	-10	345673
8	9	25-30	2	Ibis	Non-Veg	3456	3	-99999
9	10	30-35	5	RedFox	non-Veg	-6755	4	87777

	CustomerID	Age_Group	Rating(1-5)	Hotel	FoodPreference	Bill	NoOfPax	EstimatedSalary
0	1.0	20-25	4.0	Ibis	Veg	1300.0	2.0	40000.0
1	2.0	30-35	5.0	LemonTree	Non-Veg	2000.0	3.0	59000.0
2	3.0	25-30	4.0	RedFox	Veg	1322.0	2.0	30000.0
3	4.0	20-25	4.0	LemonTree	Veg	1234.0	2.0	120000.0
4	5.0	35+	3.0	Ibis	Veg	989.0	2.0	45000.0
5	6.0	35+	3.0	Ibis	Non-Veg	1909.0	2.0	122220.0
6	7.0	35+	4.0	RedFox	Veg	1000.0	2.0	21122.0
7	8.0	20-25	4.0	LemonTree	Veg	2999.0	2.0	345673.0
8	9.0	25-30	2.0	Ibis	Non-Veg	3456.0	3.0	96755.0
9	10.0	30-35	5.0	RedFox	Non-Veg	1801.0	4.0	87777.0

 # Data Preprocessing

 # 230701016

 # M. Aishwarya

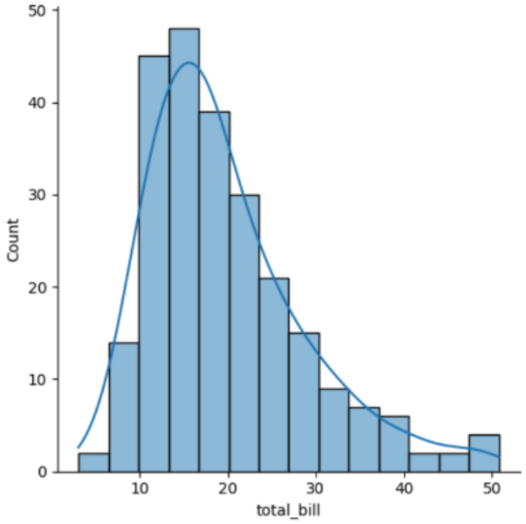
 # 27.08.2024

```
import numpy as np

import pandas as pd


df = pd.read_csv("/content/pre-process_datasample.csv")


df.info()


df.Country.fillna(df.Country.mode()[0], inplace=True)

df.Age.fillna(df.Age.median(), inplace=True)

df.Salary.fillna(round(df.Salary.mean()), inplace=True)


encoded_countries = pd.get_dummies(df.Country)


updated_dataset = pd.concat([encoded_countries, df.iloc[:, [1, 2, 3]]], axis=1)


updated_dataset.Purchased.replace(['No', 'Yes'], [0, 1], inplace=True)


print(updated_dataset)
```

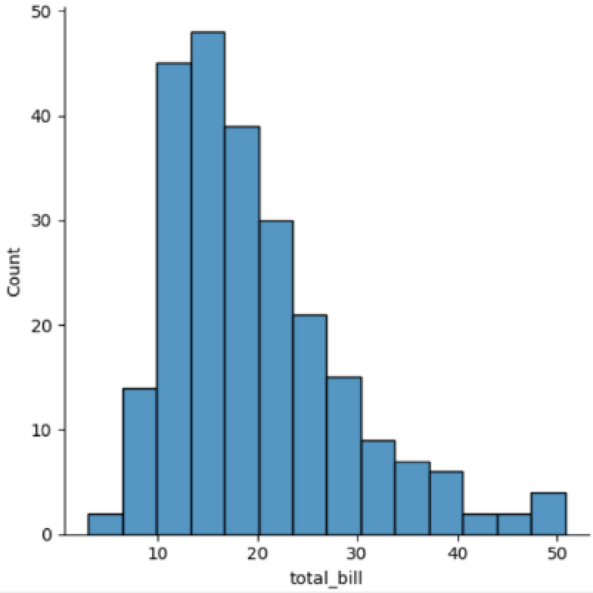
	France	Germany	Spain	Age	Salary	Purchased
0	True	False	False	44.0	72000.0	0
1	False	False	True	27.0	48000.0	1
2	False	True	False	30.0	54000.0	0
3	False	False	True	38.0	61000.0	0
4	False	True	False	40.0	63778.0	1
5	True	False	False	35.0	58000.0	1
6	False	False	True	38.0	52000.0	0
7	True	False	False	48.0	79000.0	1
8	True	False	False	50.0	83000.0	0
9	True	False	False	37.0	67000.0	1

```
# EDA-Quantitative and Qualitative plots

# 230701016

# M. Aishwarya

# 03.09.2024


import seaborn as sns

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

%matplotlib inline


tips = sns.load_dataset('tips')

tips.head()


sns.displot(tips.total_bill, kde=True)

plt.show()


sns.displot(tips.total_bill, kde=False)

plt.show()


sns.jointplot(x=tips.tip, y=tips.total_bill)

plt.show()


sns.jointplot(x=tips.tip, y=tips.total_bill, kind="reg")

plt.show()


sns.jointplot(x=tips.tip, y=tips.total_bill, kind="hex")

plt.show()


sns.pairplot(tips)

plt.show()


print(tips.time.value_counts())
```

