

```
!pip install tensorflow
```

```
Requirement already satisfied: tensorflow in /usr/local/lib/python3.10/dist-packages (2.13.0)
Requirement already satisfied: absl-py>=1.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.4.0)
Requirement already satisfied: astunparse>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.6.3)
Requirement already satisfied: flatbuffers>=23.1.21 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (23.5.26)
Requirement already satisfied: gast<0.4.0,>=0.2.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.4.0)
Requirement already satisfied: google-pasta>=0.1.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.2.0)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.59.0)
Requirement already satisfied: h5py>=2.9.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (3.9.0)
Requirement already satisfied: keras<2.14,>=2.13.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (2.13.1)
Requirement already satisfied: libclang>=13.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (16.0.6)
Requirement already satisfied: numpy<=1.24.3,>=1.22 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.23.5)
Requirement already satisfied: opt-einsum>=2.3.2 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (3.3.0)
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from tensorflow) (23.2)
Requirement already satisfied: protobuf!=4.21.0,!<4.21.1,!<4.21.2,!<4.21.3,!<4.21.4,!<4.21.5,<5.0.0dev,>=3.20.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (4.21.0)
Requirement already satisfied: setuptools in /usr/local/lib/python3.10/dist-packages (from tensorflow) (67.7.2)
Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.16.0)
Requirement already satisfied: tensorboard<2.14,>=2.13 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (2.13.0)
Requirement already satisfied: tensorflow-estimator<2.14,>=2.13.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (2.13.0)
Requirement already satisfied: termcolor>=1.1.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (2.3.0)
Requirement already satisfied: typing-extensions<4.6.0,>=3.6.6 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (4.5.0)
Requirement already satisfied: wrapt>=1.11.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (1.15.0)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow) (0.34.0)
Requirement already satisfied: wheel<1.0,>=0.23.0 in /usr/local/lib/python3.10/dist-packages (from astunparse>=1.6.0->tensorflow) (0.41.0)
Requirement already satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.14,>=2.13->tensorflow) (2.22.0)
Requirement already satisfied: google-auth-oauthlib<1.1,>=0.5 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.14,>=2.13->tensorflow) (0.4.6)
Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.14,>=2.13->tensorflow) (3.4.1)
Requirement already satisfied: requests<3,>=2.21.0 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.14,>=2.13->tensorflow) (2.28.1)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.14,>=2.13->tensorflow) (0.17.0)
Requirement already satisfied: werkzeug>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from tensorboard<2.14,>=2.13->tensorflow) (2.3.7)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from google-auth<3,>=1.6.3->tensorflow) (5.2.0)
Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.10/dist-packages (from google-auth<3,>=1.6.3->tensorflow) (0.3.0)
Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.10/dist-packages (from google-auth<3,>=1.6.3->tensorflow) (4.9)
Requirement already satisfied: requests-oauthlib>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from google-auth-oauthlib<1.1,>=0.5->tensorflow) (1.3.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.21.0->tensorflow) (3.2.0)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.21.0->tensorflow) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.21.0->tensorflow) (2.0.3)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.21.0->tensorflow) (2023.7.22)
