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Assignment 4

```
import random,math
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

def poly(x,pow):
    res=np.zeros((x.shape[0],pow))
    x=np.array(x)
    for i in range(pow):
        res[:,i]=x[:,0]**(i+1)
    res=np.concatenate((res,x[:,1:]),axis=1)
    res=pd.DataFrame(res)
    return res

def gradient_descent(x,y,theta,lr=0.01,iterations=200):
    y=np.array(y)
    x=np.array(x)
    y=np.resize(y,(len(y),1))
    m=len(y)
    for i in range(iterations):
        y_pred=np.dot(x,theta)
        error=(np.subtract(y_pred,y))
        theta=theta-(lr*(np.dot(np.transpose(x),error)))/m
    return theta

if __name__=="main":
    df=pd.read_csv("/content/drive/MyDrive/Position_Salaries.csv")
    df=df.iloc[:,1:]
    df=(df-df.min())/(df.max()-df.min())

    df=poly(df,2)
    df.insert(loc=0,column=None,value=1)
    train=df.head(int(0.8*len(df)))
    test =df.tail(int(0.2*len(df)))

    X_train,Y_train=train.iloc[:,-1],train.iloc[:,-1]
    X_test,Y_test=test.iloc[:,-1],test.iloc[:,-1]
    X,Y=df.iloc[:,-1],df.iloc[:,-1]
    theta = np.ones((X.shape[1],1))
    theta =gradient_descent(X_train,Y_train,theta)
    y_pred=np.dot(X,theta)

    RMS=[0.0]
    Y_test=np.array(Y_test)
```

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for i in range(len(y_pred)):
    RMS=RMS+(y_pred[i]-Y[i])**2
RMS=RMS/float(len(y_pred))
RMS=math.sqrt(RMS)
print(f'Rms: {RMS}')
```

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Rms: 0.2067390665894823

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