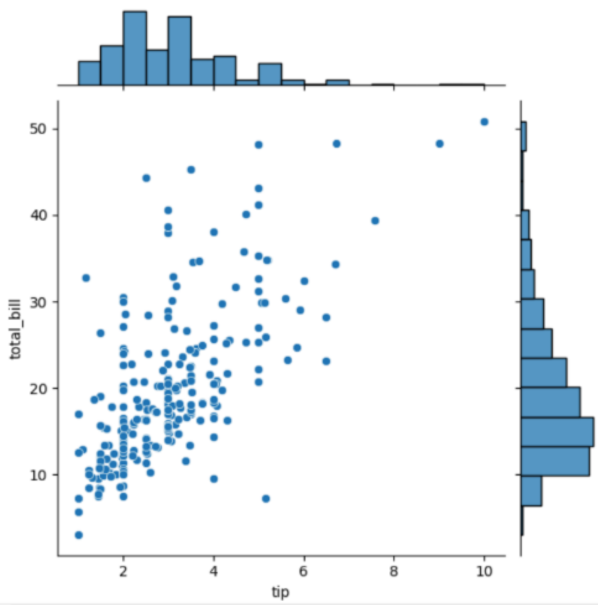
```
sns.pairplot(tips, hue='time')
plt.show()

sns.pairplot(tips, hue='day')
plt.show()

sns.heatmap(tips.corr(numeric_only=True), annot=True)
plt.show()

sns.boxplot(x=tips.total_bill)
plt.show()
sns.boxplot(x=tips.tip)
plt.show()

sns.countplot(x=tips.day)
plt.show()
sns.countplot(x=tips.sex)
plt.show()

tips.sex.value_counts().plot(kind='pie', autopct='%1.1f%%')
plt.show()

tips.sex.value_counts().plot(kind='bar')
plt.show()
sns.countplot(x=tips[tips.time == 'Dinner']['day'])
plt.show()
```



