```
import numpy as np
import pandas as pd


import matplotlib.pyplot as plt
import matplotlib.pyplot as plt

data = pd.read_csv("/content/dataset/Labsheet 5 Sales.csv")


data.head()
```

	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContou
0	1	60	RL	65.0	8450	Pave	NaN	Reg	L
1	2	20	RL	80.0	9600	Pave	NaN	Reg	L
2	3	60	RL	68.0	11250	Pave	NaN	IR1	L
3	4	70	RL	60.0	9550	Pave	NaN	IR1	L
4	5	60	RL	84.0	14260	Pave	NaN	IR1	L

5 rows × 81 columns

```
x = data['GrLivArea']
y = data['SalePrice']
x = (x - x.mean()) / x.std()
x = np.c_[np.ones(x.shape[0]), x]


alpha = 0.01
iterations = 2000
m = y.size
np.random.seed(123)
theta = np.random.rand(2)
def gradient_descent(x, y, theta, iterations, alpha):
    past_costs = []
    past_thetas = [theta]
    for i in range(iterations):
        prediction = np.dot(x, theta)
        error = prediction - y
        cost = 1 / (2 * m) * np.dot(error.T, error)
        past_costs.append(cost)
        theta = theta - (alpha * (1 / m) * np.dot(x.T, error))
        past_thetas.append(theta)
    return past_thetas, past_costs


past_thetas, past_costs = gradient_descent(x, y, theta, iterations, alpha)
theta = past_thetas[-1]
print("Gradient Descent: {:.2f},{:.2f}".format(theta[0], theta[1]))
```

```
Gradient Descent: 180921.20,56294.90
```

```
plt.title('Cost Function J')
plt.xlabel('No. of iterations')
plt.ylabel('Cost')
plt.plot(past_costs)
plt.show()
```