In [69]:
```
import numpy as np
import pandas as pd
def hypothesis(x,theta):
    y_ = theta[0] + theta[1] * x
    return y_
def error(x,y,theta):
    m = len(x)
    y_ = hypothesis(x , theta)
    err = np.sum((y_ - y ) **2)
    return err/m
def gradient(x,y, theta):
    m = len(x)
    grad = np.zeros(2,)
    y_ = hypothesis(x,theta)
    grad[0] = np.sum(y_-y)
    grad[1] = np.dot(x.T, y_-y)
    return grad/m
def gradient_des(x, y , learning_rate = 0.1, epoch = 200):
    m = len(x)
    theta = np.zeros(2,)
    err_list= []
    for i in range(epoch):
        err = error(x,y,theta)
        err_list.append(err)
        grad = gradient(x,y,theta)
        theta = theta - learning_rate * grad
#         o2 = o2 - learning_rate * grad
    return err_list, theta
```

In [ ]:
```
```

In [38]:
```
df = pd.read_csv("Salary_Data.csv")
df
```

Out[38]:

	YearsExperience	Salary
0	1.1	39343.0
1	1.3	46205.0

	YearsExperience	Salary
2	1.5	37731.0
3	2.0	43525.0
4	2.2	39891.0
5	2.9	56642.0
6	3.0	60150.0
7	3.2	54445.0
8	3.2	64445.0
9	3.7	57189.0
10	3.9	63218.0
11	4.0	55794.0
12	4.0	56957.0
13	4.1	57081.0
14	4.5	61111.0
15	4.9	67938.0
16	5.1	66029.0
17	5.3	83088.0
18	5.9	81363.0
19	6.0	93940.0
20	6.8	91738.0
21	7.1	98273.0
22	7.9	101302.0
23	8.2	113812.0
24	8.7	109431.0
25	9.0	105582.0
26	9.5	116969.0

	YearsExperience	Salary
27	9.6	112635.0
28	10.3	122391.0
29	10.5	121872.0

In [39]:
```
x = df["YearsExperience"]
y = df["Salary"]
x = np.array(x)
y = np.array(y)
x
```

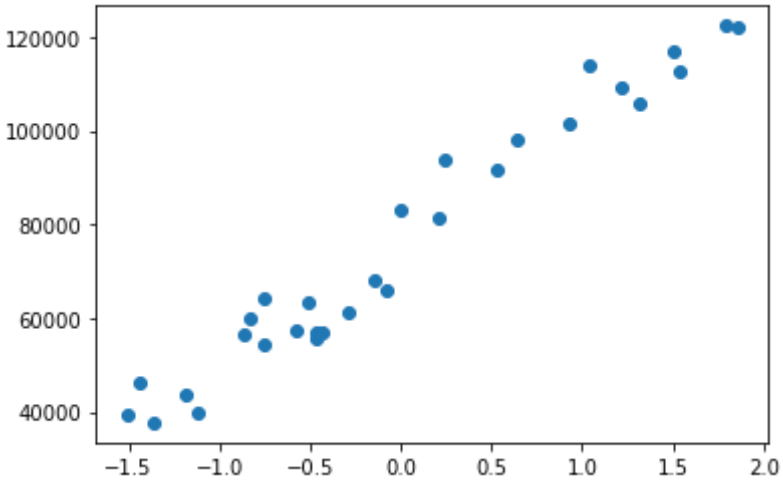
Out[39]:
```
array([ 1.1,  1.3,  1.5,  2. ,  2.2,  2.9,  3. ,  3.2,  3.2,  3.7,  3.9,
        4. ,  4. ,  4.1,  4.5,  4.9,  5.1,  5.3,  5.9,  6. ,  6.8,  7.1,
        7.9,  8.2,  8.7,  9. ,  9.5,  9.6, 10.3, 10.5])
```

