In [1]:
```
import tensorflow as tf
from tensorflow.examples.tutorials.mnist import input_datadata
```

In [2]:
```
mnist = input_data.read_data_sets("MNIST_data/", one_hot=True)
```

```
W0827 11:44:04.225675 140736573572032 deprecation.py:323] From <ipython-input-2-
a839aeb82f4b>:1: read_data_sets (from tensorflow.contrib.learn.python.learn.data
sets.mnist) is deprecated and will be removed in a future version.
Instructions for updating:
Please use alternatives such as official/mnist/dataset.py from tensorflow/model
s.
W0827 11:44:04.227918 140736573572032 deprecation.py:323] From /anaconda3/lib/py
thon3.7/site-packages/tensorflow/contrib/learn/python/learn/datasets/mnist.py:26
0: maybe_download (from tensorflow.contrib.learn.python.learn.datasets.base) is
deprecated and will be removed in a future version.
Instructions for updating:
Please write your own downloading logic.
W0827 11:44:04.230000 140736573572032 deprecation.py:323] From /anaconda3/lib/py
thon3.7/site-packages/tensorflow/contrib/learn/python/learn/datasets/mnist.py:26
2: extract_images (from tensorflow.contrib.learn.python.learn.datasets.mnist) is
deprecated and will be removed in a future version.
Instructions for updating:
Please use tf.data to implement this functionality.

Extracting MNIST_data/train-images-idx3-ubyte.gz

W0827 11:44:04.983794 140736573572032 deprecation.py:323] From /anaconda3/lib/py
thon3.7/site-packages/tensorflow/contrib/learn/python/learn/datasets/mnist.py:26
7: extract_labels (from tensorflow.contrib.learn.python.learn.datasets.mnist) is
deprecated and will be removed in a future version.
Instructions for updating:
Please use tf.data to implement this functionality.
W0827 11:44:04.986672 140736573572032 deprecation.py:323] From /anaconda3/lib/py
thon3.7/site-packages/tensorflow/contrib/learn/python/learn/datasets/mnist.py:11
0: dense_to_one_hot (from tensorflow.contrib.learn.python.learn.datasets.mnist)
is deprecated and will be removed in a future version.
Instructions for updating:
Please use tf.one_hot on tensors.
W0827 11:44:05.096377 140736573572032 deprecation.py:323] From /anaconda3/lib/py
thon3.7/site-packages/tensorflow/contrib/learn/python/learn/datasets/mnist.py:29
0: DataSet.__init__ (from tensorflow.contrib.learn.python.learn.datasets.mnist)
is deprecated and will be removed in a future version.
Instructions for updating:
Please use alternatives such as official/mnist/dataset.py from tensorflow/model
s.

Extracting MNIST_data/train-labels-idx1-ubyte.gz
Extracting MNIST_data/t10k-images-idx3-ubyte.gz
Extracting MNIST_data/t10k-labels-idx1-ubyte.gz
```

In [3]:
```
type(mnist)
```

Out[3]:
```
tensorflow.contrib.learn.python.learn.datasets.base.Datasets
```

In [4]:
```
mnist.train.images.shape
```

Out[4]:
```
(55000, 784)
```

In [5]:
```
mnist.train.num_examples
```

Out[5]:
```
55000
```

In [6]:
```
mnist.test.num_examples
```

Out[6]:
```
10000
```

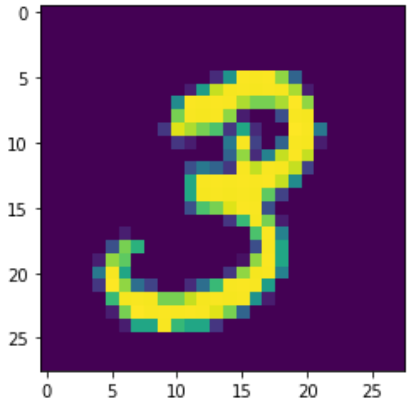
In [17]:
```
import matplotlib.pyplot as plt
%matplotlib inline
```

In [18]:
```
mnist.train.images[1].shape
```

Out[18]:
```
(784,)
```

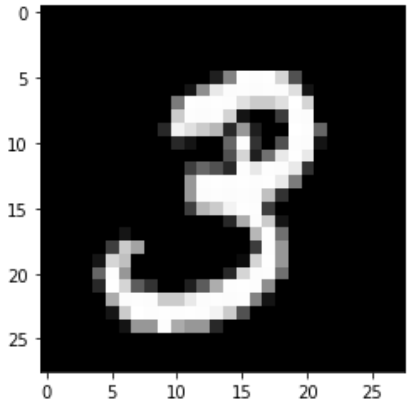
In [20]:
```
plt.imshow(mnist.train.images[1].reshape(28,28))
```

Out[20]:
```
<matplotlib.image.AxesImage at 0x1a55db9e90>
```



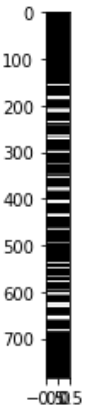
In [23]:
```
plt.imshow(mnist.train.images[1].reshape(28,28),cmap='gist_gray')
```

Out[23]:
```
<matplotlib.image.AxesImage at 0x1a566e6390>
```



In [24]:
```
plt.imshow(mnist.train.images[1].reshape(784,1),cmap='gist_gray',aspect=0.02)
```

Out[24]:
```
<matplotlib.image.AxesImage at 0x1a55d83950>
```



In [29]:
```
x = tf.placeholder(tf.float32,shape=[None, 784])
```

In [30]:
```
#Weights

W = tf.Variable(tf.zeros([784,10]))
```

In [31]:
```
#Biasis

b = tf.Variable(tf.zeros([10]))
```

In [32]:
```
y = tf.matmul(x,W) + b
```

In [41]:
```
y_true = tf.placeholder(tf.float32, shape=[None,10])
```

In [42]:
```
cross_entropy = tf.reduce_mean(tf.nn.softmax_cross_entropy_with_logits_v2(labels=
y_true, logits=y))
```

In [43]:
```
optimizer = tf.train.GradientDescentOptimizer(learning_rate=0.15)
```

In [44]:
```
train = optimizer.minimize(cross_entropy)
```

In [45]:
```
init = tf.global_variables_initializer()
```

In [46]:
```
with tf.Session() as sess:
    sess.run(init)

    for step in range(10000):

        batch_x, batch_y = mnist.train.next_batch(1000)

        sess.run(train, feed_dict={x:batch_x, y_true:batch_y})

    matches = tf.equal(tf.argmax(y,1), tf.argmax(y_true,1))

    acc = tf.reduce_mean(tf.cast(matches, tf.float32))

    print(sess.run(acc, feed_dict={x:mnist.test.images,y_true:mnist.test.label
s}))
```

```
0.9226
```

In [ ]: