What's TensorFlow?

- Open source software library for numerical computation using data flow graphs
- Originally developed by Google Brain Team to conduct machine learning and deep neural networks research
- General enough to be applicable in a wide variety of other domains as well

Why TensorFlow

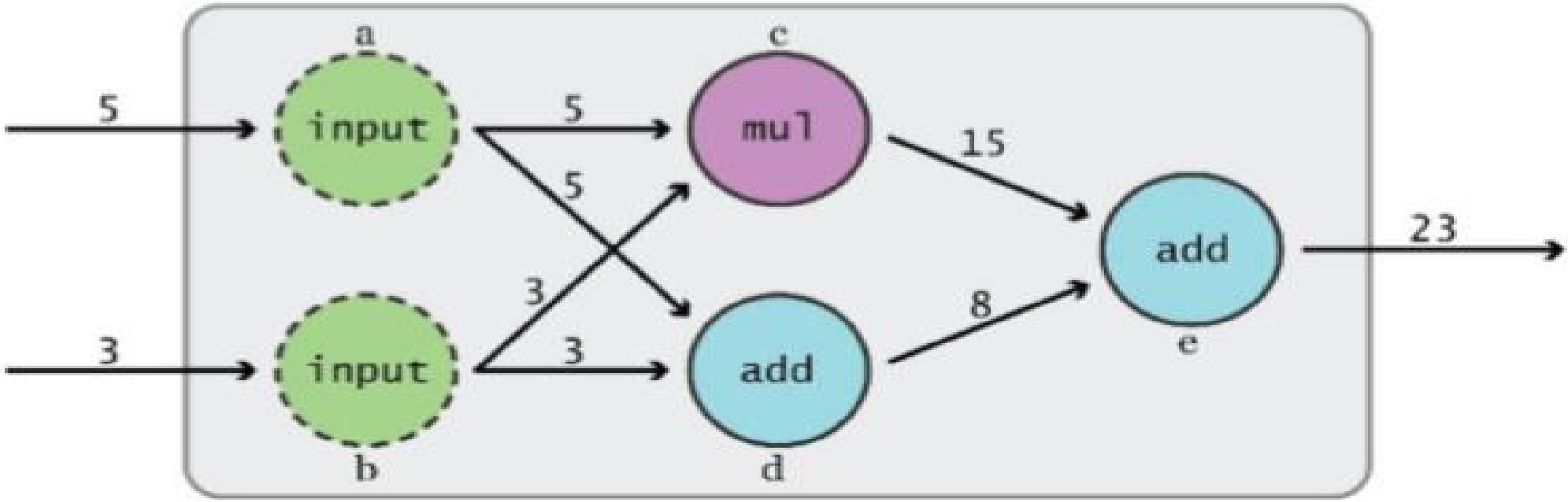
- Python API
- Portability: deploy computation to one or more **CPUs or GPUs** in a desktop, server, or mobile device with a single API
- Flexibility: from Raspberry Pi,Android, Windows, IOS, Linux to server farms
- Visualization(**TensorBoard**)
- **Checkpoints**(for managing experiments)
- Large community
- Awesome projects already using TensorFlow

What's a tensor

- An n-dimensional array
- 0-d tensor: scalar(number)
- 1-d tensor: vector
- 2-d tensor: matrix
- and so on

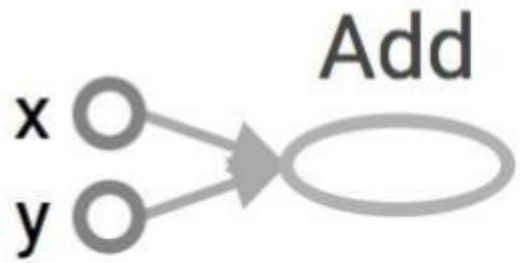
Data Flow Graphs

- assemble a **graph**
- use a **session** to execute operations in the graph



Data Flow Graphs

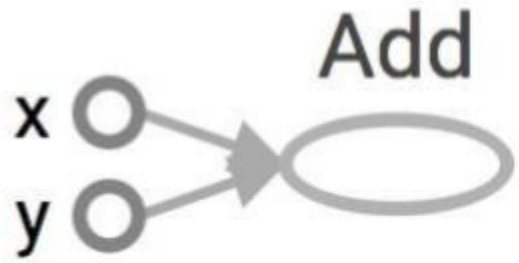
```
import tensorflow as tf
a = tf.add(3,5)
print(a)
```



