# Create a new notebook

* In Juypiter create a new python notebook and change the name to “SimpleTensors”
* Add the following imports

import tensorflow as tf

import numpy as np

* Run the section

numpy is a python tool for scientific computing, it can also be used to extract the values of our tensors. In many cases, such as the ones we start with, our tensors are containing numpy arrays.

* Create a few tensors of different shapes

myScalar = tf.constant(34)

myVector = tf.constant([23,45,678])

myMatrix = tf.constant([[34,56,67],[23,67,45]])

myRank4 = tf.constant([[[34,56,67],[23,67,45]],[[56,28,432],[98,362,654]]])

print(myScalar)

print(myVector)

print(myMatrix)

print(myRank4)

print(myScalar.numpy())

print(myVector.numpy())

print(myMatrix.numpy())

print(myRank4.numpy())

* Press run and see the results
* Now we can use TensorFlow to do some mathematic operations on our tensors
* Here we are adding all the elements in the tensors

rs1 = tf.reduce\_sum(myVector)

rs2 = tf.reduce\_sum(myMatrix)

rs3 = tf.reduce\_sum(myRank4)

print(rs1)

print(rs2)

print(rs3)

* In this case we will multiply the values together

rp1 = tf.reduce\_prod(myVector)

rp2 = tf.reduce\_prod(myMatrix)

rp3 = tf.reduce\_prod(myRank4)

print(rp1)

print(rp2)

print(rp3)

* Or get the mean

rm1 = tf.reduce\_mean(myVector)

rm2 = tf.reduce\_mean(myMatrix)

rm3 = tf.reduce\_mean(myRank4)

print(rm1)

print(rm2)

print(rm3)

* Try these out

One of the strengths of TensorFlow is the extremely fast ways that it can manipulate extremely large multi-dimensional datasat. TensorFlow can even be configured to take advantage of the device’s GPU for training.

* We can also easily get the shape of and reshape our tensors. Try this:

t1 = tf.constant([[4, 5], [54, 3]])

print(tf.shape(t1))

print(tf.reshape(t1, [4]))

print(tf.reshape(t1, [1,4]))

print(tf.reshape(t1, [1,1,2,2]))

print(tf.reshape(t1, [2,1,2,1]))

* We can also easily slice and dice our data in different ways

t2 = tf.constant([[435, 45, 45], [54, 33,865]])

t3, t4 = tf.split(t2, num\_or\_size\_splits=2, axis=0)

print(t3)

print(t4)

t5, t6, t7 = tf.split(t2, num\_or\_size\_splits=3, axis=1)

print(t5)

print(t6)

print(t7)

We can see that TensorFlow also allows the easy and fast manipulation and reshaping of large sets of data