In [40]:
```
u = x.mean()
std = x.std()
x = (x - u)/std
x
```

Out[40]:
```
array([-1.51005294, -1.43837321, -1.36669348, -1.18749416, -1.11581443,
       -0.86493538, -0.82909552, -0.75741579, -0.75741579, -0.57821647,
       -0.50653674, -0.47069688, -0.47069688, -0.43485702, -0.29149756,
       -0.1481381 , -0.07645838, -0.00477865,  0.21026054,  0.2461004 ,
        0.53281931,  0.6403389 ,  0.92705781,  1.03457741,  1.21377673,
        1.32129632,  1.50049564,  1.5363355 ,  1.78721455,  1.85889428])
```

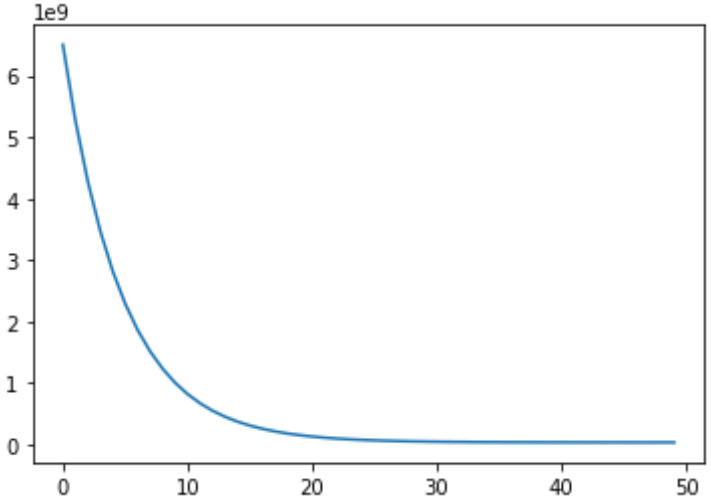
In [41]:
```
import matplotlib.pyplot as plt
plt.scatter(x,y)
```

Out[41]:
```
<matplotlib.collections.PathCollection at 0x17434038f70>
```



In [71]:
```
err_list, theta = gradient_des(x,y,learning_rate=0.1, epoch=50)
plt.plot(err_list)
```

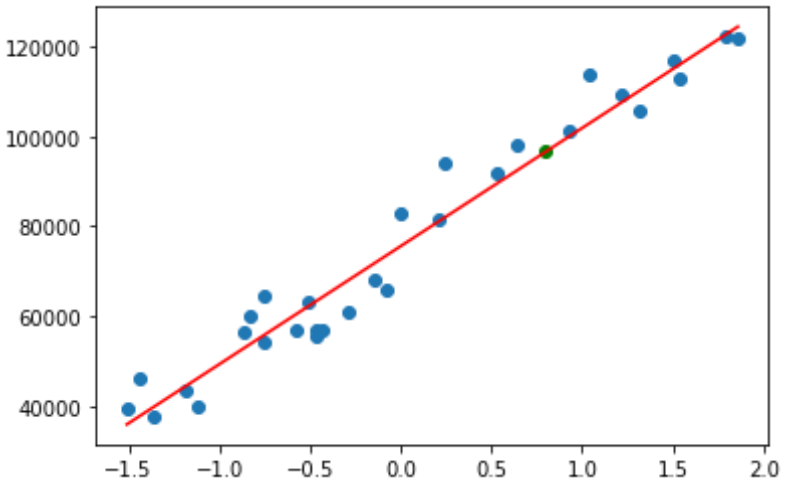
Out[71]:
```
[<matplotlib.lines.Line2D at 0x174340261c0>]
```



In [81]:
```
y_ = hypothesis(x,theta)
plt.scatter(x,y)
```

```
plt.plot(x,y_ ,c="r")
plt.scatter(0.8,y_pred,c="green")
```

Out[81]: <matplotlib.collections.PathCollection at 0x174345f0c40>



In [75]:
```
theta
```

Out[75]: array([75611.29762292, 26231.29191238])

In [76]:
```
y_pred = hypothesis(0.8,theta)
y_pred
```

Out[76]: 96596.33115282048

In [ ]:
```

```