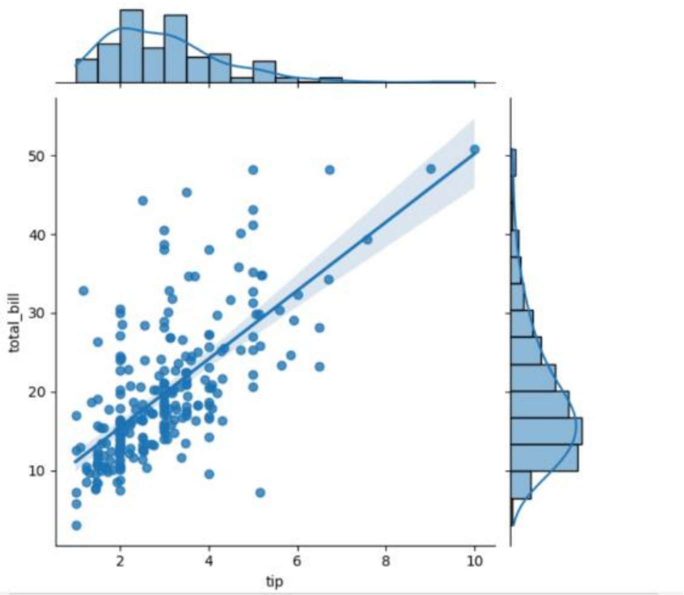
Count
total_bill



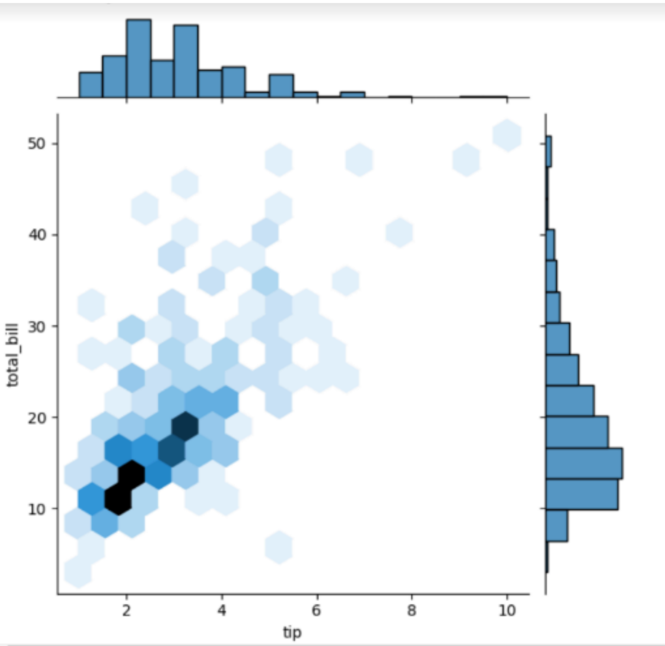
Count
total_bill



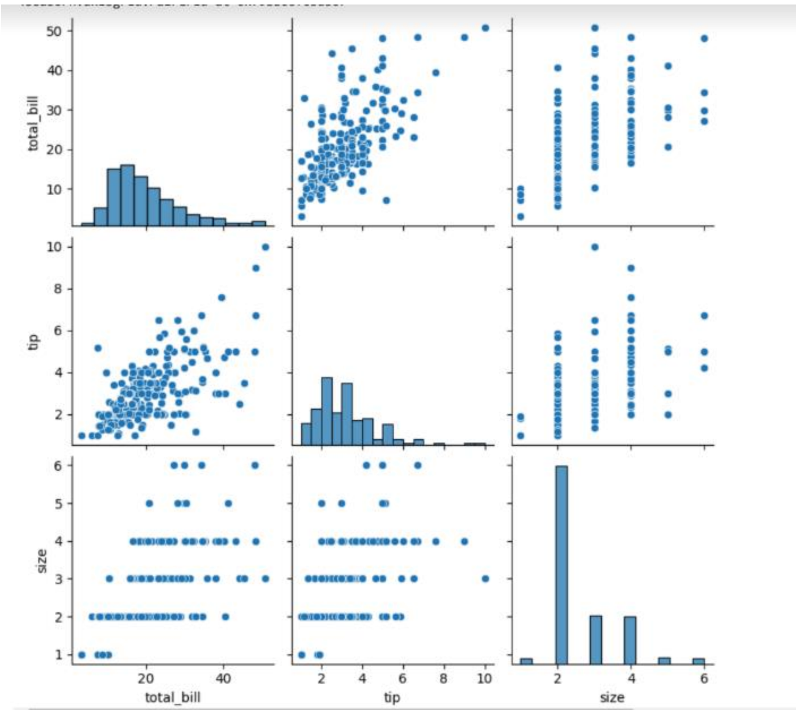
total_bill
