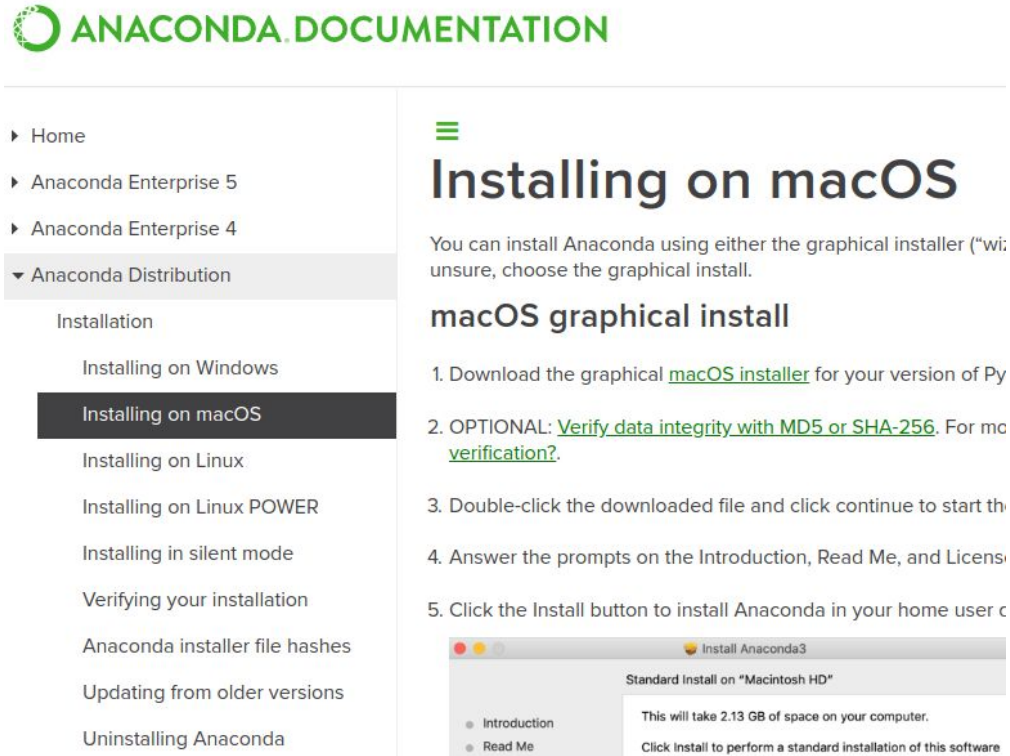
TensorFlow

Курс “Практическое применение по TensorFlow”
Шигапова Фирюза Зинатуллаевна
1-й семестр, 2019 г.

TensorFlow installation

1. Install Anaconda *https://docs.anaconda.com/anaconda/install/#*



Tensorflow installation

2. Create conda environment:

conda create -n tensorflow_1 python=3.x

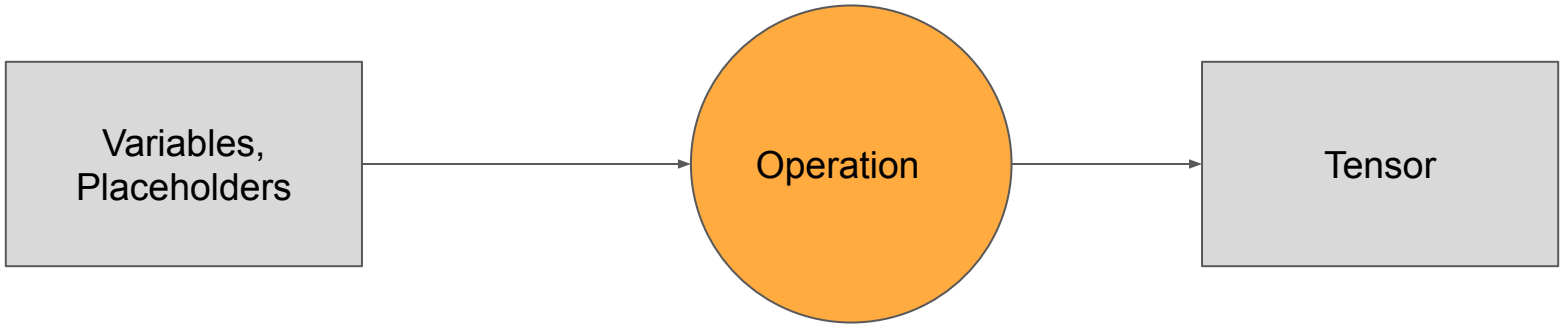
3. Install TensorFlow into created environment (tensorflow 1.15):

