

```
In [1]: import numpy as np
import pandas as pd
```

```
In [2]: df = pd.read_csv('/Users/yash/Downloads/Experience-Salary.csv')
df
```

```
Out[2]:
```

	exp(in months)	salary(in thousands)
0	18.290293	16.521825
1	17.023407	11.666234
2	26.343613	23.167255
3	19.105834	20.877145
4	27.742516	23.166236
...
995	22.161741	24.666502
996	32.266497	24.160270
997	17.039030	19.903797
998	25.222124	21.974413
999	16.418028	19.634787

1000 rows × 2 columns

independent variable : experience (X), dependent variable : salary (Y)

```
In [3]: X = np.array(df['exp(in months)']).reshape((1000,1))
Y = np.array(df['salary(in thousands)']).reshape((1000,1))
```

```
In [4]: X.shape
```

```
Out[4]: (1000, 1)
```

```
In [5]: Y.shape
```

```
Out[5]: (1000, 1)
```

```
In [6]: #adding 1 to X vector { 1, x1, x2,...}
ones_arr = np.ones((1000,1),order="C")
ones_arr.shape
```

```
Out[6]: (1000, 1)
```

```
In [7]: #concatenating the ones-arr and X
X_matrix = np.concatenate((ones_arr,X),axis=1)
X_matrix.shape
```

```
Out[7]: (1000, 2)
```

```
In [8]: X_matrix
```

```
Out[8]: array([[ 1.          , 18.29029332],
 [ 1.          , 17.02340669],
 [ 1.          , 26.34361348],
 ...,
 [ 1.          , 17.03902988],
 [ 1.          , 25.22212418],
 [ 1.          , 16.41802763]])
```

Mean squared error estimator

the vector of weights/coefficients B initialized randomly

```
In [37]: B = np.random.rand(2,1) # shape of B will be (2,1)
B
```

```
Out[37]: array([[0.07502747],
 [0.5781419 ]])
```

mean squared error

```
In [46]: lr = 0.05 # learning rate
iterations = 1000
m = 1000 # number of samples in dataset
```

```
In [47]: for i in range(iterations):
          gradient = 2/m * np.dot(X_matrix.T, np.dot(X_matrix, B) - Y)
          if(np.isinf(gradient).any() or np.isnan(gradient).any()):
              break
          B = B - lr * gradient
          print(f'Iteration {i + 1}, B values: {B}')
```

```
In [48]: B
```

```
Out[48]: array([[1.32362912e+301],
 [3.84594680e+302]])
```

```
In [49]: Y_pred = X_matrix.dot(B)
```

```
In [50]: Y_pred
```

```
Out[50]: array([[7.04758579e+303],
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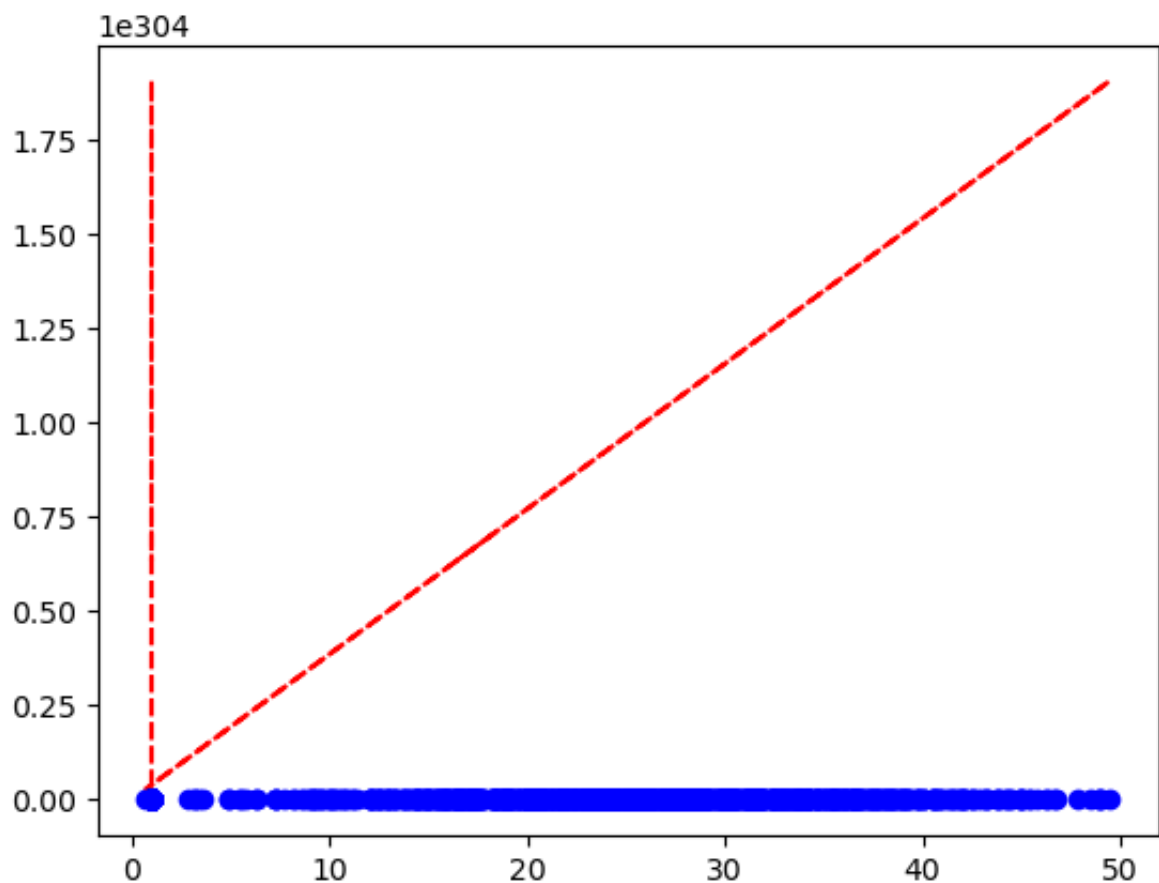
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In [51]: import matplotlib.pyplot as plt
```

```
In [52]: plt.plot(X_matrix,Y_pred,'r--')  
plt.plot(X_matrix,Y,'bo')  
plt.show()
```



```
In [ ]:
```