Aim :-

```
import numpy as np
from sklearn.linear_model import LinearRegression
import matplotlib.pyplot as plt
from sklearn.metrics import mean_absolute_error, mean_squared_error
```

1.Prepare the dataset

```
#independent variable (features) - Years of experience
x = np.array([[1], [2], [3], [4], [5], [6], [7], [8], [9], [10]])
#dependent variable (target) - Salary
y = np.array([30000, 35000, 45000, 50000, 60000, 65000, 75000, 80000, 90000, 95000])
```

```
model = LinearRegression()
model.fit(x,y)
```

```
▾ LinearRegression ⓘ ?
LinearRegression()
```

```
y_pred = model.predict(x)
```

```
mae = mean_absolute_error(y,y_pred)
mse = mean_squared_error(y,y_pred)
rmse = np.sqrt(mse)
```

```
print("Mean Absoulte Error (MAE):",mae)
print("Mean Squared Error (MSE):",mse)
print("Root Mean Squared Error (RMSE):",rmse)
```

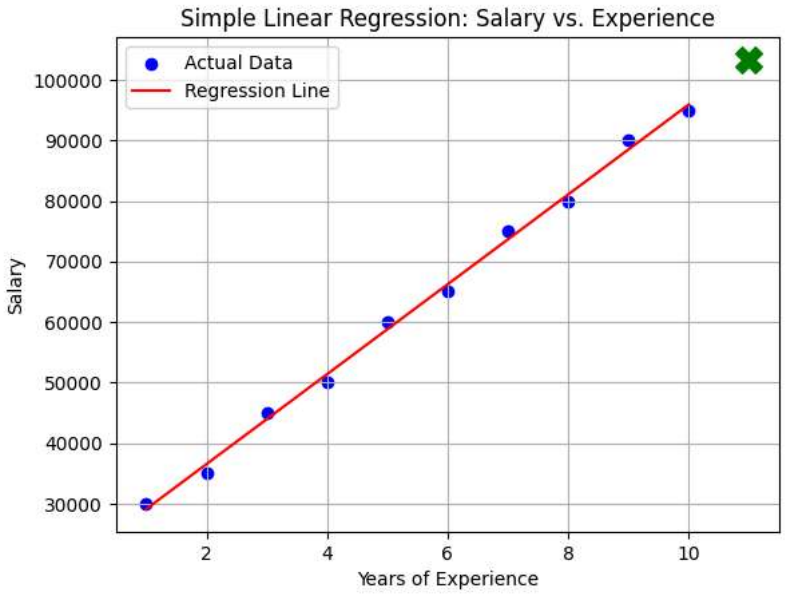
```
Mean Absoulte Error (MAE): 1212.1212121212113
Mean Squared Error (MSE): 1515151.5151515105
Root Mean Squared Error (RMSE): 1230.9149097933255
```

```
new_experience = np.array([[11]])
predicted_salary = model.predict(new_experience)
```

```
print(f"Coefficients (slope): {model.coef_}")
print(f"Intercept: {model.intercept_}")
print(f"Predicted salary for 11 years of experience : ${predicted_salary[0]:.2f}")
```

```
Coefficients (slope): [7424.24242424]
Intercept: 21666.666666666657
Predicted salary for 11 years of experience : $103333.33
```

```
#5. Visualize the results
plt.scatter(x, y, color='blue', label='Actual Data')
plt.plot(x, model.predict(x), color='red', label='Regression Line')
plt.scatter(new_experience, predicted_salary, color='green', marker = 'X', s=200)
plt.xlabel('Years of Experience')
plt.ylabel('Salary')
plt.title('Simple Linear Regression: Salary vs. Experience')
plt.legend()
plt.grid(True)
plt.show()
```



Multiple Linear Regression

```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_absolute_error, mean_squared_error
```

```
from google.colab import files
uploaded = files.upload()
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

```
import pandas as pd
df = pd.read_csv('ICC_Test_Batting_Rankings.csv')
df
```

	rank	name	country	rating	points	trend	avg	difference
0	1	Joe Root	England	881	881	Flat	50.34	NaN
1	2	Kane Williamson	New Zealand	859	859	Flat	54.99	NaN
2	3	Daryl Mitchell	New Zealand	768	768	Flat	50.25	NaN
3	4	Harry Brook	England	758	758	Up	58.64	3.0
4	5	Steven Smith	Australia	757	757	Flat	56.97	NaN
5	6	Rohit Sharma	India	751	751	Flat	45.47	NaN
6	7	Yashasvi Jaiswal	India	740	740	Up	68.53	1.0
7	8	Virat Kohli	India	737	737	Up	49.16	2.0
8	9	Babar Azam	Pakistan	734	734	Down	45.06	-6.0
9	10	Mohammad Rizwan	Pakistan	728	728	Up	44.83	7.0

```
model = LinearRegression()
model.fit(df[['rating']], df['rank'])
```

```
▾ LinearRegression ⓘ ?
LinearRegression()
```

```
y_pred = model.predict(df[['rating']])
```

```
mae = mean_absolute_error(df['rank'],y_pred)
mse = mean_squared_error(df['rank'],y_pred)
rmse = np.sqrt(mse)
```

```
print("Mean Absoulte Error (MAE):",mae)
print("Mean Squared Error (MSE):",mse)
print("Root Mean Squared Error (RMSE):",rmse)
```

```
Mean Absoulte Error (MAE): 1.2867058927793906
Mean Squared Error (MSE): 2.3871902466467043
Root Mean Squared Error (RMSE): 1.5450534769536957
```