tip

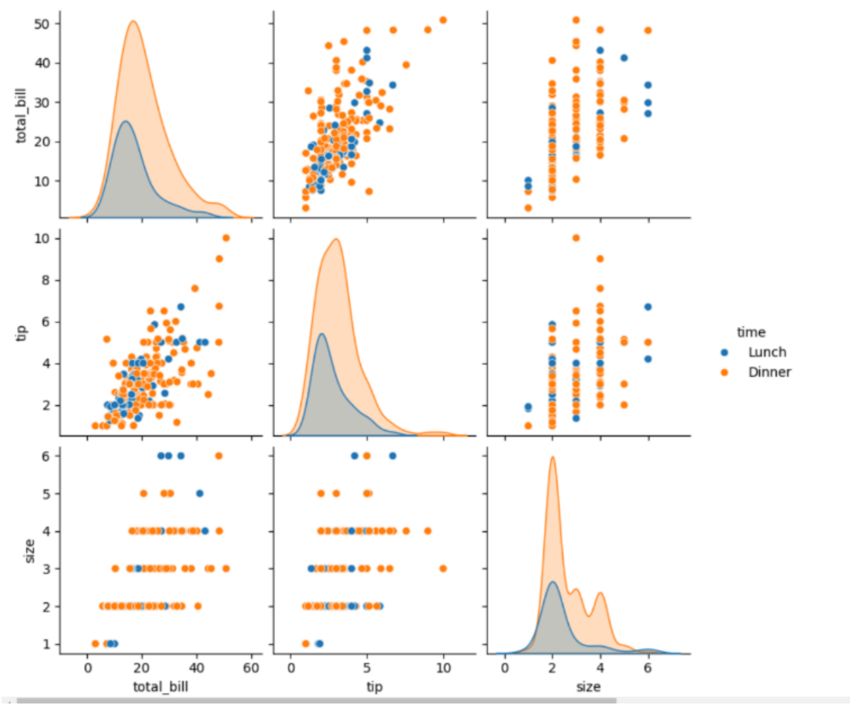


total_bill
tip
50
40
30
20
10
2
4
6
8
10



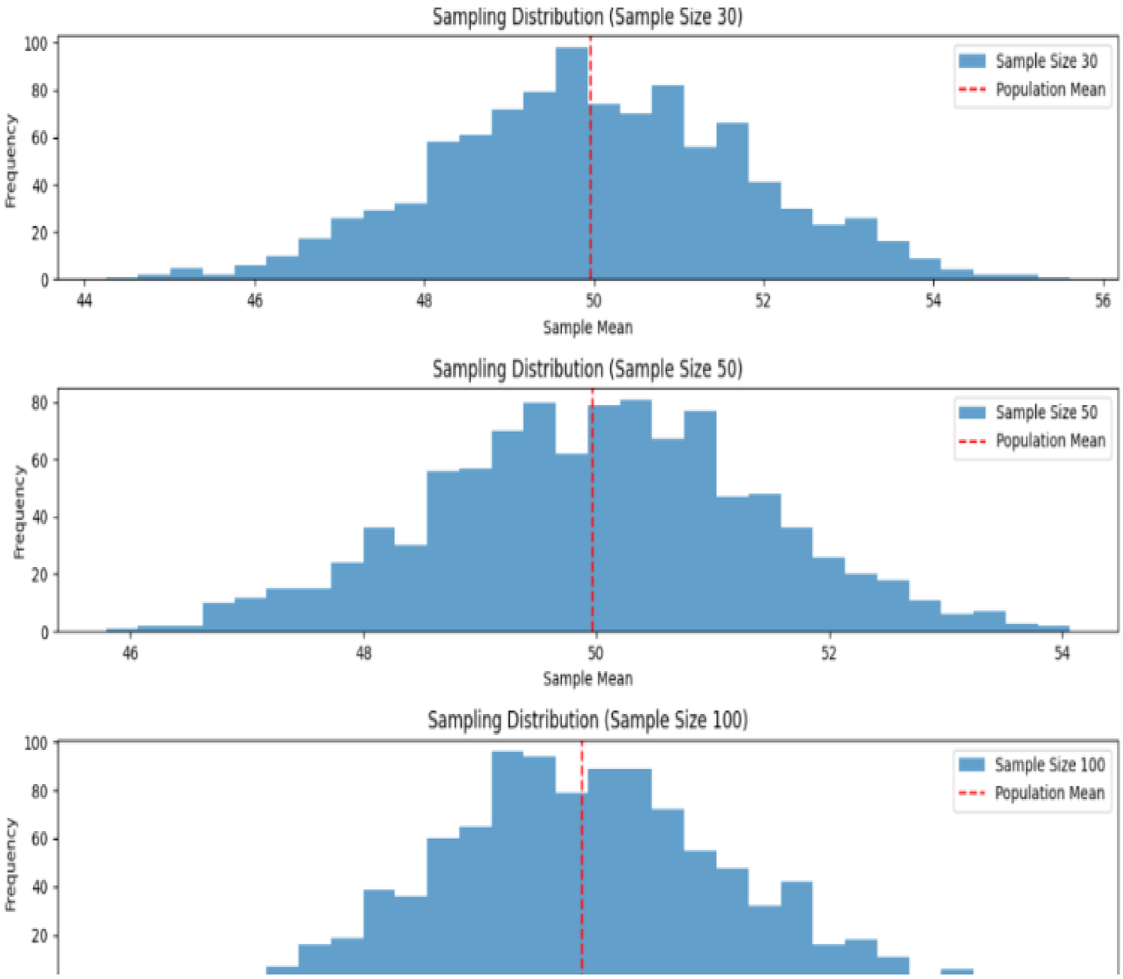
total_bill
tip
50
40
30
20
10
2
4
6
8
10


