```python
import numpy as np
import pandas as pd
import seaborn as sns
from sklearn.linear_model import LogisticRegression
```

```python
df=pd.read_csv("C8_loan-test - C8_loan-test.csv")
df
```

	Loan_ID	Gender	Married	Dependents	Education	Self_Employed	ApplicantIncome	CoapplicantI
0	LP001015	Male	Yes	0	Graduate	No	5720	
1	LP001022	Male	Yes	1	Graduate	No	3076	
2	LP001031	Male	Yes	2	Graduate	No	5000	
3	LP001035	Male	Yes	2	Graduate	No	2340	
4	LP001051	Male	No	0	Not Graduate	No	3276	
...	...	...	...	...	...	...	...	
362	LP002971	Male	Yes	3+	Not Graduate	Yes	4009	
363	LP002975	Male	Yes	0	Graduate	No	4158	
364	LP002980	Male	No	0	Graduate	No	3250	
365	LP002986	Male	Yes	0	Graduate	No	5000	
366	LP002989	Male	No	0	Graduate	Yes	9200	

367 rows × 12 columns

```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 367 entries, 0 to 366
Data columns (total 12 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Loan_ID            367 non-null    object
 1   Gender             356 non-null    object
 2   Married            367 non-null    object
 3   Dependents         357 non-null    object
 4   Education          367 non-null    object
 5   Self_Employed      344 non-null    object
 6   ApplicantIncome    367 non-null    int64
 7   CoapplicantIncome  367 non-null    int64
 8   LoanAmount         362 non-null    float64
 9   Loan_Amount_Term   361 non-null    float64
 10  Credit_History     338 non-null    float64
 11  Property_Area      367 non-null    object
dtypes: float64(3), int64(2), object(7)
memory usage: 34.5+ KB
```

```
In [70]:   df1=df.fillna(value=0)
           df1
```

Out[70]:

	Loan_ID	Gender	Married	Dependents	Education	Self_Employed	ApplicantIncome	CoapplicantI
0	LP001015	Male	Yes	0	Graduate	No	5720	
1	LP001022	Male	Yes	1	Graduate	No	3076	
2	LP001031	Male	Yes	2	Graduate	No	5000	
3	LP001035	Male	Yes	2	Graduate	No	2340	
4	LP001051	Male	No	0	Not Graduate	No	3276	
...	...	...	...	...	...	...	...	
362	LP002971	Male	Yes	3+	Not Graduate	Yes	4009	
363	LP002975	Male	Yes	0	Graduate	No	4158	
364	LP002980	Male	No	0	Graduate	No	3250	
365	LP002986	Male	Yes	0	Graduate	No	5000	
366	LP002989	Male	No	0	Graduate	Yes	9200	

367 rows × 12 columns

```
In [71]:   df1.columns
```

Out[71]:   Index(['Loan_ID', 'Gender', 'Married', 'Dependents', 'Education',
                  'Self_Employed', 'ApplicantIncome', 'CoapplicantIncome', 'LoanAmount',
                  'Loan_Amount_Term', 'Credit_History', 'Property_Area'],
                 dtype='object')

```
In [72]:   df2=df1[['ApplicantIncome', 'CoapplicantIncome', 'LoanAmount', 'Loan_Amount_Term', 'Cre
           df2
```

Out[72]:

	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_History
0	5720	0	110.0	360.0	1.0
1	3076	1500	126.0	360.0	1.0
2	5000	1800	208.0	360.0	1.0
3	2340	2546	100.0	360.0	0.0
4	3276	0	78.0	360.0	1.0
...	...	...	...	...	...
362	4009	1777	113.0	360.0	1.0
363	4158	709	115.0	360.0	1.0

	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_History
364	3250	1993	126.0	360.0	0.0
365	5000	2393	158.0	360.0	1.0
366	9200	0	98.0	180.0	1.0

367 rows × 5 columns

In [84]:
```python
feature_matrix=df2.iloc[:,0:4]
target_vector=df2.iloc[:,-1]
```

In [85]:
```python
feature_matrix.shape
```

Out[85]: (367, 4)

In [86]:
```python
target_vector.shape
```

Out[86]: (367,)

In [87]:
```python
from sklearn.preprocessing import StandardScaler
```

In [88]:
```python
fs=StandardScaler().fit_transform(feature_matrix)
```

In [89]:
```python
logr =LogisticRegression()
logr.fit(fs,target_vector)
```

Out[89]: LogisticRegression()

In [94]:
```python
observation=[[1.4,2.3,5.0,11]]
```

In [95]:
```python
prediction=logr.predict(observation)
print(prediction)
```

[0.]

In [96]:
```python
logr.classes_
```

Out[96]: array([0., 1.])

In [97]:
```python
logr.predict_proba(observation)[0][0]
```

Out[97]: 0.5265701322087126

In [98]:
```python
logr.predict_proba(observation)[0][1]
```

Out[98]: 0.47342986779128743

In [ ]:

In [ ]: