Name-Anadi Sharma
SAP ID- 500126798
B-46

Experiment 6:-

Code:-

```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
#Generate synthetic data
np.random.seed(42)
X=2*np.random.rand(100,1)
Y=4+3*X+np.random.randn(100,1)
print(X)
print("\n")
print(Y)

#Visualize the generated data
plt.scatter(X,Y,color="blue")
plt.title("Generated Data")
plt.xlabel("X")
plt.ylabel("Y")
plt.show()
#Split data into training and testing tests
X_train, X_test , Y_train ,Y_test = train_test_split(X,Y,test_size=0.2, random_state=42)
print(X_test)
print("\n")
print(X_train)
#Train the Simple Linear Regression Model
model=LinearRegression()
#Creates an instance of the LinearRegression client.
model.fit(X_train,Y_train)
#Model Parameters
print("Intercept:",model.intercept_)
print("Coefficient:",model.coef_)
#Make prediction on test  data
Y_pred=model.predict(X_test)
#Calculate and display the MSE and R-squared values
mse=mean_squared_error(Y_test,Y_pred)
r2=r2_score(Y_test,Y_pred)
print("Mean Squared Error (MSE):",mse)
print("R-squared(R^2)",r2)
plt.scatter(X_test,Y_test,color="blue",label="Actual Data")
plt.plot(X_test,Y_pred,color="red",linewidth=2,label="Regression line")
plt.title("Simple Linear Regression")
plt.xlabel("X")
plt.ylabel("Y")
plt.legend()
plt.show()
```

Name-Anadi Sharma
SAP ID- 500126798
B-46

Output:-

```
[[0.74908024]
 [1.90142861]
 [1.46398788]
 [1.19731697]
 [0.31203728]
 [0.31198904]
 [0.11616722]
 [1.73235229]
 [1.20223002]
 [1.41614516]
 [0.04116899]
 [1.9398197 ]
 [1.66488528]
 [0.42467822]
 [0.36364993]
 [0.36680902]
 [0.60848449]
 [1.04951286]
 [0.86389004]
 [0.58245828]
 [1.22370579]
 [0.27898772]
 [0.5842893 ]
 [0.73272369]
 [0.91213997]
 [1.57035192]
 [0.39934756]
 [1.02846888]
 [1.18482914]
 [0.09290083]
 [1.2150897 ]
 [0.34104825]
 [0.13010319]
 [1.89777107]
 [1.93126407]
 [1.6167947 ]
 [0.60922754]
 [0.19534423]
 [1.36846605]
 [0.88030499]
 [0.24407647]
 [0.99035382]
 [0.06877704]
 [1.8186408 ]
 [0.51755996]
 [1.32504457]
 [0.62342215]
```

Name-Anadi Sharma
SAP ID- 500126798
B-46

[1.04013604]
[1.09342056]
[0.36970891]
[1.93916926]
[1.55026565]
[1.87899788]
[1.7896547]
[1.19579996]
[1.84374847]
[0.176985]
[0.39196572]
[0.09045458]
[0.65066066]
[0.77735458]
[0.54269806]
[1.65747502]
[0.71350665]
[0.56186902]
[1.08539217]
[0.28184845]
[1.60439396]
[0.14910129]
[1.97377387]
[1.54448954]
[0.39743136]
[0.01104423]
[1.63092286]
[1.41371469]
[1.45801434]
[1.54254069]
[0.1480893]
[0.71693146]
[0.23173812]
[1.72620685]
[1.24659625]
[0.66179605]
[0.1271167]
[0.62196464]
[0.65036664]
[1.45921236]
[1.27511494]
[1.77442549]
[0.94442985]
[0.23918849]
[1.42648957]
[1.5215701]
[1.1225544]
[1.54193436]
[0.98759119]

Name-Anadi Sharma
SAP ID- 500126798
B-46

```
 [1.04546566]
 [0.85508204]
 [0.05083825]
 [0.21578285]]
```

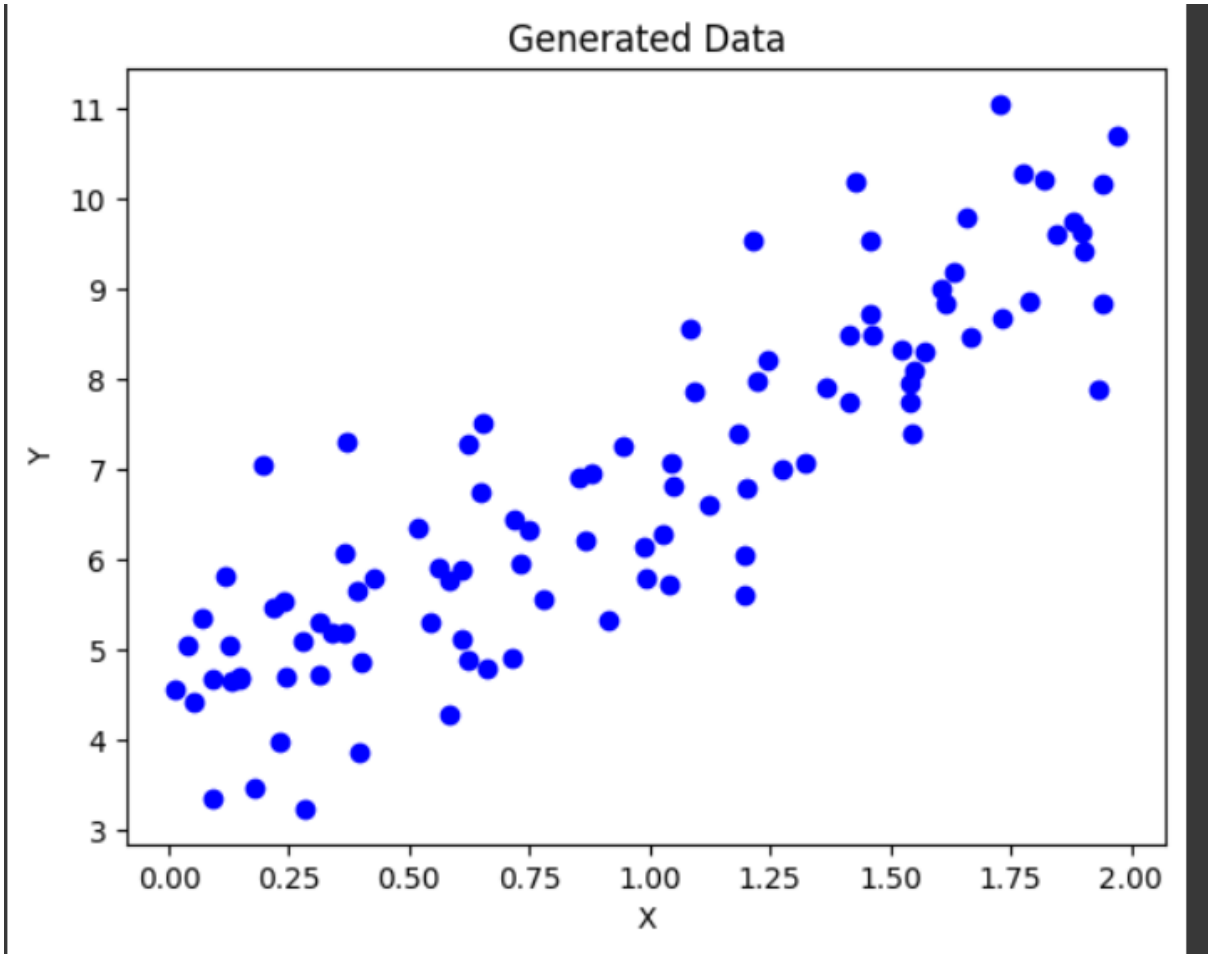
```
[[ 6.33428778]
 [ 9.40527849]
 [ 8.48372443]
 [ 5.60438199]
 [ 4.71643995]
 [ 5.29307969]
 [ 5.82639572]
 [ 8.67878666]
 [ 6.79819647]
 [ 7.74667842]
 [ 5.03890908]
 [10.14821022]
 [ 8.46489564]
 [ 5.7873021 ]
 [ 5.18802735]
 [ 6.06907205]
 [ 5.12340036]
 [ 6.82087644]
 [ 6.19956196]
 [ 4.28385989]
 [ 7.96723765]
 [ 5.09801844]
 [ 5.75798135]
 [ 5.96358393]
 [ 5.32104916]
 [ 8.29041045]
 [ 4.85532818]
 [ 6.28312936]
 [ 7.3932017 ]
 [ 4.68275333]
 [ 9.53145501]
 [ 5.19772255]
 [ 4.64785995]
 [ 9.61886731]
 [ 7.87502098]
 [ 8.82387021]
 [ 5.88791282]
 [ 7.0492748 ]
 [ 7.91303719]
 [ 6.9424623 ]
 [ 4.69751764]
 [ 5.80238342]
 [ 5.34915394]
```

Name-Anadi Sharma
SAP ID- 500126798
B-46

[10.20785545]
[6.34371184]
[7.06574625]
[7.27306077]
[5.71855706]
[7.86711877]
[7.29958236]
[8.82697144]
[8.08449921]
[9.73664501]
[8.86548845]
[6.03673644]
[9.59980838]
[3.4686513]
[5.64948961]
[3.3519395]
[7.50191639]
[5.54881045]
[5.30603267]
[9.78594227]
[4.90965564]
[5.91306699]
[8.56331925]
[3.23806212]
[8.99781574]
[4.70718666]
[10.70314449]
[7.3965179]
[3.87183748]
[4.55507427]
[9.18975324]
[8.49163691]
[8.72049122]
[7.94759736]
[4.67652161]
[6.44386684]
[3.98086294]
[11.04439507]
[8.21362168]
[4.79408465]
[5.03790371]
[4.89121226]
[6.73818454]
[9.53623265]
[7.00466251]
[10.28665258]
[7.24607048]
[5.53962564]
[10.17626171]

Name-Anadi Sharma
SAP ID- 500126798
B-46

[8.31932218]
[6.61392702]
[7.73628865]
[6.14696329]
[7.05929527]
[6.90639808]
[4.42920556]
[5.47453181]]



[[0.1271167]
[1.7896547]
[1.54448954]
[1.32504457]
[0.51755996]
[0.88030499]
[0.5842893]
[1.72620685]
[0.04116899]
[0.74908024]
[0.86389004]
[1.2150897]
[1.63092286]
[1.89777107]

Name-Anadi Sharma
SAP ID- 500126798
B-46

[0.23918849]
[0.31203728]
[1.54254069]
[0.1480893]
[1.66488528]
[0.34104825]]

[[1.84374847]
[1.77442549]
[0.39934756]
[0.06877704]
[1.97377387]
[0.36680902]
[0.24407647]
[1.04546566]
[1.41614516]
[0.01104423]
[1.9398197]
[1.04013604]
[0.65036664]
[1.18482914]
[1.1225544]
[0.31198904]
[0.28184845]
[1.08539217]
[1.6167947]
[0.60848449]
[0.36970891]
[1.93126407]
[1.73235229]
[0.98759119]
[1.02846888]
[0.58245828]
[1.24659625]
[1.57035192]
[1.65747502]
[0.42467822]
[0.91213997]
[1.19731697]
[1.04951286]
[1.36846605]
[1.20223002]
[0.71693146]
[0.11616722]
[0.56186902]
[0.60922754]
[0.94442985]
[0.176985]

Name-Anadi Sharma
SAP ID- 500126798
B-46

[0.21578285]
[1.19579996]
[1.8186408]
[1.93916926]
[1.60439396]
[0.62342215]
[0.14910129]
[0.54269806]
[0.85508204]
[0.23173812]
[0.99035382]
[0.09045458]
[1.09342056]
[0.05083825]
[0.39196572]
[1.45801434]
[0.13010319]
[1.54193436]
[0.65066066]
[0.71350665]
[0.62196464]
[0.19534423]
[0.09290083]
[1.90142861]
[1.87899788]
[0.27898772]
[1.46398788]
[0.73272369]
[1.27511494]
[1.42648957]
[1.41371469]
[1.45921236]
[0.66179605]
[1.22370579]
[0.77735458]
[0.39743136]
[0.36364993]
[1.5215701]
[1.55026565]]
Mean Squared Error (MSE): 0.6536995137170021
R-squared(R^2) 0.8072059636181392

Name-Anadi Sharma
SAP ID- 500126798
B-46