total_bill
tip
size
total_bill
tip
size


total_bill
tip
size
time
Lunch
Dinner
total_bill
tip
size

```
# Random Sampling and Sampling Distribution
# 230701016
# M. Aishwarya
# 10.09.2024

import numpy as np
import matplotlib.pyplot as plt

population_mean = 50
population_std = 10
population_size = 100000
population = np.random.normal(population_mean, population_std, population_size)



plt.figure(figsize=(8, 5))
plt.hist(population, bins=50, color='skyblue', edgecolor='black', alpha=0.7)
plt.title('Population Distribution')
plt.xlabel('Value')
plt.ylabel('Frequency')
plt.axvline(population_mean, color='red', linestyle='dashed', linewidth=1.5, label='Population Mean')
plt.legend()
plt.show()



sample_sizes = [30, 50, 100]
num_samples = 1000
sample_means = {}

for size in sample_sizes:
    sample_means[size] = []
    for _ in range(num_samples):
        sample = np.random.choice(population, size=size, replace=False)
        sample_means[size].append(np.mean(sample))
```

```python
plt.figure(figsize=(12, 8))
for i, size in enumerate(sample_sizes):
    plt.subplot(len(sample_sizes), 1, i + 1)
    plt.hist(sample_means[size], bins=30, alpha=0.7, color='orange', edgecolor='black',
             label=f'Sample Size {size}')
    plt.axvline(np.mean(population), color='red', linestyle='dashed', linewidth=1.5, label='Population Mean')
    plt.title(f'Sampling Distribution of the Sample Mean (Sample Size {size})')
    plt.xlabel('Sample Mean')
    plt.ylabel('Frequency')
    plt.legend()

plt.tight_layout()
plt.show()

plt.figure(figsize=(12, 8))
for i, size in enumerate(sample_sizes):
    plt.subplot(len(sample_sizes), 1, i + 1)
    plt.hist(sample_means[size], bins=30, alpha=0.7, color='purple', edgecolor='black',
             label=f'Sample Size {size}', density=True)
    plt.axvline(np.mean(population), color='red', linestyle='dashed', linewidth=1.5, label='Population Mean')
    plt.title(f'Sampling Distribution (Sample Size {size}) - CLT Demonstration')
    plt.xlabel('Sample Mean')
    plt.ylabel('Density')
    plt.legend()

plt.tight_layout()
plt.show()
```


Sampling Distribution (Sample Size 30)
Frequency
Sample Mean
Sample Size 30
Population Mean
Sampling Distribution (Sample Size 50)
Frequency
Sample Mean
Sample Size 50
Population Mean
Sampling Distribution (Sample Size 100)
Frequency
Sample Size 100
Population Mean

```python
# Z-Test
# 230701016
# M. Aishwarya
# 10.09.2024

import numpy as np
import scipy.stats as stats

sample_data = np.array([
    152, 148, 151, 149, 147, 153, 150, 148, 152, 149,
    151, 150, 149, 152, 151, 148, 150, 152, 149, 150,
    148, 153, 151, 150, 149, 152, 148, 151, 150, 153
])

population_mean = 150
sample_mean = np.mean(sample_data)
sample_std = np.std(sample_data, ddof=1)

n = len(sample_data)
z_statistic = (sample_mean - population_mean) / (sample_std / np.sqrt(n))
p_value = 2 * (1 - stats.norm.cdf(np.abs(z_statistic)))
print(f"Sample Mean: {sample_mean:.2f}")
print(f"Z-Statistic: {z_statistic:.4f}")
print(f"P-Value: {p_value:.4f}")

alpha = 0.05
if p_value < alpha:
    print("Reject the null hypothesis: The average weight is significantly different from 150 grams.")
else:
    print("Fail to reject the null hypothesis: There is no significant difference in average weight from 150 grams.")
```

OUTPUT:

Sample Mean: 150.20

Z-Statistic: 0.6406

P-Value: 0.5218

Fail to reject the null hypothesis: There is no significant difference in average weight from 150 grams.

```
# T-Test
# 230701016
# M. Aishwarya
# 08.10.2024

import numpy as np
import scipy.stats as stats

np.random.seed(42)

sample_size = 25
sample_data = np.random.normal(loc=102, scale=15, size=sample_size)

population_mean = 100

sample_mean = np.mean(sample_data)
sample_std = np.std(sample_data, ddof=1)

n = len(sample_data)

t_statistic, p_value = stats.ttest_1samp(sample_data, population_mean)

print(f"Sample Mean: {sample_mean:.2f}")
print(f"T-Statistic: {t_statistic:.4f}")
print(f"P-Value: {p_value:.4f}")

alpha = 0.05
if p_value < alpha:
    print("Reject the null hypothesis: The average IQ score is significantly different from 100.")
else:
    print("Fail to reject the null hypothesis: There is no significant difference in average IQ score from 100.")
```

OUTPUT:

Sample Mean: 99.55

T-Statistic: -0.1577

P-Value: 0.8760

Fail to reject the null hypothesis: There is no significant difference in average IQ score from 100.

```
# Anova TEST
# 230701016
# M. Aishwarya
# 08.10.2024

import numpy as np
import scipy.stats as stats
np.random.seed(42)
n_plants = 25
growth_A = np.random.normal(loc=10, scale=2, size=n_plants)
growth_B = np.random.normal(loc=12, scale=3, size=n_plants)
growth_C = np.random.normal(loc=15, scale=2.5, size=n_plants)
f_statistic, p_value = stats.f_oneway(growth_A, growth_B, growth_C)
print("Treatment A Mean Growth:", np.mean(growth_A))
print("Treatment B Mean Growth:", np.mean(growth_B))
print("Treatment C Mean Growth:", np.mean(growth_C))
print()
print(f"F-Statistic: {f_statistic:.4f}")
print(f"P-Value: {p_value:.4f}")
alpha = 0.05
if p_value < alpha:
    print("Reject the null hypothesis: There is a significant difference in mean growth rates among the three treatments.")
else:
    print("Fail to reject the null hypothesis: There is no significant difference in mean growth rates among the three treatments.")
if p_value < alpha:
    all_data = np.concatenate([growth_A, growth_B, growth_C])
    treatment_labels = ['A'] * n_plants + ['B'] * n_plants + ['C'] * n_plants


    tukey_results = pairwise_tukeyhsd(all_data, treatment_labels, alpha=0.05)
    print("\nTukey's HSD Post-hoc Test:")
    print(tukey_results)
```

OUTPUT:

Treatment A Mean Growth: 9.672983882683818

Treatment B Mean Growth: 11.137680744437432

Treatment C Mean Growth: 15.265234904828972

F-Statistic: 36.1214

P-Value: 0.0000

Reject the null hypothesis: There is a significant difference in mean growth rates among the three treatments.

```python
# Feature Scaling

# 230701016

# M. Aishwarya

# 22.10.2024


import numpy as np

import pandas as pd


df = pd.read_csv('/content/pre-process_datasample.csv')


print("Original Data:")

print(df)


df['Country'].fillna(df['Country'].mode()[0], inplace=True)


features = df.iloc[:, :-1].values

label = df.iloc[:, -1].values


from sklearn.impute import SimpleImputer


age_imputer = SimpleImputer(strategy="mean")

salary_imputer = SimpleImputer(strategy="mean")


age_imputer.fit(features[:, [1]])

salary_imputer.fit(features[:, [2]])


features[:, [1]] = age_imputer.transform(features[:, [1]])

features[:, [2]] = salary_imputer.transform(features[:, [2]])


print("Features after handling missing values:")

print(features)
```

```
from sklearn.preprocessing import OneHotEncoder
oh = OneHotEncoder(sparse_output=False)

Country = oh.fit_transform(features[:, [0]])

print("OneHotEncoded 'Country' column:")
print(Country)

final_set = np.concatenate((Country, features[:, [1, 2]]), axis=1)

print("Final dataset with OneHotEncoded 'Country' and other features:")
print(final_set)

from sklearn.preprocessing import StandardScaler
sc = StandardScaler()

sc.fit(final_set)
feat_standard_scaler = sc.transform(final_set)

print("Standardized features:")
print(feat_standard_scaler)

from sklearn.preprocessing import MinMaxScaler
mms = MinMaxScaler(feature_range=(0, 1))

mms.fit(final_set)
feat_minmax_scaler = mms.transform(final_set)

print("Normalized features:")
print(feat_minmax_scaler)
```

```
array([['France', 44.0, 72000.0],
       ['Spain', 27.0, 48000.0],
       ['Germany', 30.0, 54000.0],
       ['Spain', 38.0, 61000.0],
       ['Germany', 40.0, 63777.77777777778],
       ['France', 35.0, 58000.0],
       ['Spain', 38.77777777777778, 52000.0],
       ['France', 48.0, 79000.0],
       ['France', 50.0, 83000.0],
       ['France', 37.0, 67000.0]], dtype=object)
```

```
array([[1.        , 0.        , 0.        , 0.73913043, 0.68571429],
       [0.        , 0.        , 1.        , 0.        , 0.        ],
       [0.        , 1.        , 0.        , 0.13043478, 0.17142857],
       [0.        , 0.        , 1.        , 0.47826087, 0.37142857],
       [0.        , 1.        , 0.        , 0.56521739, 0.45079365],
       [1.        , 0.        , 0.        , 0.34782609, 0.28571429],
       [0.        , 0.        , 1.        , 0.51207729, 0.11428571],
       [1.        , 0.        , 0.        , 0.91304348, 0.88571429],
       [1.        , 0.        , 0.        , 1.        , 1.        ],
       [1.        , 0.        , 0.        , 0.43478261, 0.54285714]])
```

```
array([[1.0, 0.0, 0.0, 44.0, 72000.0],
       [0.0, 0.0, 1.0, 27.0, 48000.0],
       [0.0, 1.0, 0.0, 30.0, 54000.0],
       [0.0, 0.0, 1.0, 38.0, 61000.0],
       [0.0, 1.0, 0.0, 40.0, 63777.77777777778],
       [1.0, 0.0, 0.0, 35.0, 58000.0],
       [0.0, 0.0, 1.0, 38.77777777777778, 52000.0],
       [1.0, 0.0, 0.0, 48.0, 79000.0],
       [1.0, 0.0, 0.0, 50.0, 83000.0],
       [1.0, 0.0, 0.0, 37.0, 67000.0]], dtype=object)
```

```
array([[1.        , 0.        , 0.        , 0.73913043, 0.68571429],
       [0.        , 0.        , 1.        , 0.        , 0.        ],
       [0.        , 1.        , 0.        , 0.13043478, 0.17142857],
       [0.        , 0.        , 1.        , 0.47826087, 0.37142857],
       [0.        , 1.        , 0.        , 0.56521739, 0.45079365],
       [1.        , 0.        , 0.        , 0.34782609, 0.28571429],
       [0.        , 0.        , 1.        , 0.51207729, 0.11428571],
       [1.        , 0.        , 0.        , 0.91304348, 0.88571429],
       [1.        , 0.        , 0.        , 1.        , 1.        ],
       [1.        , 0.        , 0.        , 0.43478261, 0.54285714]])
```

```
array([[ 1.00000000e+00, -5.00000000e-01, -6.54653671e-01,
         7.58874362e-01,  7.49473254e-01],
       [-1.00000000e+00, -5.00000000e-01,  1.52752523e+00,
        -1.71150388e+00, -1.43817841e+00],
       [-1.00000000e+00,  2.00000000e+00, -6.54653671e-01,
        -1.27555478e+00, -8.91265492e-01],
       [-1.00000000e+00, -5.00000000e-01,  1.52752523e+00,
        -1.13023841e-01, -2.53200424e-01],
       [-1.00000000e+00,  2.00000000e+00, -6.54653671e-01,
         1.77608893e-01,  6.63219199e-16],
       [ 1.00000000e+00, -5.00000000e-01, -6.54653671e-01,
        -5.48972942e-01, -5.26656882e-01],
       [-1.00000000e+00, -5.00000000e-01,  1.52752523e+00,
         0.00000000e+00, -1.07356980e+00],
       [ 1.00000000e+00, -5.00000000e-01, -6.54653671e-01,
         1.34013983e+00,  1.38753832e+00],
       [ 1.00000000e+00, -5.00000000e-01, -6.54653671e-01,
         1.63077256e+00,  1.75214693e+00],
       [ 1.00000000e+00, -5.00000000e-01, -6.54653671e-01,
        -2.58340208e-01,  2.93712492e-01]])
```

```
# Linear Regression
# 230701016
# M. Aishwarya
# 29.10.2024

import numpy as np
import pandas as pd
df=pd.read_csv('Salary_data.csv')
df
df.info()

df.dropna(inplace=True)

df.info()
df.describe()

features=df.iloc[:,[0]].values
label=df.iloc[:,[1]].values

from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(features,label,test_size=0.2,random_state=23)

from sklearn.linear_model import LinearRegression
model=LinearRegression()
model.fit(x_train,y_train)

model.score(x_train,y_train)
model.score(x_test,y_test)

model.coef_
model.intercept_

import pickle
```

```
pickle.dump(model,open('SalaryPred.model','wb'))

model=pickle.load(open('SalaryPred.model','rb'))

yr_of_exp=float(input("Enter Years of Experience: "))

yr_of_exp_NP=np.array([[yr_of_exp]])

Salary=model.predict(yr_of_exp_NP)


print("Estimated Salary for {} years of experience is {}: " .format(yr_of_exp,Salary)
```

