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Batch: 2028
Degree: B.E CSE

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2024_28_IV_CSE A_Artificial Intelligence and Machine Learning Lab

PSG ITech_2028_AIML_Week 5_COD

Attempt : 1
Total Mark : 40
Marks Obtained : 20

Section 1 : Coding

1.   Problem Statement

Jenna, a healthcare analyst, is working with a dataset containing patient records. Each entry includes the age of the patient and a binary indicator has_disease showing whether the patient has a disease (1) or not (0). Jenna wants to predict the likelihood of disease occurrence based solely on a patient's age using logistic regression.

Write a program to ensure that the task is done by reading the dataset, fitting a logistic regression model, and printing the prediction accuracy rounded to four decimal places.

Answer

main.py

```
X = df[['age']]
```

```python
y = df['has_disease']

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)

model = LogisticRegression()
model.fit(X_train, y_train)

y_pred = model.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
```

data.csv

```
age,has_disease
22,0
34,1
45,1
29,0
50,1
31,0
27,0
40,1
33,1
36,0
25,0
48,1
54,1
60,1
42,0
39,1
30,0
28,0
23,0
37,1
```

data1.csv

```
age,has_disease
18,0
26,0
35,1
44,1
```

52,1
38,1
30,0
29,0
41,1
19,0
32,0
41,1
50,1
24,0
35,1
46,1
29,0
39,1
53,1
27,0
48,1
22,0
37,1
18,0
25,0
30,0
44,1
55,1
60,1
62,1
40,1
38,0
45,1
51,1
54,1
33,1
42,1
26,0
28,0
34,1
36,0
57,1
58,1
59,1
61,1
63,1

64,1
65,1
66,1
67,1
68,1
69,1
70,1
71,1
72,1
73,1
74,1
75,1
76,1
77,1
78,1
79,1
80,1
81,1
82,1
83,1
84,1
85,1
86,1
87,1
88,1
89,1
90,1
91,1
92,1
93,1
94,1
95,1
96,1
97,1
98,1
99,1
100,1
101,1
102,1
103,1
104,1
105,1

106,1
107,1
108,1
109,1
110,1

data2.csv

age,has_disease
21,0
33,1
47,1
36,0
28,0
52,1
30,0
42,1
58,1
49,1
40,1
22,0
35,1
39,1
44,1
26,0
31,0
54,1
38,0
18,0
25,0
29,0
32,1
41,1
55,1
60,1
43,1
34,1
48,1
37,1
19,0
20,0
27,0
45,1

46,1
50,1
23,0
24,0
39,1
59,1
61,1
62,1
53,1
64,1
66,1
65,1
70,1

data3.csv

age,has_disease
19,0
32,0
41,1
50,1
24,0
35,1
46,1
29,0
39,1
53,1
27,0
48,1
22,0
37,1
18,0
25,0
30,0
44,1
55,1
60,1
62,1
40,1
38,0
45,1
51,1
54,1

33,1
42,1
26,0
28,0
34,1
36,0
57,1
58,1
59,1
61,1
63,1
64,1
65,1
66,1
67,1
68,1
69,1
70,1
71,1
72,1
73,1
74,1
75,1
76,1
77,1
78,1
79,1
80,1
81,1
82,1
83,1
84,1
85,1
86,1
87,1
88,1
89,1
90,1
91,1
92,1
93,1
94,1

```
95,1
96,1
97,1
98,1
99,1
100,1
101,1
102,1
103,1
104,1
105,1
106,1
107,1
108,1
109,1
110,1
```

data4.csv

```
age,has_disease
23,0
30,0
42,1
54,1
32,0
38,1
29,0
25,0
41,1
48,1
35,1
52,1
33,1
27,0
39,1
45,1
36,0
18,0
40,1
24,0
37,1
46,1
28,0
```

44,1
55,1
31,0
58,1
49,1
53,1
26,0
34,1
59,1
60,1
61,1
62,1
63,1
64,1
65,1
66,1
67,1
68,1
69,1
70,1
71,1
72,1
73,1
74,1
75,1
76,1
77,1
78,1
79,1
80,1
81,1
82,1
83,1
84,1
85,1
86,1
87,1
88,1
89,1
90,1
91,1
92,1

93,1
94,1
95,1
96,1
97,1
98,1
99,1
100,1
101,1
102,1
103,1
104,1
105,1
106,1
107,1
108,1
109,1
110,1

Status : Correct   **Marks : 10/10**

2. Problem Statement

Nisha, a data analyst, wants to predict students' exam scores based on the number of hours they study. She aims to build a simple linear regression model, calculate its coefficient, intercept, and R-squared value, and understand the relationship between study hours and scores.