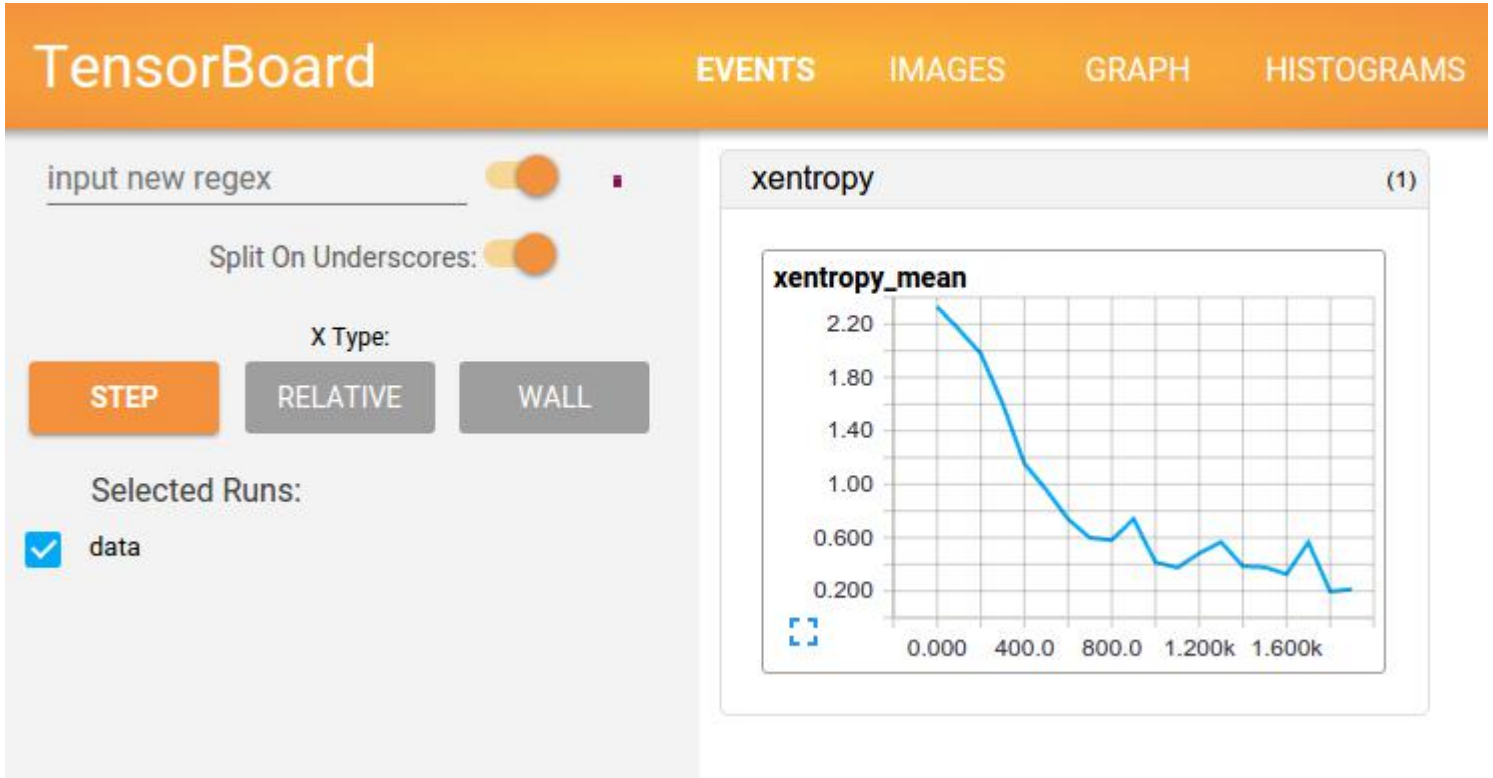
How to get the value of a

- Create a session, assign it to variables sess so we can call it later!