OUTPUT-

Estimated Salary for 44.0 years of experience is [[435544.30953887]]:

```
# Logistic Regression

# 230701016

# M. Aishwarya

# 05.11.2024

import numpy as np

import pandas as pd

df=pd.read_csv('Social_Network_Ads.csv')

df

df.head()

features=df.iloc[:,[2,3]].values

label=df.iloc[:,4].values

features

label

from sklearn.model_selection import train_test_split

from sklearn.linear_model import LogisticRegression

for i in range(1,401):

    x_train,x_test,y_train,y_test=train_test_split(features,label,test_size=0.2,random_state=i)

    model=LogisticRegression()

    model.fit(x_train,y_train)

    train_score=model.score(x_train,y_train)

    test_score=model.score(x_test,y_test)

    if test_score>train_score:

        print("Test {} Train{} Random State {}".format(test_score,train_score,i)

x_train,x_test,y_train,y_test=train_test_split(features,label,test_size=0.2,random_state=314)

finalModel=LogisticRegression()

finalModel.fit(x_train,y_train)
```

```
print(finalModel.score(x_train,y_train))
print(finalModel.score(x_test,y_test))

from sklearn.metrics import classification_report
print(classification_report(label,finalModel.predict(features)))
```

	precision	recall	f1-score	support
0	0.85	0.93	0.89	257
1	0.84	0.71	0.77	143
accuracy			0.85	400
macro avg	0.85	0.82	0.83	400
weighted avg	0.85	0.85	0.85	400