Write a Python program to read the dataset, fit a linear regression model, and display the model's intercept, coefficient, and R-squared value.

Answer

main.py

```
import pandas as pd
from sklearn.linear_model import LinearRegression

# Read filename from input
filename = input().strip()
```

```python
# Load dataset
data = pd.read_csv(filename)

# Explanatory variable (hours) and target (score)
X = data[['hours']]
y = data['score']

# Fit linear regression model
model = LinearRegression()
model.fit(X, y)

# Get intercept and coefficient
intercept = model.intercept_
coefficient = model.coef_[0]

# Predictions
y_pred = model.predict(X)

# Manual R-squared calculation
ssr = ((y - y_pred) ** 2).sum()        # Sum of squared residuals
sst = ((y - y.mean()) ** 2).sum()      # Total sum of squares
r_squared = 1 - (ssr / sst)

# Output (single line exactly as required)
print(f"Intercept: {intercept:.4f} Coefficient: {coefficient:.4f} R-squared:
{r_squared:.4f}")
```

data.csv

```
hours,score
1,64
2,66
4,76
5,73
5,74
6,81
6,83
7,82
8,80
10,88
11,84
11,82
12,91
```

12,93
14,89

data1.csv

```
hours,score
1,70
2,72
3,78
4,75
5,77
6,80
7,81
8,79
9,85
10,87
11,83
12,90
13,92
14,88
```

data2.csv

```
hours,score
1,70
2,72
3,78
4,75
5,77
6,80
7,81
8,79
9,85
10,87
11,83
12,90
13,92
14,88
15,85
16,86
17,89
18,91
19,83
20,80
```

21,78
22,76
23,75
24,74
25,77
26,79
27,81
28,82
29,84
30,86
31,88
32,89
33,90
34,87
35,85
36,83
37,81
38,79
39,77
40,75

data3.csv

hours,score
1,68
2,70
3,72
4,74
5,76
6,78
7,80
8,82
9,84
10,86
11,88
12,90
13,92
14,94
15,96
16,98
17,100
18,102
19,104

20,106
21,108
22,110
23,112
24,114
25,116
26,118
27,120
28,122
29,124
30,126
31,128
32,130
33,132
34,134
35,136
36,138
37,140
38,142
39,144
40,146
41,148
42,150
43,152
44,154
45,156
46,158
47,160
48,162
49,164
50,166
51,168
52,170
53,172
54,174
55,176
56,178
57,180
58,182
59,184
60,186

data4.csv

```
hours,score
1,72
2,74
3,76
4,78
5,80
6,82
7,84
8,86
9,88
10,90
11,92
12,94
13,96
14,98
15,100
16,102
17,104
18,106
19,108
20,110
21,112
22,114
23,116
24,118
25,120
26,122
27,124
28,126
29,128
30,130
31,132
32,134
33,136
34,138
35,140
36,142
37,144
38,146
39,148
40,150
41,152
```

42,154
43,156
44,158
45,160
46,162
47,164
48,166
49,168
50,170
51,172
52,174
53,176
54,178
55,180
56,182
57,184
58,186
59,188
60,190
61,192
62,194
63,196
64,198
65,200
66,202
67,204
68,206
69,208
70,210

Status : Wrong   *Marks : 0/10*

3. Problem Statement

Amara, a clinical data analyst, is evaluating a heart disease prediction
model using historical patient data stored in a CSV file. Each row in the file
represents a patient's medical attributes, and a target column indicates the
presence (1) or absence (0) of heart disease.

Write a program that reads the dataset, trains a logistic regression model

using 80% of the data, tests it on the remaining 20%, and prints evaluation metrics including accuracy, precision, recall, F1 score, AUC-ROC score, confusion matrix, and specificity.

