Training Day-12 Report:

What is a Polynomial Regression?
- There are some relationships that a researcher will hypothesize is curvilinear. Clearly, such types of cases will include a polynomial term.
- Inspection of residuals. If we try to fit a linear model to curved data, a scatter plot of residuals (Y-axis) on the predictor (X-axis) will have patches of many positive residuals in the middle. Hence in such a situation, it is not appropriate.
- An assumption in the usual multiple linear regression analysis is that all the independent variables are independent.

How does a Polynomial Regression work?
If we observe closely then we will realize that to evolve from linear regression to polynomial regression. We are just supposed to add the higher-order terms of the dependent features in the feature space.
When the relationship is non-linear, a polynomial regression model introduces higher-degree polynomial terms.
The general form of a polynomial regression equation of degree n is:
where,

- y is the dependent variable.
- x is the independent variable.
- are the coefficients of the polynomial terms.
- n is the degree of the polynomial.
- represents the error term.

Polynomial Regression implementations using Python
To get the Dataset used for the analysis of Polynomial Regression. Import the important libraries and the dataset we are using to perform Polynomial Regression.
Python libraries make it very easy for us to handle the data and perform typical and complex tasks with a single line of code.
- Pandas – This library helps to load the data frame in a 2D array format and has multiple functions to perform analysis tasks in one go.
  Numpy arrays are very fast and can perform large computations in a very short time.
 Matplotlib/Seaborn: This library is used to draw visualizations.
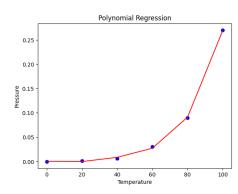
- Sklearn – This module contains multiple libraries having pre-implemented functions to perform tasks from data preprocessing to model development and evaluation.

Example:-
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
datas = pd.read_csv('data.csv')
datas
plt.scatter(X, y, color='blue')

plt.plot(X, lin2.predict(poly.fit_transform(X)),
        color='red')
```

```
plt.title('Polynomial Regression')
plt.xlabel('Temperature')
plt.ylabel('Pressure')
plt.show()
```

	sno	Temperature	Pressure
0	1	0	0.0002
1	2	20	0.0012
2	3	40	0.0060
3	4	60	0.0300
4	5	80	0.0900
5	6	100	0.2700

Polynomial Regression