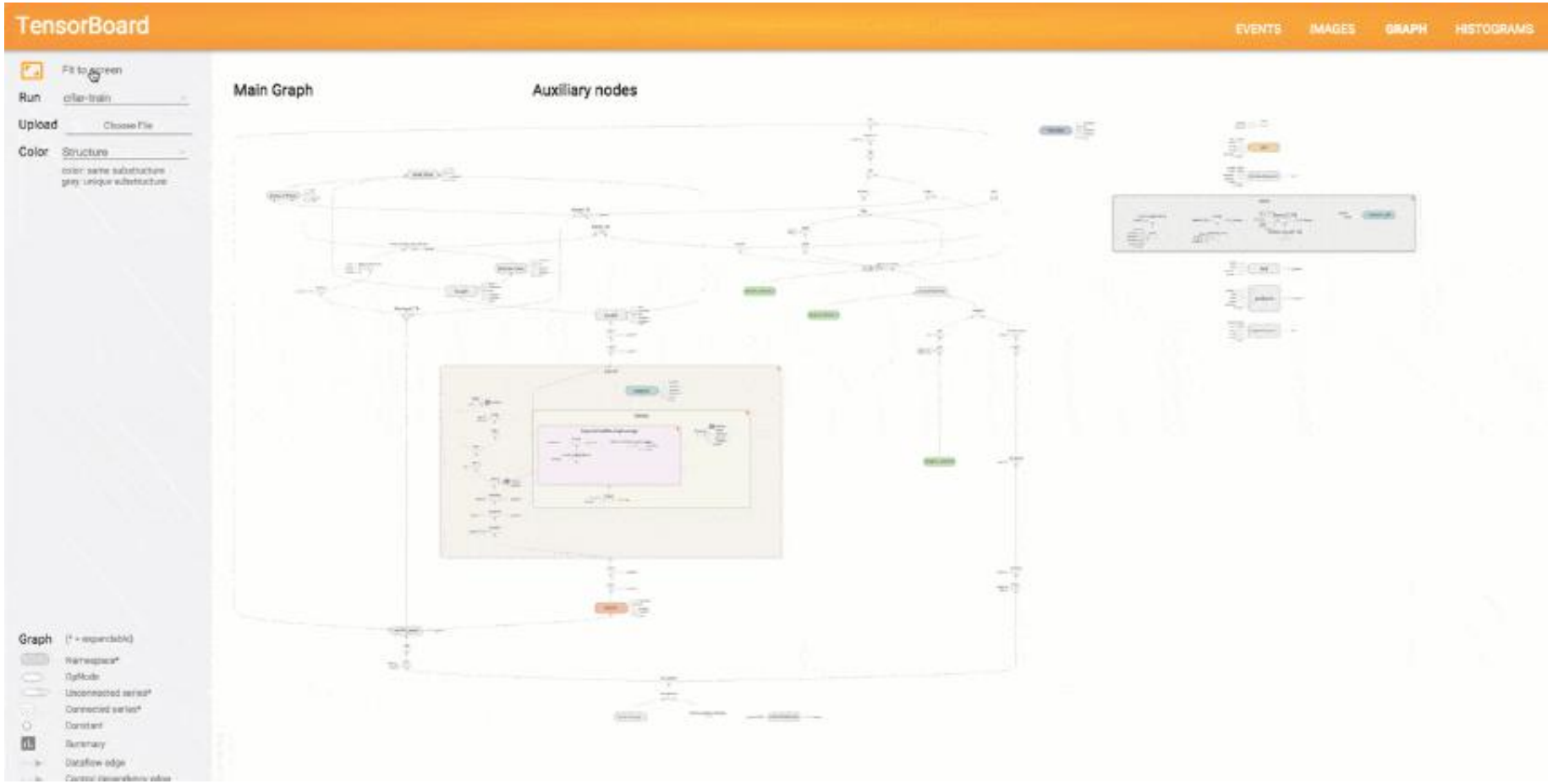
```
import tensorflow as tf
a = tf.add(3,5)
sess = tf.Session()
print(sess.run(a))
sess.close()
```



TensorBoard:Visulaizing Learning



TensorBoard: Graph Visualization



TensorBoard: Graph Visualization

Symbol	Meaning
	High-level node representing a name scope. Double-click to expand a high-level node.
	Sequence of numbered nodes that are not connected to each other.
	Sequence of numbered nodes that are connected to each other.
	An individual operation node.
	A constant.
	A summary node.
	Edge showing the data flow between operations.
	Edge showing the control dependency between operations.
	A reference edge showing that the outgoing operation node can mutate the incoming tensor.

tf.constant() and tf.Variable()

```
tf.Variable(initial_value=None, trainable=True, collections=None,
            name=None, dtype=None,....)
```

- Constant values are stored in the graph definition
- Sessions allocate memory to store variable values

tf.Variable() and tf.get_variable()

- tf.variable() 检测到命名冲突会自己处理
- tf.get_variable() 检测到命名冲突会报错
- 所以我们在需要共享变量的时候需要使用tf.get_variable()，其余情况下，这两个的用法都是一样的。

Create placeholders for inputs and labels

tf.placeholder(dtype, shape=None, name=None)

- For More :
- https://www.tensorflow.org/