Requirement already satisfied: MarkupSafe>=2.1.1 in /usr/local/lib/python3.10/dist-packages (from werkzeug>=1.0.1->tensorflow) (2.1.1)
Requirement already satisfied: pyasn1<0.6.0,>=0.4.6 in /usr/local/lib/python3.10/dist-packages (from pyasn1-modules>=0.2.1->google-auth<3,>=1.6.3->tensorflow) (0.5.0)
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.10/dist-packages (from requests-oauthlib>=0.7.0->google-auth-oauthlib<1.1,>=0.5->tensorflow) (3.2.2)
```

```
import tensorflow as tf
import numpy as np
```

```
a=tf.constant(20)
b=tf.constant(15)
print(a*b)

tf.Tensor(300, shape=(), dtype=int32)
```

```
x=np.random.rand(100).astype(np.float32)
print(x)
```

```
[0.36269245 0.5978034 0.6744555 0.32958552 0.3597888 0.04364101
0.20109059 0.6057117 0.45303428 0.1027298 0.39911097 0.6254156
0.89423364 0.6872932 0.83792675 0.62470555 0.23988456 0.76628095
0.1833827 0.9744697 0.83600384 0.3080415 0.9101248 0.6354085
0.6466026 0.20287631 0.17266065 0.363246 0.53830874 0.9160116
0.53985757 0.32943305 0.8529553 0.7997989 0.13197176 0.22550087
0.05201474 0.38826963 0.64080685 0.3501183 0.5768401 0.33025512
0.00449546 0.07376295 0.2960689 0.06564567 0.3529866 0.2565754
0.3327112 0.95453453 0.16794705 0.87934965 0.91023356 0.00150361
0.19101274 0.8372648 0.7617004 0.32082334 0.6533382 0.4620393
0.10991699 0.20074093 0.9014741 0.52267987 0.9212178 0.11187173
0.533811 0.27458203 0.02144265 0.8166203 0.7621315 0.23861527
0.9403709 0.8756498 0.10573691 0.58758885 0.7745565 0.9668833
0.25619513 0.01247067 0.7327769 0.8634355 0.36091918 0.22170913
0.09474564 0.07119031 0.813125 0.92725885 0.6813211 0.49813837
0.41418296 0.3024356 0.56498486 0.95329 0.97105825 0.4904791
0.69300604 0.48885557 0.11717276 0.9672001 ]
```

```
y=x*0.2+0.2
```

```
print(y)
```

```
[0.27253848 0.31956068 0.3348911 0.26591712 0.27195776 0.20872821
0.24021812 0.32114235 0.29060686 0.22054596 0.2798222 0.32508314
0.37884673 0.33745864 0.36758536 0.3249411 0.24797691 0.3532562
0.23667654 0.39489394 0.3672008 0.2616083 0.38202494 0.3270817
0.32932052 0.24057527 0.23453213 0.2726492 0.30766174 0.3832023
0.27253848 0.31956068 0.3348911 0.26591712 0.27195776 0.20872821
0.24021812 0.32114235 0.29060686 0.22054596 0.2798222 0.32508314
0.37884673 0.33745864 0.36758536 0.3249411 0.24797691 0.3532562
0.23667654 0.39489394 0.3672008 0.2616083 0.38202494 0.3270817
0.32932052 0.24057527 0.23453213 0.2726492 0.30766174 0.3832023]
```

```

0.3079715 0.2658866 0.37059104 0.35995978 0.22639436 0.24510017
0.21040295 0.27765393 0.32816136 0.27002367 0.31536803 0.26605102
0.2008991 0.2147526 0.25921378 0.21312913 0.27059734 0.2513151
0.26654226 0.39090693 0.23358941 0.37586993 0.3820467 0.20030072
0.23820256 0.36745298 0.3523401 0.2641647 0.33066764 0.29240787
0.2219834 0.24014819 0.38029483 0.30453598 0.38424355 0.22237435
0.3067622 0.2549164 0.20428853 0.36332405 0.3524263 0.24772306
0.3880742 0.37512997 0.22114739 0.31751776 0.35491133 0.39337665
0.25123903 0.20249414 0.34655538 0.3726871 0.27218384 0.24434184
0.21894914 0.21423806 0.362625 0.3854518 0.33626422 0.29962766
0.2828366 0.26048714 0.31299698 0.39065802 0.39421165 0.29809582
0.33860123 0.29777113 0.22343455 0.39344 ]

```

```

w=tf.Variable(tf.random.normal([1]))
print(w)

<tf.Variable 'Variable:0' shape=(1,) dtype=float32, numpy=array([1.0353487], dtype=float32)>

```

```

b = tf.Variable(tf.zeros([1]))
print(b)

<tf.Variable 'Variable:0' shape=(1,) dtype=float32, numpy=array([0.], dtype=float32)>

```

```

def mse_loss():
    ypred=w*x+b
    loss = tf.reduce_mean(tf.square(ypred-y))
    return loss

```

```
optimizer=tf.keras.optimizers.Adam()
```

```

# Iterations
for step in range(5000):
    optimizer.minimize(mse_loss,var_list=[w,b])
if step % 500 != 0:
    print(step, w.numpy(), b.numpy())

4999 [0.20000003] [0.19999999]

```