Variables and Placeholders

In [1]:
```
import tensorflow as tf
```

REMEMBER TO ONLY RUN THIS NEXT CELL ONCE!

In [2]:
```
sess = tf.InteractiveSession()
```

Variables

In [3]:
```
my_tensor = tf.random_uniform((4, 4), 0, 1)
```

In [4]:
```
my_tensor
```

Out[4]:
```
<tf.Tensor 'random_uniform:0' shape=(4, 4) dtype=float32>
```

In [5]:
```
my_var = tf.Variable(initial_value=my_tensor)
```

In [6]:
```
print(my_var)
```

```
<tf.Variable 'Variable:0' shape=(4, 4) dtype=float32_ref>
```

The next cell is to show the importance of initializing all variables. The command which would cause the problem is

```
sess.run(my_var)
```

In [7]:
```
do_show_error = False

print("The command is:")
print(" >>> sess.run(my_var)")
print("You'll see the real error from running that command or some")
print("text copied representing the error. With the latter, i.e.")
print("with do_show_error = False, you can do things like")
print("Kernel -> Restart & Run All")
print()
print()

if do_show_error:
    sess.run(my_var)
else:
    large_error_text = """
---------------------------------------------------------------------------
FailedPreconditionError                   Traceback (most recent call last)
~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
_do_call(self, fn, *args)
   1277     try:
-> 1278       return fn(*args)
   1279     except errors.OpError as e:

~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
_run_fn(feed_dict, fetch_list, target_list, options, run_metadata)
   1262       return self._call_tf_sessionrun(
-> 1263           options, feed_dict, fetch_list, target_list, run_metadata)
   1264

~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
_call_tf_sessionrun(self, options, feed_dict, fetch_list, target_list, run_metadata)
   1349         self._session, options, feed_dict, fetch_list, target_list,
-> 1350         run_metadata)
   1351

FailedPreconditionError: Attempting to use uninitialized value Variable_1
        [[Node: _retval_Variable_1_0_0 = _Retval[T=DT_FLOAT, index=0, \\
        _device="/job:localhost/replica:0/task:0/device:CPU:0"](Variable_1)]]

During handling of the above exception, another exception occurred:

FailedPreconditionError                   Traceback (most recent call last)
```

```
<ipython-input-16-1e5809ec9d7c> in <module>()
      2
      3 if do_show_error:
----> 4     sess.run(my_var)
      5 else:
      6     print("The error was:")

~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
run(self, fetches, feed_dict, options, run_metadata)
    875     try:
    876       result = self._run(None, fetches, feed_dict, options_ptr,
--> 877                          run_metadata_ptr)
    878       if run_metadata:
    879         proto_data = tf_session.TF_GetBuffer(run_metadata_ptr)

~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
_run(self, handle, fetches, feed_dict, options, run_metadata)
   1098     if final_fetches or final_targets or (handle and feed_dict_tensor):
   1099       results = self._do_run(handle, final_targets, final_fetches,
-> 1100                              feed_dict_tensor, options, run_metadata)
   1101     else:
   1102       results = []

~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
_do_run(self, handle, target_list, fetch_list, feed_dict, options, run_metadata)
   1270     if handle is None:
   1271       return self._do_call(_run_fn, feeds, fetches, targets, options,
-> 1272                            run_metadata)
   1273     else:
   1274       return self._do_call(_prun_fn, handle, feeds, fetches)

~\.conda\envs\tfdeeplearning\lib\site-packages\tensorflow\python\client\session.py in \\
_do_call(self, fn, *args)
   1289         except KeyError:
   1290           pass
-> 1291       raise type(e)(node_def, op, message)
   1292
   1293   def _extend_graph(self):

FailedPreconditionError: Attempting to use uninitialized value Variable_1
         [[Node: _retval_Variable_1_0_0 = _Retval[T=DT_FLOAT, index=0, \\
         _device="/job:localhost/replica:0/task:0/device:CPU:0"](Variable_1)]]
```

```
    """
    print("The error was as follows, where I've put in '\\' to")
    print("show line continuation.")
    print("~~~~~~~~~~")
    print(large_error_text)
    print("~~~~~~~~~~")
##endof:  if/else
```

```
The command is:
 >>> sess.run(my_var)
You'll see the real error from running that command or some
text copied representing the error. With the latter, i.e.
with do_show_error = False, you can do things like
Kernel -> Restart & Run All


The error was as follows, where I've put in '\' to
show line continuation.
~~~~~~~~~~

---------------------------------------------------------------------------
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```

```
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~~~~~~~~~~
```

Note! You must initialize all global variables!

That will prevent the error above.

In [8]:
```
init = tf.global_variables_initializer()
```

In [9]:
```
sess.run(init) # we run the just-created object
```

In [10]:
```
sess.run(my_var) # now we shouldn't get that error
```

Out[10]:
```
array([[0.9439746 , 0.7892542 , 0.14171898, 0.32033575],
       [0.5717102 , 0.28137934, 0.46700025, 0.53858304],
       [0.64763105, 0.73465145, 0.7991557 , 0.9201087 ],
       [0.0472753 , 0.89916945, 0.41707695, 0.94807696]], dtype=float32)
```

Placeholders

In [11]:
```
my_type = tf.float32 #  that will be good for this class
                     #+ note it for later

ph = tf.placeholder(my_type)
```

In [12]:
```
ph
```

Out[12]:
```
<tf.Tensor 'Placeholder:0' shape=<unknown> dtype=float32>
```

In [13]:
```
ph_big = tf.placeholder(tf.float64)
```

In [14]:
```
ph_big
```

Out[14]:
```
<tf.Tensor 'Placeholder_1:0' shape=<unknown> dtype=float64>
```

In [15]:
```
ph_type_and_shape = tf.placeholder(tf.float32, shape=(None, 5))
#  That 'None' as the first one allows it to be filled with the
#+ number of samples.
```

In [16]:
```
ph_type_and_shape
```

Out[16]:
```
<tf.Tensor 'Placeholder_2:0' shape=(?, 5) dtype=float32>
```

Coming up next is where we'll put this all together!

That's all for now!