In [ ]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
np.set_printoptions(precision=2)
```

In [ ]:
```
df =pd.read_csv("Position_Salaries.csv")
df
```

Out[ ]:

	Position	Level	Salary
0	Business Analyst	1	45000
1	Junior Consultant	2	50000
2	Senior Consultant	3	60000
3	Manager	4	80000
4	Country Manager	5	110000
5	Region Manager	6	150000
6	Partner	7	200000
7	Senior Partner	8	300000
8	C-level	9	500000
9	CEO	10	1000000

In [ ]:
```
X = df.iloc[:,1:-1].values
y = df.iloc[:,-1:].values
```

In [ ]:
```
print(X)
```

```
[[ 1]
 [ 2]
 [ 3]
 [ 4]
 [ 5]
 [ 6]
 [ 7]
 [ 8]
 [ 9]
 [10]]
```

In [ ]:
```
print(y)
```

```
[[  45000]
 [  50000]
 [  60000]
 [  80000]
 [ 110000]
 [ 150000]
 [ 200000]
 [ 300000]
 [ 500000]
 [1000000]]
```

In [ ]:
```
# linear regression
from sklearn.linear_model import LinearRegression
lin_reg = LinearRegression()
lin_reg.fit(X, y)
```

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

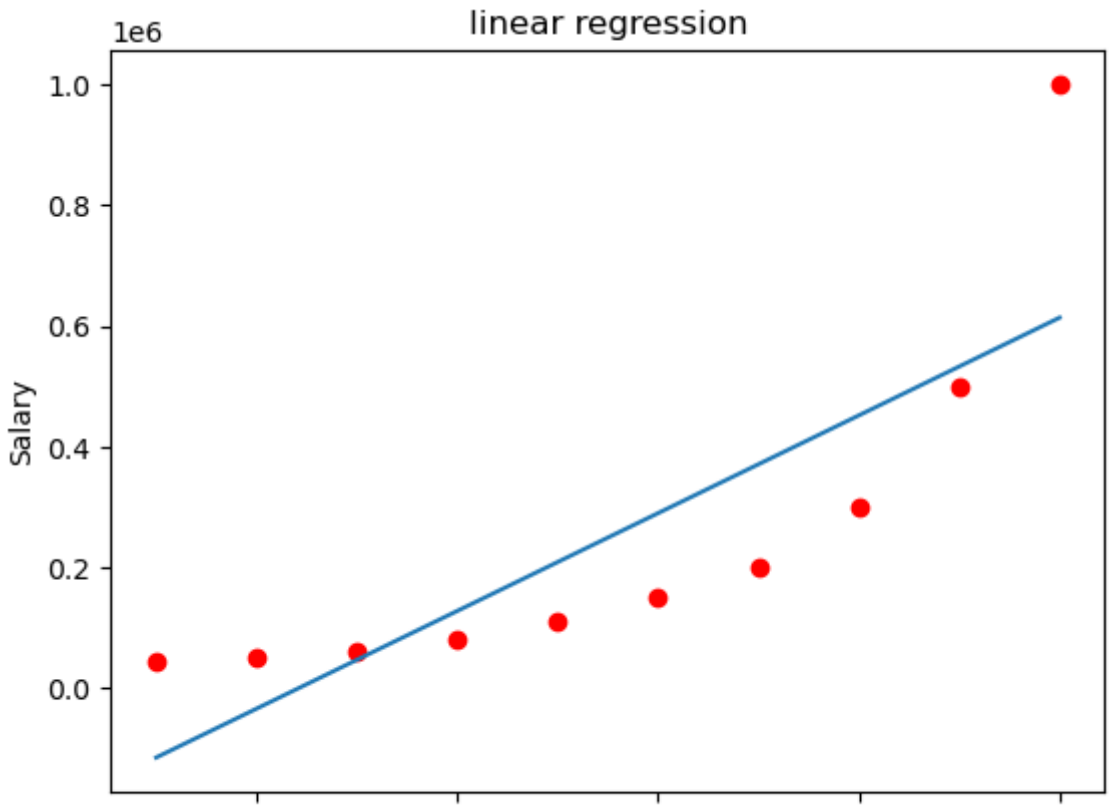
In [ ]:
```
# polynomial regression
from sklearn.preprocessing import PolynomialFeatures
poly_reg = PolynomialFeatures(degree=4)  # jumlah independent variable (column)
X_poly = poly_reg.fit_transform(X)   # berisi independent variable yang mau dipower.  X_poly = X Xpower2 Xpower3 Xpower4
lin_reg_2 = LinearRegression()
lin_reg_2.fit(X_poly, y)
```

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

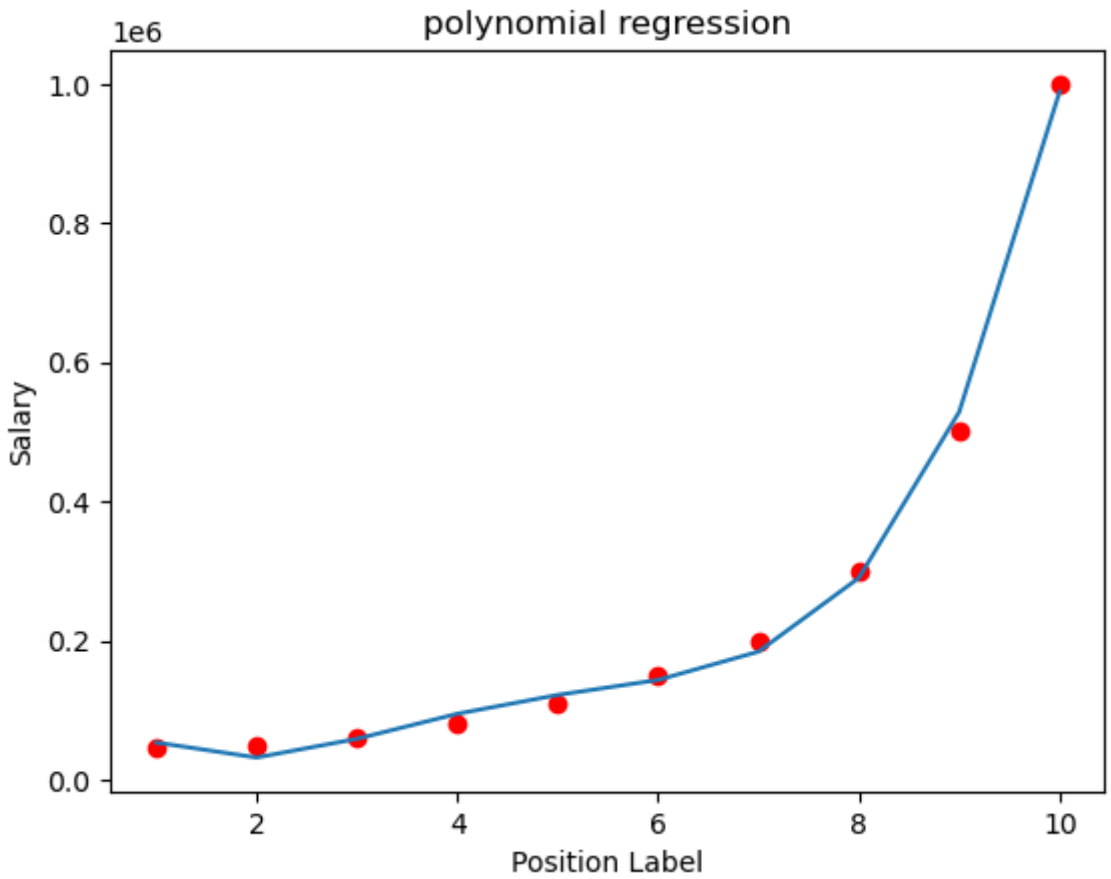
In [ ]:
```
print(X_poly)
```

```
[[1.00e+00 1.00e+00 1.00e+00 1.00e+00 1.00e+00]
 [1.00e+00 2.00e+00 4.00e+00 8.00e+00 1.60e+01]
 [1.00e+00 3.00e+00 9.00e+00 2.70e+01 8.10e+01]
 [1.00e+00 4.00e+00 1.60e+01 6.40e+01 2.56e+02]
 [1.00e+00 5.00e+00 2.50e+01 1.25e+02 6.25e+02]
 [1.00e+00 6.00e+00 3.60e+01 2.16e+02 1.30e+03]
 [1.00e+00 7.00e+00 4.90e+01 3.43e+02 2.40e+03]
 [1.00e+00 8.00e+00 6.40e+01 5.12e+02 4.10e+03]
 [1.00e+00 9.00e+00 8.10e+01 7.29e+02 6.56e+03]
 [1.00e+00 1.00e+01 1.00e+02 1.00e+03 1.00e+04]]
```

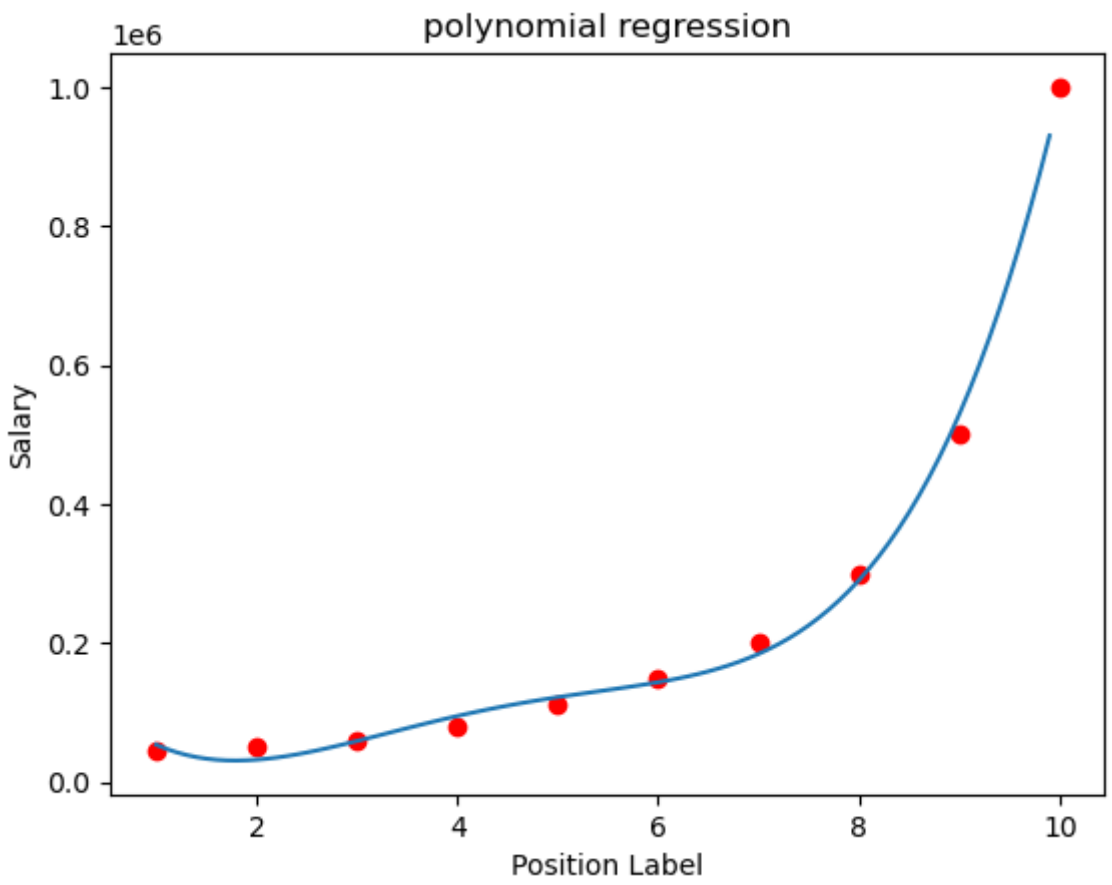
In [ ]:
```
# visualising linear regression
plt.scatter(X, y, color="red")
plt.plot(X, lin_reg.predict(X))
plt.title("linear regression")
plt.xlabel("Position Label")
plt.ylabel("Salary")
plt.show()
```



In [ ]:
```
# visualising polynomial regression
plt.scatter(X, y, color="red")
plt.plot(X, lin_reg_2.predict(X_poly))
plt.title("polynomial regression")
plt.xlabel("Position Label")
plt.ylabel("Salary")
plt.show()
```



In [ ]:
```
# visualising polynomial regression (higher resolution)
X_grid = np.arange(min(X), max(X), 0.1)
X_grid = X_grid.reshape((len(X_grid),1))
plt.scatter(X, y, color="red")
plt.plot(X_grid, lin_reg_2.predict(poly_reg.fit_transform(X_grid)))
plt.title("polynomial regression")
plt.xlabel("Position Label")
plt.ylabel("Salary")
plt.show()
```



In [ ]:
```
# predicting linear regression
output_lin = lin_reg.predict([[6.5]])
print(output_lin)
```

```
[[330378.79]]
```

In [ ]:
```
# predicting polynomial regression
output_poly = lin_reg_2.predict(poly_reg.fit_transform([[6.5]]))
print(output_poly)
```

```
[[158862.45]]
```

In [ ]:
```
# intercept
print(lin_reg_2.intercept_)
```

```
[184166.67]
```

In [ ]:
```
# coeffisient
print(lin_reg_2.coef_)
```

```
[[      0.   -211002.33   94765.44  -15463.29     890.15]]
```

Equation polynomial degree = 4 :

Salary = 184166.67 - 211002.33 × level + 94765.44 x level power 2 - 15463.29 x level power 3 + 890.15 x level power 4