Name: Pranav Mehendale

Roll No.: TCOD34

Batch: T11

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import LabelEncoder

df = pd.read_csv("Social_Network_Ads.csv")
df.head(5)
```

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

```
df.shape
```

```
(400, 5)
```

```
df.isnull().sum()
```

```
User ID            0
Gender             0
Age                0
EstimatedSalary    0
Purchased          0
dtype: int64
```

```
df.describe()
```

	User ID	Age	EstimatedSalary	Purchased
count	4.000000e+02	400.000000	400.000000	400.000000
mean	1.569154e+07	37.655000	69742.500000	0.357500
std	7.165832e+04	10.482877	34096.960282	0.479864
min	1.556669e+07	18.000000	15000.000000	0.000000
25%	1.562676e+07	29.750000	43000.000000	0.000000
50%	1.569434e+07	37.000000	70000.000000	0.000000
75%	1.575036e+07	46.000000	88000.000000	1.000000
max	1.581524e+07	60.000000	150000.000000	1.000000

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 400 entries, 0 to 399
Data columns (total 5 columns):
```

```
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   User ID          400 non-null    int64
 1   Gender           400 non-null    object
 2   Age              400 non-null    int64
 3   EstimatedSalary  400 non-null    int64
 4   Purchased        400 non-null    int64
dtypes: int64(4), object(1)
memory usage: 15.8+ KB
```

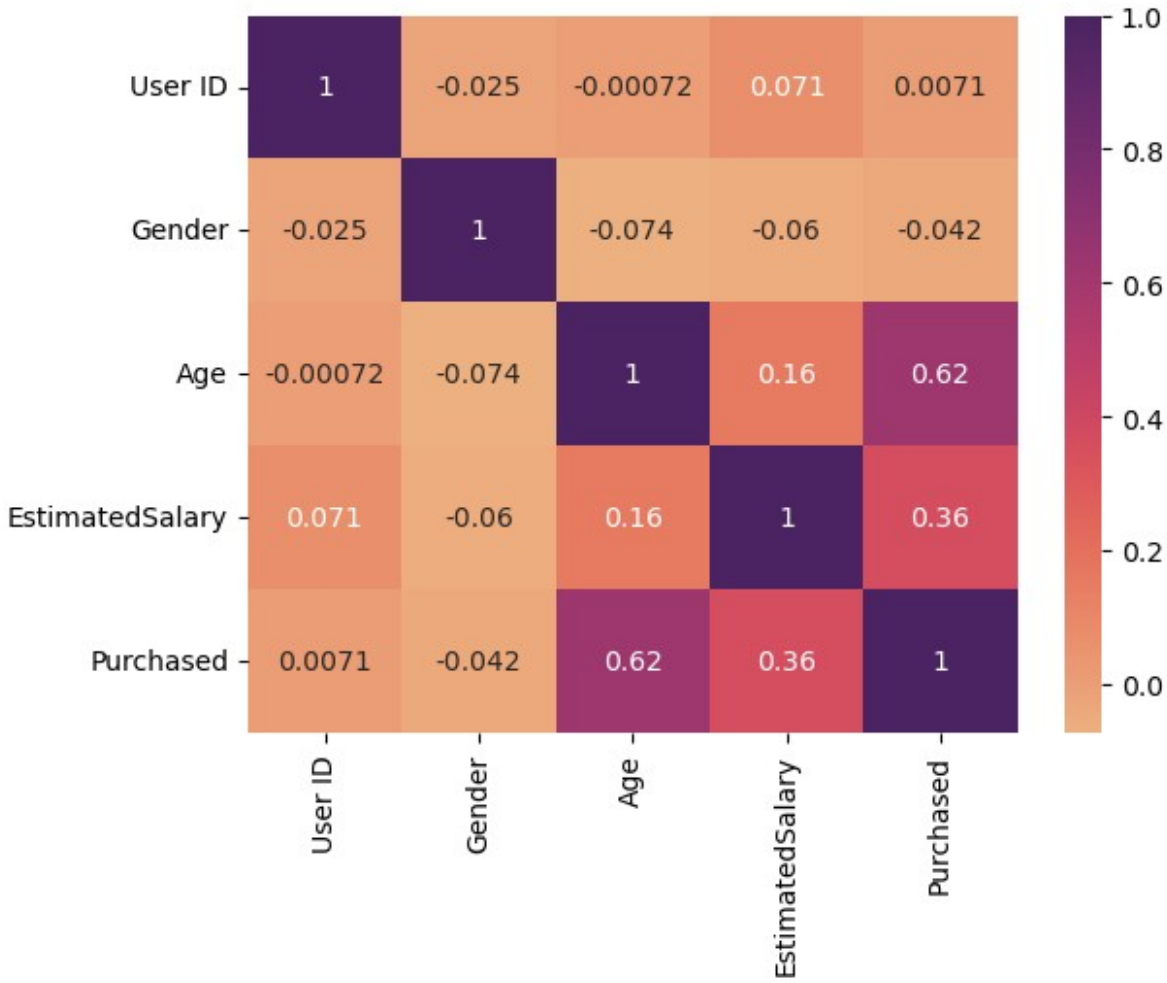
```
enc=LabelEncoder()
df['Gender']=enc.fit_transform(df['Gender'])
```

```
df.head(5)
```

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	1	19	19000	0
1	15810944	1	35	20000	0
2	15668575	0	26	43000	0
3	15603246	0	27	57000	0
4	15804002	1	19	76000	0

```
sns.heatmap(df.corr(), annot=True, cmap="flare")
```

```
<Axes: >
```




```
df.drop('User ID',inplace=True,axis=1)
df.head(5)
```

	Gender	Age	EstimatedSalary	Purchased
0	1	19	19000	0
1	1	35	20000	0
2	0	26	43000	0
3	0	27	57000	0
4	1	19	76000	0

```
X=df.drop('Purchased',axis=1)
Y=df['Purchased']

from sklearn.model_selection import train_test_split
X_train,X_test,Y_train,Y_test=train_test_split(X,Y, test_size=0.2,
random_state=42)

from sklearn.linear_model import LogisticRegression

model = LogisticRegression()
```

```
model.fit(X_train,Y_train)
```

```
LogisticRegression()
```

```
Y_pred=model.predict(X_test)
```

```
from sklearn.metrics import confusion_matrix, accuracy_score,
precision_recall_curve
```

```
accuracy_score (Y_test,Y_pred)
```

```
0.65
```

```
from sklearn.preprocessing import StandardScaler
from sklearn.pipeline import make_pipeline

std=StandardScaler()
model2 = make_pipeline(std, LogisticRegression())
```

```
model2.fit(X_train,Y_train)
```

```
Pipeline(steps=[('standardscaler', StandardScaler()),
                ('logisticregression', LogisticRegression())])
```

```
y_pred=model2.predict(X_test)
```

```
accuracy_score(Y_test,y_pred)
```

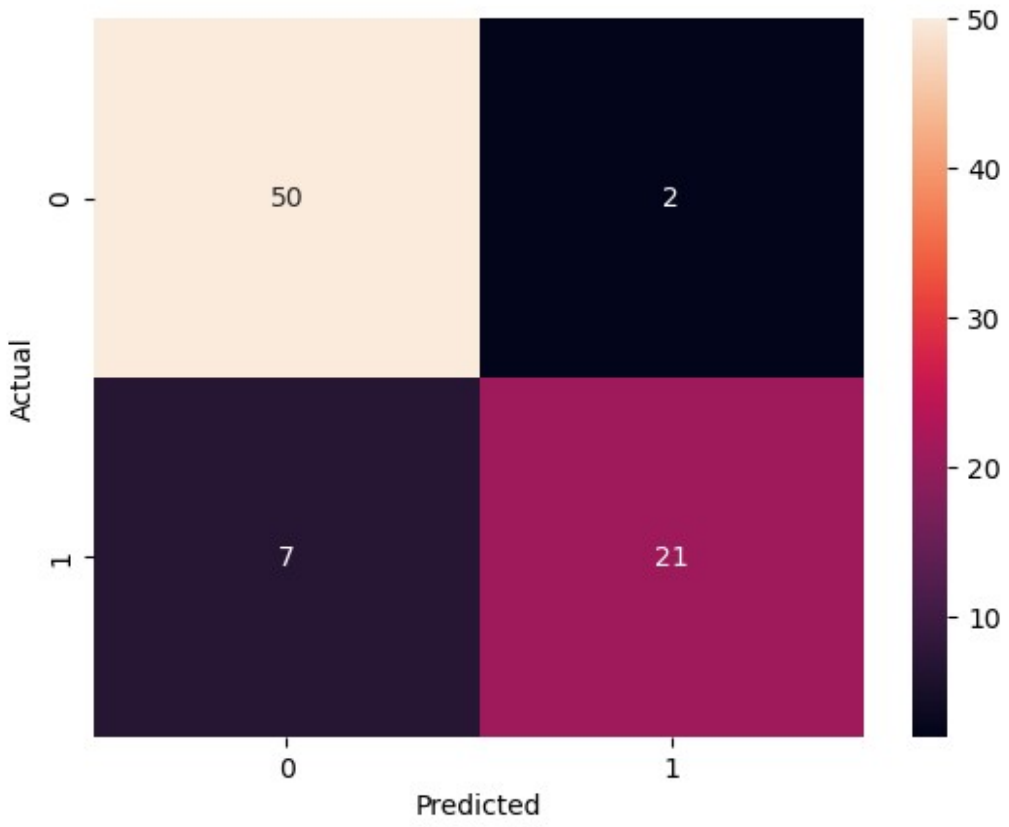
```
0.8875
```

```
confusion_matrix(Y_test,y_pred)
```

```
array([[50,  2],
       [ 7, 21]], dtype=int64)
```

```
sns.heatmap(confusion_matrix(Y_test,y_pred),annot=True)
plt.ylabel('Actual')
plt.xlabel('Predicted')
```

```
Text(0.5, 23.52222222222222, 'Predicted')
```




```
accuracy_score (Y_test,y_pred)
```

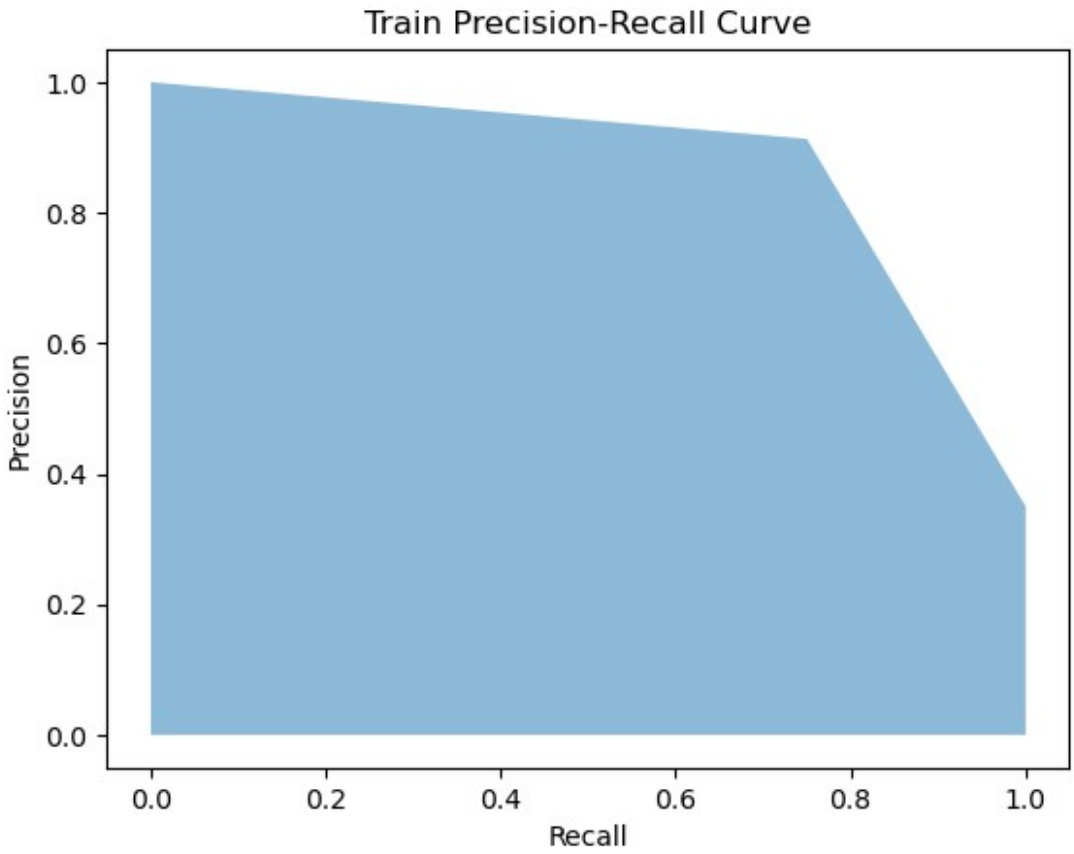
```
0.8875
```

```
.value_counts()
```

```
Purchased
0    205
1    115
Name: count, dtype: int64
```

```
precision, recall, threshold = precision_recall_curve(Y_test, y_pred)
plt.fill_between(recall,precision,alpha = 0.5)
plt.ylabel('Precision')
plt.xlabel('Recall')
plt.title('Train Precision-Recall Curve')
```

```
Text(0.5, 1.0, 'Train Precision-Recall Curve')
```


Train Precision-Recall Curve
Precision
Recall
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0