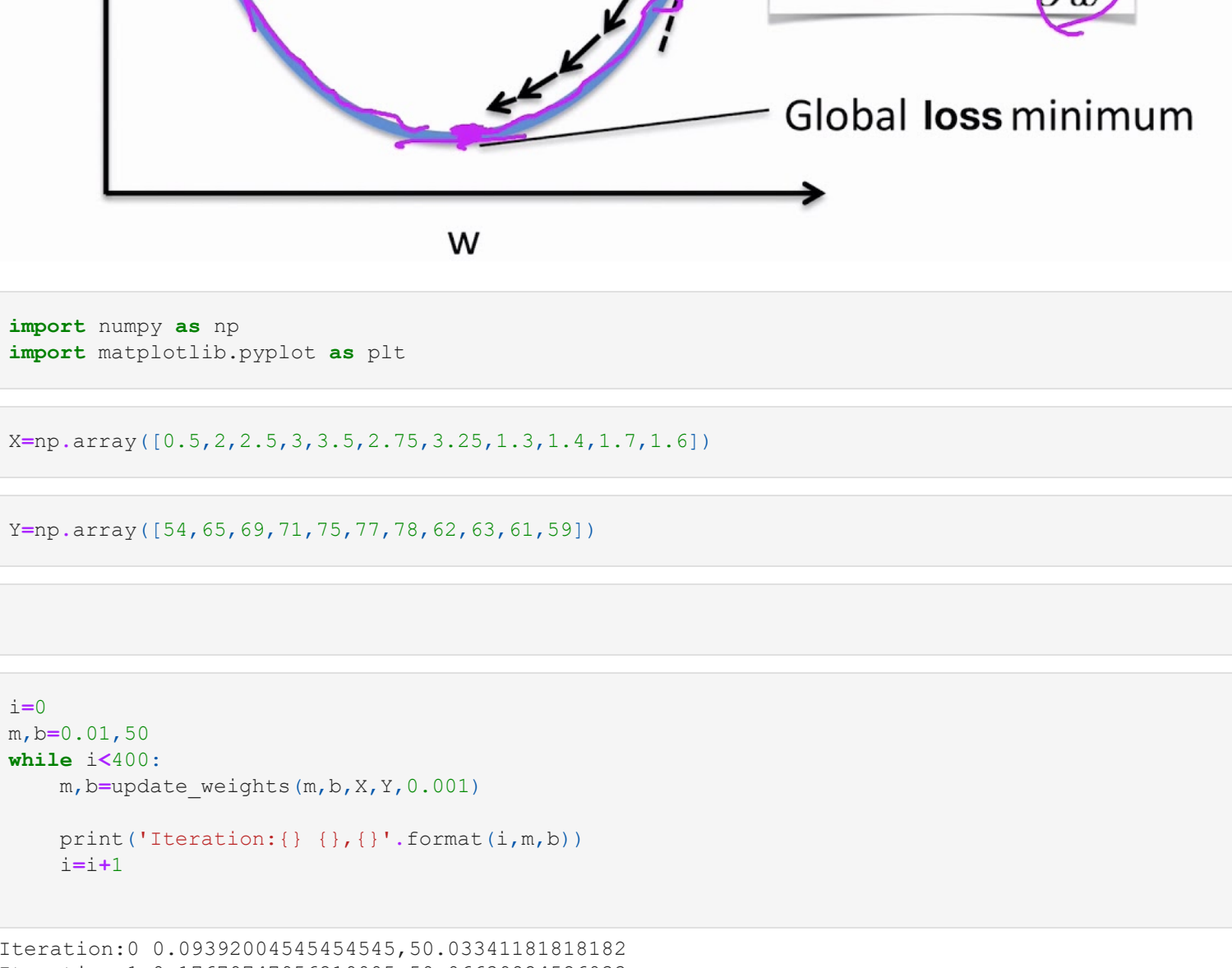


```
[1]: def update_weights(b; b, X, Y, learning_rate):
    m_deriv = 0.5
    b_deriv = 0.5
    N = len(X)
    for i in range(N):
        # Calculate partial derivatives
        # -2x(y - (mx + b))
        m_deriv += -2*X[i] * (Y[i] - (m*X[i] + b))
        # -2(y - (mx + b))
        b_deriv += -2*(Y[i] - (m*X[i] + b))

    # We subtract because the derivatives point in direction of steepest ascent
    m = (m_deriv / float(N)) * learning_rate
    b = (b_deriv / float(N)) * learning_rate

    return m, b
```

## Gradient descent algorithm



```
In [2]: import numpy as np
import matplotlib.pyplot as plt
```

```
In [3]: X=np.array([0.5,2,2.5,3,3.5,2.75,3.25,1.3,1.4,1.7,1.6])
```

```
In [4]: Y=np.array([54,65,69,71,75,77,78,62,63,61,59])
```

```
In [ ]:
```

```
In [5]: i=0
m,b=0,0.1,50
while i<400:
    m,b=update_weights(m,b,X,Y,0.001)
    print("Iteration:({} , {})"'.format(i,m,b))
    i=i+1
```

```
Iteration:0 0.09762074545454545,50.03341181818182
Iteration:1 0.1767974956219405,50.0639824526033
Iteration:2 0.2586452995402268,50.09896458681168
Iteration:3 0.33947634057105236,50.1311160822673
Iteration:4 0.4193032778222416,50.162857905738505
Iteration:5 0.4981386284414377,50.19419516683088
Iteration:6 0.5759947535263723,50.225132911448426
Iteration:7 0.6528838600703258,52.25976122874172
Iteration:8 0.7288180028833332,50.28582972112226
Iteration:9 0.803809064849439,50.31559856565776
Iteration:10 0.8778686070002992,50.34498745789227
Iteration:11 0.9510089539654245,50.37400113418112
Iteration:12 1.0232408121993577,50.40264427547309
Iteration:13 1.094575763860713,52.430921503451835
Iteration:14 1.165024988680701,50.458837382182367
Iteration:15 1.2345995293700784,50.4863964182892
Iteration:16 1.3031028880879,50.5136034636605
Iteration:17 1.3711680349369535,50.54046171427605
Iteration:18 1.4381834012740637,50.565976709243676
Iteration:19 1.5045889860725258,50.59515233933793
Iteration:20 1.569728867473499,50.6189282718695
Iteration:21 1.634279578126256,50.64450236344249
Iteration:22 1.698029133823413,50.66968507344683
Iteration:23 1.7609875215700974,50.69454503364506
Iteration:24 1.8231646038667042,50.71908626934198
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Iteration:36 2.511774392406107,50.99011940662334
Iteration:37 2.5643780831610527,51.01086158631527
Iteration:38 2.616846305300538,51.03133640951459
Iteration:39 2.6684072295771393,51.05154721157291
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Iteration:41 2.7696193595029293,51.0911898628092
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