Import the Required Libraries

In [ ]:

```
import cv2
import numpy as np
from keras.datasets import mnist
from keras.layers import Dense, Flatten
from keras.layers.convolutional import Conv2D
from keras.models import Sequential
from keras.utils import to_categorical
import matplotlib.pyplot as plt
```

Load The Data

In [ ]:

```
(X_train, y_train), (X_test, y_test) = mnist.load_data()
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.n
pz
11490434/11490434 [==============================] - 0s 0us/step
```

In [ ]:

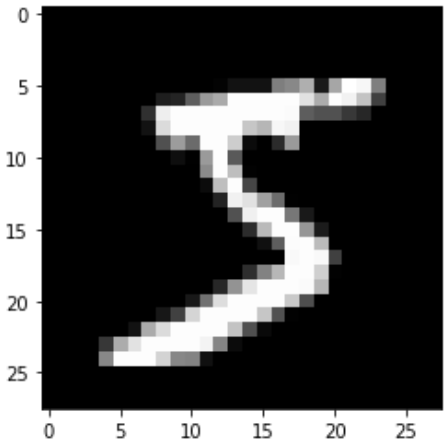
```
print(X_train.shape)
print(X_test.shape)
```

```
(60000, 28, 28, 1)
(10000, 28, 28, 1)
```

Analyze the Data

In [ ]:

```
plt.imshow(X_train[0], cmap="gray")
plt.show()
print (y_train[0])
```




```
5
```

In [ ]:

```
## Checking out the shapes involved in dataset
print ("Shape of X_train: {}".format(X_train.shape))
print ("Shape of y_train: {}".format(y_train.shape))
print ("Shape of X_test: {}".format(X_test.shape))
print ("Shape of y_test: {}".format(y_test.shape))
```

```
Shape of X_train: (60000, 28, 28)
Shape of y_train: (60000,)
Shape of X_test: (10000, 28, 28)
```

```
Shape of X_test: (10000, 28, 28)
Shape of y_test: (10000,)
```

In [ ]:

```
X_train = X_train.reshape(60000, 28, 28, 1)
X_test = X_test.reshape(10000, 28, 28, 1)
```

In [ ]:

```
print ("Shape of X_train: {}".format(X_train.shape))
print ("Shape of y_train: {}".format(y_train.shape))
print ("Shape of X_test: {}".format(X_test.shape))
print ("Shape of y_test: {}".format(y_test.shape))
```

```
Shape of X_train: (60000, 28, 28, 1)
Shape of y_train: (60000,)
Shape of X_test: (10000, 28, 28, 1)
Shape of y_test: (10000,)
```

Applying One Hot Encoding

In [ ]:

```
y_train = to_categorical(y_train)
y_test = to_categorical(y_test)
```