Answer

main.py

```python
import sys
import pandas as pd
import numpy as np
from io import StringIO
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import (
    accuracy_score,
    precision_score,
    recall_score,
    f1_score,
    roc_auc_score,
    confusion_matrix,
)

data = sys.stdin.read().strip()
df = pd.read_csv(StringIO(data))

df.columns = df.columns.str.strip()
X = df.drop('target', axis=1)
y = df['target']

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)

model = LogisticRegression(max_iter=1000)
model.fit(X_train, y_train)

y_pred = model.predict(X_test)
y_pred_proba = model.predict_proba(X_test)[:, 1]

accuracy = accuracy_score(y_test, y_pred)
precision = precision_score(y_test, y_pred)
recall = recall_score(y_test, y_pred)
```

```python
f1 = f1_score(y_test, y_pred)
auc_roc = roc_auc_score(y_test, y_pred_proba)

conf_matrix = confusion_matrix(y_test, y_pred)
tn, fp, fn, tp = conf_matrix.ravel()
specificity = tn / (tn + fp)

print(f"Accuracy Score: {accuracy:.2f}")
print(f"Precision Score: {precision:.2f}")
print(f"Recall Score: {recall:.2f}")
print(f"F1 Score: {f1:.2f}")
print(f"AUC-ROC Score: {auc_roc:.2f}")
print("Confusion Matrix:")
print(conf_matrix)
print(f"Specificity: {specificity:.2f}")
```

data.csv

```
age,sex,cp,trestbps,chol,fbs,restecg,thalach,exang,oldpeak,slope,ca,thal,target
63,1,3,145,233,1,0,150,0,2.3,0,0,1,1
37,1,2,130,250,0,1,187,0,3.5,0,0,2,1
41,0,1,130,204,0,0,172,0,1.4,2,0,2,1
56,1,1,120,236,0,1,178,0,0.8,2,0,2,1
57,0,0,120,354,0,1,163,1,0.6,2,0,2,1
57,1,0,140,192,0,1,148,0,0.4,1,0,1,1
56,0,1,140,294,0,0,153,0,1.3,1,0,2,1
44,1,1,120,263,0,1,173,0,0,2,0,3,1
52,1,2,172,199,1,1,162,0,0.5,2,0,3,1
57,1,2,150,168,0,1,174,0,1.6,2,0,2,1
54,1,0,140,239,0,1,160,0,1.2,2,0,2,1
48,0,2,130,275,0,1,139,0,0.2,2,0,2,1
49,1,1,130,266,0,1,171,0,0.6,2,0,2,1
64,1,3,110,211,0,0,144,1,1.8,1,0,2,1
58,0,3,150,283,1,0,162,0,1,2,0,2,1
50,0,2,120,219,0,1,158,0,1.6,1,0,2,1
58,0,2,120,340,0,1,172,0,0,2,0,2,1
66,0,3,150,226,0,1,114,0,2.6,0,0,2,1
43,1,0,150,247,0,1,171,0,1.5,2,0,2,1
69,0,3,140,239,0,1,151,0,1.8,2,2,2,1
59,1,0,135,234,0,1,161,0,0.5,1,0,3,1
44,1,2,130,233,0,1,179,1,0.4,2,0,2,1
42,1,0,140,226,0,1,178,0,0,2,0,2,1
61,1,2,150,243,1,1,137,1,1,1,0,2,1
```

```
40,1,3,140,199,0,1,178,1,1.4,2,0,3,1
71,0,1,160,302,0,1,162,0,0.4,2,2,2,1
59,1,2,150,212,1,1,157,0,1.6,2,0,2,1
51,1,2,110,175,0,1,123,0,0.6,2,0,2,1
65,0,2,140,417,1,0,157,0,0.8,2,1,2,1
53,1,2,130,197,1,0,152,0,1.2,0,0,2,1
41,0,1,105,198,0,1,168,0,0,2,1,2,1
65,1,0,120,177,0,1,140,0,0.4,2,0,3,1
44,1,1,130,219,0,0,188,0,0,2,0,2,1
54,1,2,125,273,0,0,152,0,0.5,0,1,2,1
51,1,3,125,213,0,0,125,1,1.4,2,1,2,1
46,0,2,142,177,0,0,160,1,1.4,0,0,2,1
54,0,2,135,304,1,1,170,0,0,2,0,2,1
54,1,2,150,232,0,0,165,0,1.6,2,0,3,1
65,0,2,155,269,0,1,148,0,0.8,2,0,2,1
65,0,2,160,360,0,0,151,0,0.8,2,0,2,1
51,0,2,140,308,0,0,142,0,1.5,2,1,2,1
48,1,1,130,245,0,0,180,0,0.2,1,0,2,1
45,1,0,104,208,0,0,148,1,3,1,0,2,1
53,0,0,130,264,0,0,143,0,0.4,1,0,2,1
39,1,2,140,321,0,0,182,0,0,2,0,2,1
52,1,1,120,325,0,1,172,0,0.2,2,0,2,1
44,1,2,140,235,0,0,180,0,0,2,0,2,1
47,1,2,138,257,0,0,156,0,0,2,0,2,1
53,0,2,128,216,0,0,115,0,0,2,0,0,1
53,0,0,138,234,0,0,160,0,0,2,0,2,1
51,0,2,130,256,0,0,149,0,0.5,2,0,2,1
66,1,0,120,302,0,0,151,0,0.4,1,0,2,1
62,1,2,130,231,0,1,146,0,1.8,1,3,3,1
44,0,2,108,141,0,1,175,0,0.6,1,0,2,1
63,0,2,135,252,0,0,172,0,0,2,0,2,1
52,1,1,134,201,0,1,158,0,0.8,2,1,2,1
48,1,0,122,222,0,0,186,0,0,2,0,2,1
45,1,0,115,260,0,0,185,0,0,2,0,2,1
34,1,3,118,182,0,0,174,0,0,2,0,2,1
57,0,0,128,303,0,0,159,0,0,2,1,2,1
71,0,2,110,265,1,0,130,0,0,2,1,2,1
54,1,1,108,309,0,1,156,0,0,2,0,3,1
52,1,3,118,186,0,0,190,0,0,1,0,1,1
41,1,1,135,203,0,1,132,0,0,1,0,1,1
58,1,2,140,211,1,0,165,0,0,2,0,2,1
35,0,0,138,183,0,1,182,0,1.4,2,0,2,1
```

51,1,2,100,222,0,1,143,1,1.2,1,0,2,1
45,0,1,130,234,0,0,175,0,0.6,1,0,2,1
44,1,1,120,220,0,1,170,0,0,2,0,2,1
62,0,0,124,209,0,1,163,0,0,2,0,2,1
54,1,2,120,258,0,0,147,0,0.4,1,0,3,1
51,1,2,94,227,0,1,154,1,0,2,1,3,1
29,1,1,130,204,0,0,202,0,0,2,0,2,1
51,1,0,140,261,0,0,186,1,0,2,0,2,1
43,0,2,122,213,0,1,165,0,0.2,1,0,2,1
55,0,1,135,250,0,0,161,0,1.4,1,0,2,1
51,1,2,125,245,1,0,166,0,2.4,1,0,2,1
59,1,1,140,221,0,1,164,1,0,2,0,2,1
52,1,1,128,205,1,1,184,0,0,2,0,2,1
58,1,2,105,240,0,0,154,1,0.6,1,0,3,1
41,1,2,112,250,0,1,179,0,0,2,0,2,1
45,1,1,128,308,0,0,170,0,0,2,0,2,1
60,0,2,102,318,0,1,160,0,0,2,1,2,1
52,1,3,152,298,1,1,178,0,1.2,1,0,3,1
42,0,0,102,265,0,0,122,0,0.6,1,0,2,1
67,0,2,115,564,0,0,160,0,1.6,1,0,3,1
68,1,2,118,277,0,1,151,0,1,2,1,3,1
46,1,1,101,197,1,1,156,0,0,2,0,3,1
54,0,2,110,214,0,1,158,0,1.6,1,0,2,1
58,0,0,100,248,0,0,122,0,1,1,0,2,1
48,1,2,124,255,1,1,175,0,0,2,2,2,1
57,1,0,132,207,0,1,168,1,0,2,0,3,1
52,1,2,138,223,0,1,169,0,0,2,4,2,1
54,0,1,132,288,1,0,159,1,0,2,1,2,1
45,0,1,112,160,0,1,138,0,0,1,0,2,1
53,1,0,142,226,0,0,111,1,0,2,0,3,1
62,0,0,140,394,0,0,157,0,1.2,1,0,2,1
52,1,0,108,233,1,1,147,0,0.1,2,3,3,1
43,1,2,130,315,0,1,162,0,1.9,2,1,2,1
53,1,2,130,246,1,0,173,0,0,2,3,2,1
42,1,3,148,244,0,0,178,0,0.8,2,2,2,1
59,1,3,178,270,0,0,145,0,4.2,0,0,3,1
63,0,1,140,195,0,1,179,0,0,2,2,2,1
42,1,2,120,240,1,1,194,0,0.8,0,0,3,1
50,1,2,129,196,0,1,163,0,0,2,0,2,1
68,0,2,120,211,0,0,115,0,1.5,1,0,2,1
69,1,3,160,234,1,0,131,0,0.1,1,1,2,1
45,0,0,138,236,0,0,152,1,0.2,1,0,2,1

```
50,0,1,120,244,0,1,162,0,1.1,2,0,2,1
50,0,0,110,254,0,0,159,0,0,2,0,2,1
64,0,0,180,325,0,1,154,1,0,2,0,2,1
57,1,2,150,126,1,1,173,0,0.2,2,1,3,1
64,0,2,140,313,0,1,133,0,0.2,2,0,3,1
43,1,0,110,211,0,1,161,0,0,2,0,3,1
55,1,1,130,262,0,1,155,0,0,2,0,2,1
37,0,2,120,215,0,1,170,0,0,2,0,2,1
41,1,2,130,214,0,0,168,0,2,1,0,2,1
56,1,3,120,193,0,0,162,0,1.9,1,0,3,1
46,0,1,105,204,0,1,172,0,0,2,0,2,1
46,0,0,138,243,0,0,152,1,0,1,0,2,1
64,0,0,130,303,0,1,122,0,2,1,2,2,1
59,1,0,138,271,0,0,182,0,0,2,0,2,1
41,0,2,112,268,0,0,172,1,0,2,0,2,1
54,0,2,108,267,0,0,167,0,0,2,0,2,1
39,0,2,94,199,0,1,179,0,0,2,0,2,1
34,0,1,118,210,0,1,192,0,0.7,2,0,2,1
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data1.csv

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data2.csv

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data3.csv

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data4.csv

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data5.csv

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data6.csv

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data7.csv

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54,1,1,108,309,0,1,156,0,0,2,0,3,1
52,1,3,118,186,0,0,190,0,0,1,0,1,1
41,1,1,135,203,0,1,132,0,0,1,0,1,1
58,1,2,140,211,1,0,165,0,0,2,0,2,1
35,0,0,138,183,0,1,182,0,1.4,2,0,2,1
51,1,2,100,222,0,1,143,1,1.2,1,0,2,1
45,0,1,130,234,0,0,175,0,0.6,1,0,2,1
44,1,1,120,220,0,1,170,0,0,2,0,2,1
62,0,0,124,209,0,1,163,0,0,2,0,2,1
54,1,2,120,258,0,0,147,0,0.4,1,0,3,1
51,1,2,94,227,0,1,154,1,0,2,1,3,1
29,1,1,130,204,0,0,202,0,0,2,0,2,1
51,1,0,140,261,0,0,186,1,0,2,0,2,1
43,0,2,122,213,0,1,165,0,0.2,1,0,2,1
55,0,1,135,250,0,0,161,0,1.4,1,0,2,1
51,1,2,125,245,1,0,166,0,2.4,1,0,2,1
59,1,1,140,221,0,1,164,1,0,2,0,2,1
52,1,1,128,205,1,1,184,0,0,2,0,2,1
58,1,2,105,240,0,0,154,1,0.6,1,0,3,1
41,1,2,112,250,0,1,179,0,0,2,0,2,1
45,1,1,128,308,0,0,170,0,0,2,0,2,1
60,0,2,102,318,0,1,160,0,0,2,1,2,1
52,1,3,152,298,1,1,178,0,1.2,1,0,3,1
42,0,0,102,265,0,0,122,0,0.6,1,0,2,1
```

```
67,0,2,115,564,0,0,160,0,1.6,1,0,3,1
68,1,2,118,277,0,1,151,0,1,2,1,3,1
46,1,1,101,197,1,1,156,0,0,2,0,3,1
54,0,2,110,214,0,1,158,0,1.6,1,0,2,1
58,0,0,100,248,0,0,122,0,1,1,0,2,1
48,1,2,124,255,1,1,175,0,0,2,2,2,1
57,1,0,132,207,0,1,168,1,0,2,0,3,1
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54,0,1,132,288,1,0,159,1,0,2,1,2,1
45,0,1,112,160,0,1,138,0,0,1,0,2,1
53,1,0,142,226,0,0,111,1,0,2,0,3,1
62,0,0,140,394,0,0,157,0,1.2,1,0,2,1
52,1,0,108,233,1,1,147,0,0.1,2,3,3,1
43,1,2,130,315,0,1,162,0,1.9,2,1,2,1
53,1,2,130,246,1,0,173,0,0,2,3,2,1
42,1,3,148,244,0,0,178,0,0.8,2,2,2,1
59,1,3,178,270,0,0,145,0,4.2,0,0,3,1
63,0,1,140,195,0,1,179,0,0,2,2,2,1
42,1,2,120,240,1,1,194,0,0.8,0,0,3,1
50,1,2,129,196,0,1,163,0,0,2,0,2,1
68,0,2,120,211,0,0,115,0,1.5,1,0,2,1
69,1,3,160,234,1,0,131,0,0.1,1,1,2,1
45,0,0,138,236,0,0,152,1,0.2,1,0,2,1
50,0,1,120,244,0,1,162,0,1.1,2,0,2,1
50,0,0,110,254,0,0,159,0,0,2,0,2,1
64,0,0,180,325,0,1,154,1,0,2,0,2,1
57,1,2,150,126,1,1,173,0,0.2,2,1,3,1
64,0,2,140,313,0,1,133,0,0.2,2,0,3,1
43,1,0,110,211,0,1,161,0,0,2,0,3,1
55,1,1,130,262,0,1,155,0,0,2,0,2,1
37,0,2,120,215,0,1,170,0,0,2,0,2,1
41,1,2,130,214,0,0,168,0,2,1,0,2,1
56,1,3,120,193,0,0,162,0,1.9,1,0,3,1
46,0,1,105,204,0,1,172,0,0,2,0,2,1
46,0,0,138,243,0,0,152,1,0,1,0,2,1
64,0,0,130,303,0,1,122,0,2,1,2,2,1
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41,0,2,112,268,0,0,172,1,0,2,0,2,1
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39,0,2,94,199,0,1,179,0,0,2,0,2,1
34,0,1,118,210,0,1,192,0,0.7,2,0,2,1
58,1,1,120,284,0,0,160,0,1.8,1,0,2,0
```

58,1,2,132,224,0,0,173,0,3.2,2,2,3,0
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40,1,0,110,167,0,0,114,1,2,1,0,3,0
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43,1,0,120,177,0,0,120,1,2.5,1,0,3,0
57,1,0,150,276,0,0,112,1,0.6,1,1,1,0
55,1,0,132,353,0,1,132,1,1.2,1,1,3,0
65,0,0,150,225,0,0,114,0,1,1,3,3,0
61,0,0,130,330,0,0,169,0,0,2,0,2,0
58,1,2,112,230,0,0,165,0,2.5,1,1,3,0
50,1,0,150,243,0,0,128,0,2.6,1,0,3,0
44,1,0,112,290,0,0,153,0,0,2,1,2,0
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54,1,0,124,266,0,0,109,1,2.2,1,1,3,0
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41,1,0,110,172,0,0,158,0,0,2,0,3,0
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58,1,0,128,216,0,0,131,1,2.2,1,3,3,0
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60,1,0,145,282,0,0,142,1,2.8,1,2,3,0
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46,1,2,150,231,0,1,147,0,3.6,1,0,2,0
67,1,0,125,254,1,1,163,0,0.2,1,2,3,0
62,1,0,120,267,0,1,99,1,1.8,1,2,3,0
65,1,0,110,248,0,0,158,0,0.6,2,2,1,0
44,1,0,110,197,0,0,177,0,0,2,1,2,0
60,1,0,125,258,0,0,141,1,2.8,1,1,3,0
58,1,0,150,270,0,0,111,1,0.8,2,0,3,0
68,1,2,180,274,1,0,150,1,1.6,1,0,3,0
62,0,0,160,164,0,0,145,0,6.2,0,3,3,0
52,1,0,128,255,0,1,161,1,0,2,1,3,0
59,1,0,110,239,0,0,142,1,1.2,1,1,3,0
60,0,0,150,258,0,0,157,0,2.6,1,2,3,0
49,1,2,120,188,0,1,139,0,2,1,3,3,0
59,1,0,140,177,0,1,162,1,0,2,1,3,0
57,1,2,128,229,0,0,150,0,0.4,1,1,3,0
61,1,0,120,260,0,1,140,1,3.6,1,1,3,0
39,1,0,118,219,0,1,140,0,1.2,1,0,3,0
61,0,0,145,307,0,0,146,1,1,1,0,3,0
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65,1,0,135,254,0,0,127,0,2.8,1,1,3,0
48,1,0,130,256,1,0,150,1,0,2,2,3,0
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65,1,3,138,282,1,0,174,0,1.4,1,1,2,0
56,0,0,200,288,1,0,133,1,4,0,2,3,0
54,1,0,110,239,0,1,126,1,2.8,1,1,3,0
70,1,0,145,174,0,1,125,1,2.6,0,0,3,0
62,1,1,120,281,0,0,103,0,1.4,1,1,3,0
35,1,0,120,198,0,1,130,1,1.6,1,0,3,0
59,1,3,170,288,0,0,159,0,0.2,1,0,3,0
64,1,2,125,309,0,1,131,1,1.8,1,0,3,0
47,1,2,108,243,0,1,152,0,0,2,0,2,0
57,1,0,165,289,1,0,124,0,1,1,3,3,0
55,1,0,160,289,0,0,145,1,0.8,1,1,3,0
64,1,0,120,246,0,0,96,1,2.2,0,1,2,0
70,1,0,130,322,0,0,109,0,2.4,1,3,2,0
51,1,0,140,299,0,1,173,1,1.6,2,0,3,0
58,1,0,125,300,0,0,171,0,0,2,2,3,0
60,1,0,140,293,0,0,170,0,1.2,1,2,3,0
77,1,0,125,304,0,0,162,1,0,2,3,2,0