source activate tensorflow_1

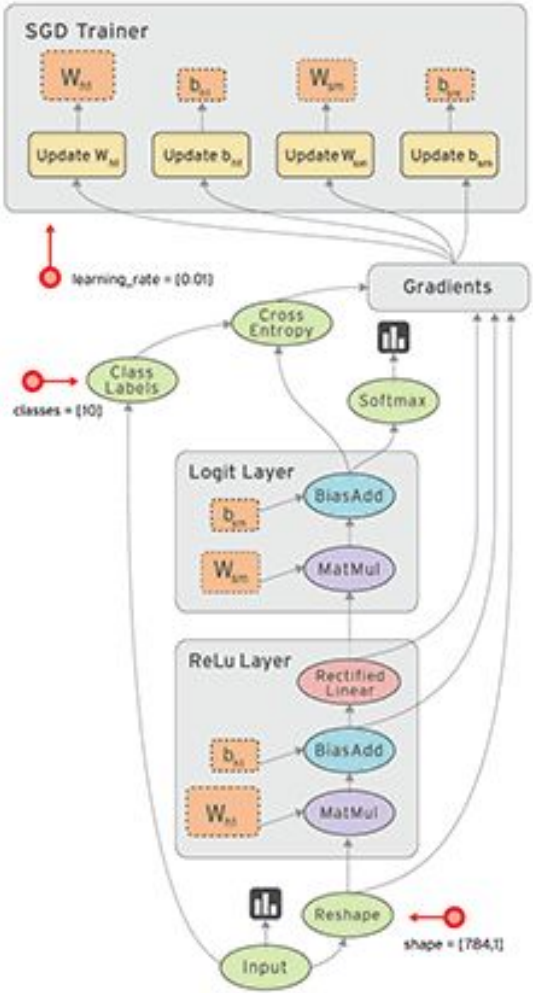
pip install tensorflow or **pip install tensorflow-gpu**

https://www.tensorflow.org/install/pip

Static graph



Dataflow



Source:https://www.tensorflow.org/guide/graphs

Static graph

```
graph = tf.Graph()
with graph.as_default():
    tmp = tf.constant(5.)

assert tmp.graph is graph
```

```
tmp = tf.constant(5.)
assert tmp.graph is tf.get_default_graph()
```

Session

```
tmp = tf.multiply(2, 3)

session = tf.Session()
output = session.run(tmp)

print(output) # 6


graph = tf.Graph()
with graph.as_default():
    tmp = tf.multiply(2, 3)

session = tf.Session(graph=graph)
output = session.run(tmp)

print(output) # 6
```

CPU / GPU config

```
session_conf = tf.ConfigProto(
    device_count={'CPU': 1, 'GPU': 0},
    allow_soft_placement=True,
    log_device_placement=True
)
```

```
gpu_options = tf.GPUOptions(per_process_gpu_memory_fraction=1.0)
session_conf = tf.ConfigProto(allow_soft_placement=True,
                              log_device_placement=True,
                              gpu_options=gpu_options)
```

```
session = tf.Session(graph=graph, config=session_conf)
```

Placeholder

```
tmp = tf.placeholder(dtype=tf.int32, shape=(None), name='temp_variable')
out = tf.matmul(tmp, tmp)

session = tf.Session()
output = session.run(out, feed_dict={tmp: np.ones((2, 2))})

print(output)  #[[2 2] [2 2]]
```

Variable

```
temp = tf.Variable(initial_value=5., dtype=tf.float32,
                   trainable=False, name='temp')

output_op = tf.multiply(temp, temp)

print(output_op) # Tensor("Mul:0", shape=(), dtype=float32)
```

How to run Variable

1. Initialize all variables in graph

```
init_variables_op = tf.initialize_all_variables()
```

2. Run init operation via Session

```
session.run(init_variables_op)
```

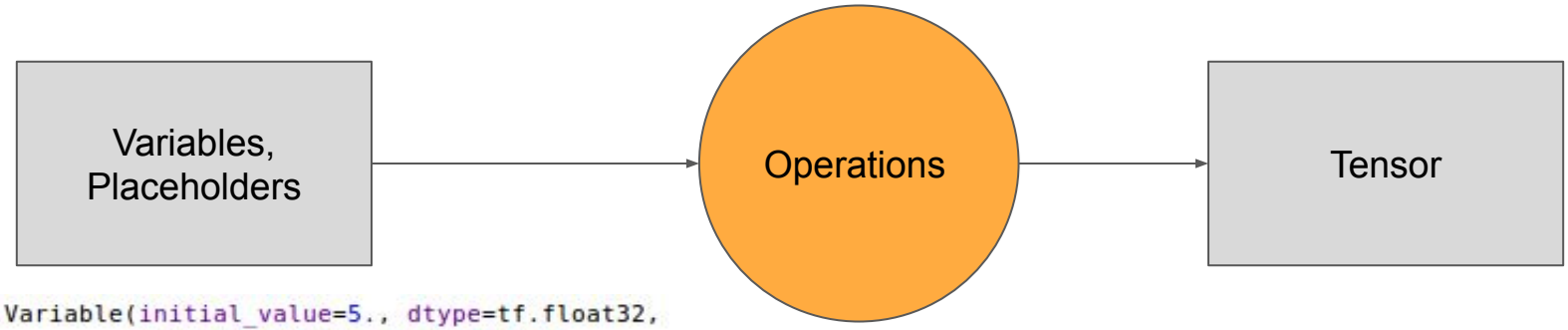
3. After that run needed graph’s operations (as was done before)

```
output_op = session.run(output_op)

print(output_op) # 25.0
```

Tensor

```
output = tf.multiply(temp, temp)
```




```
temp = tf.Variable(initial_value=5., dtype=tf.float32,
                   trainable=False, name='temp')
```