1.Importing Libraries

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.axes as ax
```

2.Loading Data

In [2]:
```
data = pd.read_csv(r'C:\Users\G.SAI KRISHNA\Desktop\ML_Projects\ML_GFG\train.csv')
```

In [3]:
```
data.head()
```

Out[3]:

	x	y
0	24.0	21.549452
1	50.0	47.464463
2	15.0	17.218656
3	38.0	36.586398
4	87.0	87.288984

In [4]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 700 entries, 0 to 699
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   x       700 non-null    float64
 1   y       699 non-null    float64
dtypes: float64(2)
memory usage: 11.1 KB
```

3.Data Preprocessing

In [5]:
```
#Handling Null Values
data = data.dropna(axis=0)
```

In [6]:
```
data['x'].max()
```

Out[6]: 100.0

In [7]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 699 entries, 0 to 699
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   x       699 non-null    float64
 1   y       699 non-null    float64
dtypes: float64(2)
memory usage: 16.4 KB
```

4.Data Splitting

In [8]:
```
train_input = np.array(data.iloc[0:500,0]).reshape(500,1)
train_output = np.array(data.iloc[0:500,1]).reshape(500,1)

test_input = np.array(data.iloc[500:700,0]).reshape(199,1)
test_output = np.array(data.iloc[500:700,1]).reshape(199,1)
```

In [9]:
```
train_input.shape
```

Out[9]:
```
(500, 1)
```

In [10]:
```
train_output.shape
```

Out[10]:
```
(500, 1)
```

In [11]:
```
test_input.shape
```

Out[11]:
```
(199, 1)
```

In [12]:
```
test_output.shape
```

Out[12]:
```
(199, 1)
```

5.Polynomial Regression

Training the Model

In [13]:
```
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import PolynomialFeatures

poly_regressor = PolynomialFeatures(degree=2)
train_input_poly = poly_regressor.fit_transform(train_input)
poly_regressor.fit(train_input,train_output)
```

Out[13]:
```
PolynomialFeatures()
```

In [14]:
```
train_input_poly
```

Out[14]:
```
array([[1.000e+00, 2.400e+01, 5.760e+02],
       [1.000e+00, 5.000e+01, 2.500e+03],
       [1.000e+00, 1.500e+01, 2.250e+02],
       ...,
       [1.000e+00, 2.100e+01, 4.410e+02],
       [1.000e+00, 8.100e+01, 6.561e+03],
       [1.000e+00, 9.700e+01, 9.409e+03]])
```

In [15]:
```
linear_regressor = LinearRegression()
linear_regressor.fit(train_input_poly,train_output)
```

Out[15]:
```
LinearRegression()
```

Predicting Test Values

In [16]:
```
test_input_poly = poly_regressor.fit_transform(test_input)
poly_regressor.fit(test_input,test_output)
```

Out[16]:
```
PolynomialFeatures()
```

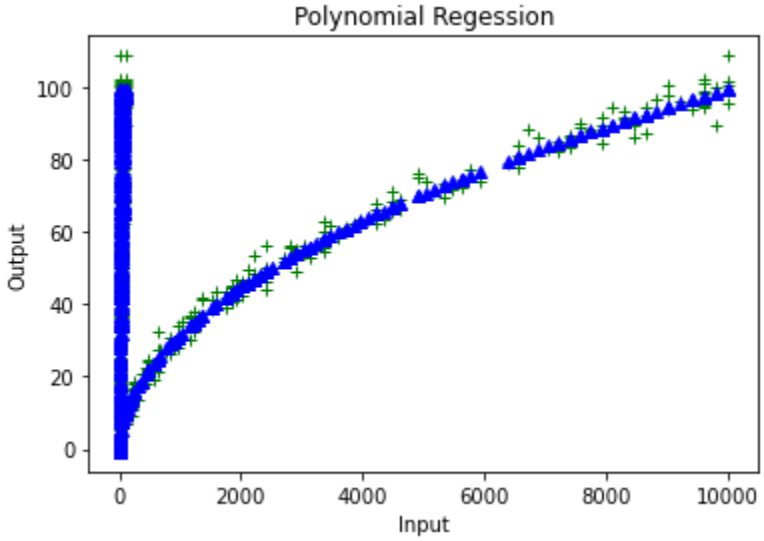
In [17]:
```
predicted_value = linear_regressor.predict(test_input_poly)
```

In [18]:
```
predicted_value
```

Out[18]:
```
array([[ 4.46957573],
       [60.99608394],
       [47.00554813],
       [97.51828372],
       [29.89058614],
       [62.98705348],
       [-0.65061901],
       [99.47374049],
       [17.72593351],
       [29.89058614],
       [97.51828372],
       [15.69177278],
       [21.78849616],
       [55.01165768],
       [42.99097571],
       [74.89255892],
       [90.65906809],
       [46.00262488],
       [84.76102421],
       [55.01165768]
```

Visualizing Model Performance

In [19]:
```
plt.figure()
plt.plot(test_input_poly,test_output,'+',color="green")
plt.plot(test_input_poly,predicted_value,'^',color="blue")
plt.title("Polynomial Regession")
plt.xlabel("Input")
plt.ylabel("Output")
plt.show()
```



In [20]:
```
from sklearn.metrics import mean_squared_error

error=mean_squared_error(predicted_value,test_output)
error
```

Out[20]:
```
8.063337564451183
```

In [21]:
```
print("Accuracy : "+str(100 - error)+"%")
```

```
Accuracy : 91.93666243554881%
```

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