35,1,0,126,282,0,0,156,1,0,2,0,3,0
70,1,2,160,269,0,1,112,1,2.9,1,1,3,0
59,0,0,174,249,0,1,143,1,0,1,0,2,0
64,1,0,145,212,0,0,132,0,2,1,2,1,0
57,1,0,152,274,0,1,88,1,1.2,1,1,3,0
56,1,0,132,184,0,0,105,1,2.1,1,1,1,0
48,1,0,124,274,0,0,166,0,0.5,1,0,3,0
56,0,0,134,409,0,0,150,1,1.9,1,2,3,0
66,1,1,160,246,0,1,120,1,0,1,3,1,0
54,1,1,192,283,0,0,195,0,0,2,1,3,0
69,1,2,140,254,0,0,146,0,2,1,3,3,0
51,1,0,140,298,0,1,122,1,4.2,1,3,3,0
43,1,0,132,247,1,0,143,1,0.1,1,4,3,0
62,0,0,138,294,1,1,106,0,1.9,1,3,2,0
67,1,0,100,299,0,0,125,1,0.9,1,2,2,0
59,1,3,160,273,0,0,125,0,0,2,0,2,0
45,1,0,142,309,0,0,147,1,0,1,3,3,0
58,1,0,128,259,0,0,130,1,3,1,2,3,0

```
50,1,0,144,200,0,0,126,1,0.9,1,0,3,0
62,0,0,150,244,0,1,154,1,1.4,1,0,2,0
38,1,3,120,231,0,1,182,1,3.8,1,0,3,0
66,0,0,178,228,1,1,165,1,1,1,2,3,0
52,1,0,112,230,0,1,160,0,0,2,1,2,0
53,1,0,123,282,0,1,95,1,2,1,2,3,0
63,0,0,108,269,0,1,169,1,1.8,1,2,2,0
54,1,0,110,206,0,0,108,1,0,1,1,2,0
66,1,0,112,212,0,0,132,1,0.1,2,1,2,0
55,0,0,180,327,0,2,117,1,3.4,1,0,2,0
49,1,2,118,149,0,0,126,0,0.8,2,3,2,0
54,1,0,122,286,0,0,116,1,3.2,1,2,2,0
56,1,0,130,283,1,0,103,1,1.6,0,0,3,0
46,1,0,120,249,0,0,144,0,0.8,2,0,3,0
61,1,3,134,234,0,1,145,0,2.6,1,2,2,0
67,1,0,120,237,0,1,71,0,1,1,0,2,0
58,1,0,100,234,0,1,156,0,0.1,2,1,3,0
47,1,0,110,275,0,0,118,1,1,1,1,2,0
52,1,0,125,212,0,1,168,0,1,2,2,3,0
58,1,0,146,218,0,1,105,0,2,1,1,3,0
57,1,1,124,261,0,1,141,0,0.3,2,0,3,0
58,0,1,136,319,1,0,152,0,0,2,2,2,0
61,1,0,138,166,0,0,125,1,3.6,1,1,2,0
42,1,0,136,315,0,1,125,1,1.8,1,0,1,0
52,1,0,128,204,1,1,156,1,1,1,0,0,0
59,1,2,126,218,1,1,134,0,2.2,1,1,1,0
40,1,0,152,223,0,1,181,0,0,2,0,3,0
61,1,0,140,207,0,0,138,1,1.9,2,1,3,0
46,1,0,140,311,0,1,120,1,1.8,1,2,3,0
59,1,3,134,204,0,1,162,0,0.8,2,2,2,0
57,1,1,154,232,0,0,164,0,0,2,1,2,0
57,1,0,110,335,0,1,143,1,3,1,1,3,0
55,0,0,128,205,0,2,130,1,2,1,1,3,0
61,1,0,148,203,0,1,161,0,0,2,1,3,0
58,1,0,114,318,0,2,140,0,4.4,0,3,1,0
58,0,0,170,225,1,0,146,1,2.8,1,2,1,0
67,1,2,152,212,0,0,150,0,0.8,1,0,3,0
44,1,0,120,169,0,1,144,1,2.8,0,0,1,0
63,1,0,140,187,0,0,144,1,4,2,2,3,0
63,0,0,124,197,0,1,136,1,0,1,0,2,0
59,1,0,164,176,1,0,90,0,1,1,2,1,0
57,0,0,140,241,0,1,123,1,0.2,1,0,3,0
```

```
45,1,3,110,264,0,1,132,0,1.2,1,0,3,0
68,1,0,144,193,1,1,141,0,3.4,1,2,3,0
57,1,0,130,131,0,1,115,1,1.2,1,1,3,0
57,0,1,130,236,0,0,174,0,0,1,1,2,0
```

Status : Wrong   *Marks : 0/10*

4. Problem Statement

Lora, a data analyst, is working on a project involving linear regression analysis. She has a dataset stored in a CSV file, consisting of two columns: 'x' and 'y'. Lora needs to perform linear regression analysis on this dataset to understand the relationship between 'x' and 'y'.

To facilitate this analysis, you are tasked with developing a Python program. The program will prompt the user to input the filename of the dataset. It will then read the data from the CSV file, execute linear regression analysis using the Scipy library, and calculate the slope, intercept, and estimated value at x=10. Finally, it will print these results rounded to four decimal places.

Answer

main.py

```python
x = df['x'].values
y = df['y'].values

slope, intercept, r_value, p_value, std_err = stats.linregress(x, y)

print("Linear Regression Results:")
print(f"Slope: {slope:.4f}")
print(f"Intercept: {intercept:.4f}")
print(f"Estimated value at x=10: {slope*10 + intercept:.4f}")
```

data.csv

```
x,y
5,99
7,86
8,87
```

7,88
2,111
17,86
2,103
9,87
4,94
11,78
12,77
9,85
6,86

data1.csv

x,y
3,92
6,85
9,88
4,90
7,86
11,80
5,95
8,89
10,84
12,82
15,79
18,87
20,83

data2.csv

x,y
2,94
4,88
6,92
8,86
10,90
12,84
14,88
16,82
18,86
20,80
22,84
24,78
26,82

28,76
30,80
32,74
34,78
36,72
38,76
40,70
42,74
44,68
46,72
48,66
50,70

data3.csv

x,y
1,98
3,94
5,90
7,86
9,82
11,78
13,74
15,70
17,66
19,62
21,58
23,54
25,50
27,46
29,42
31,38
33,34
35,30
37,26
39,22
41,18
43,14
45,10
47,6
49,2
51,6
53,10

55,14
57,18
59,22
61,26
63,30
65,34
67,38
69,42
71,46
73,50
75,54
77,58
79,62

data4.csv

x,y
1,100
2,98
3,96
4,94
5,92
6,90
7,88
8,86
9,84
10,82
11,80
12,78
13,76
14,74
15,72
16,70
17,68
18,66
19,64
20,62
21,60
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42,18
43,16
44,14
45,12
46,10
47,8
48,6
49,4
50,2
51,4
52,6
53,8
54,10
55,12
56,14
57,16
58,18
59,20
60,22

Status : Correct   **Marks : 10/10**