```
Python 3.6.2 |Anaconda custom (64-bit)| (default, Sep 19 2017, 08:03:39) [MSC
v.1900 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 6.1.0 -- An enhanced Interactive Python.

Restarting kernel...
```

```
In [1]: runfile('C:/Users/raven/Google Drive/MSEE/EE 258/Projects/Project 1/MLP-1
hidden layer.py', wdir='C:/Users/raven/Google Drive/MSEE/EE 258/Projects/Project
1')
C:\Users\raven\Anaconda3\lib\site-
packages\sklearn\neural_network\multilayer_perceptron.py:564: ConvergenceWarning:
Stochastic Optimizer: Maximum iterations (20) reached and the optimization hasn't
converged yet.
  % self.max_iter, ConvergenceWarning)
```



```
prediction is [ 9.]
label is 5.0

Predicted Labels for Test Images:  [ 0.  6.  4. ...,  1.  0.  9.]
C:\Users\raven\Anaconda3\lib\site-
packages\sklearn\neural_network\multilayer_perceptron.py:566: UserWarning:
Training interrupted by user.
  warnings.warn("Training interrupted by user.")
C:\Users\raven\Anaconda3\lib\site-
packages\sklearn\neural_network\multilayer_perceptron.py:564: ConvergenceWarning:
Stochastic Optimizer: Maximum iterations (20) reached and the optimization hasn't
converged yet.
  % self.max_iter, ConvergenceWarning)
C:\Users\raven\Anaconda3\lib\site-
packages\sklearn\neural_network\multilayer_perceptron.py:564: ConvergenceWarning:
Stochastic Optimizer: Maximum iterations (20) reached and the optimization hasn't
converged yet.
```

```
   % self.max_iter, ConvergenceWarning)
```

The Cross-Validation score is [ 0.70290942  0.84034202  0.83957594]

```
The Confusion Matrix for Test Data:
[[935   0   6   0   0   5   19   2   13   0]
 [0 1101   6   5   0   2   7   0   14   0]
 [20   7 880   23   13   2   22   24   37   4]
 [6   1   34 886   1   25   5   22   21   9]
 [3   3   5   1 871   0   16   2   8   73]
 [23   3   11   76   9 662   19   14   62   13]
 [31   5   8   0   15   11 876   0   12   0]
 [2   23   24   7   11   2   3 919   5   32]
 [13   14   19   48   13   25   15   13 791   23]
 [16   11   3   15   73   5   4   34   7 841]]
```
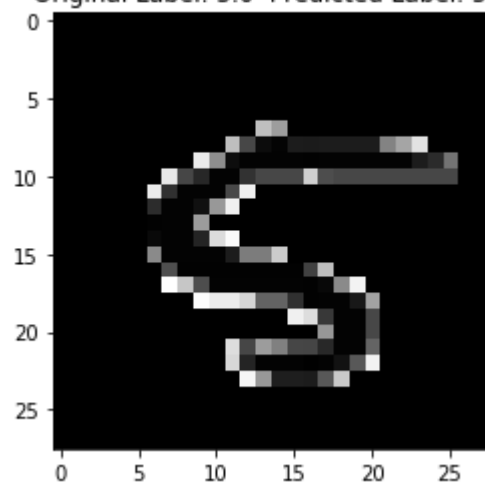


Confusion Matrix for Test Data
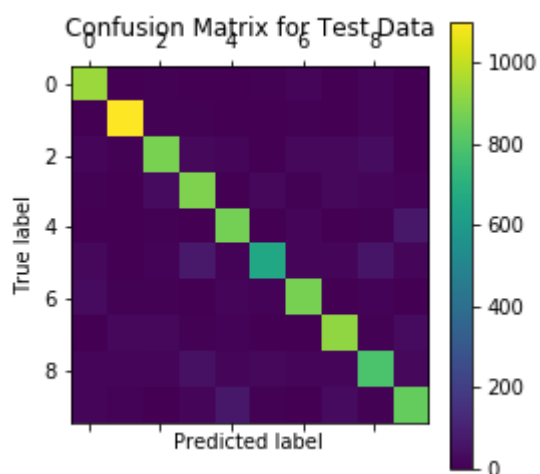
The test error for Linear Classifier is 22859.0



Original Label: 6.0  Predicted Label: 6.0
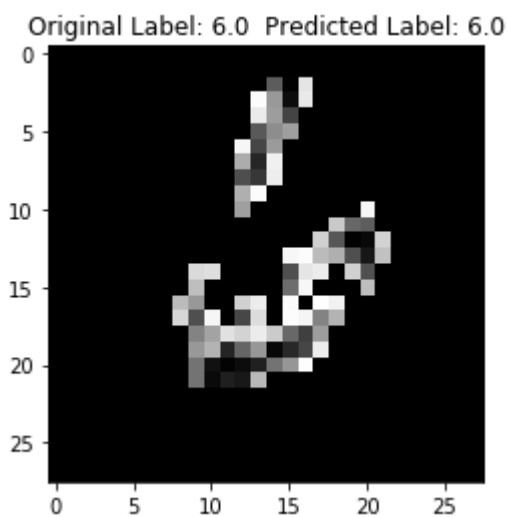
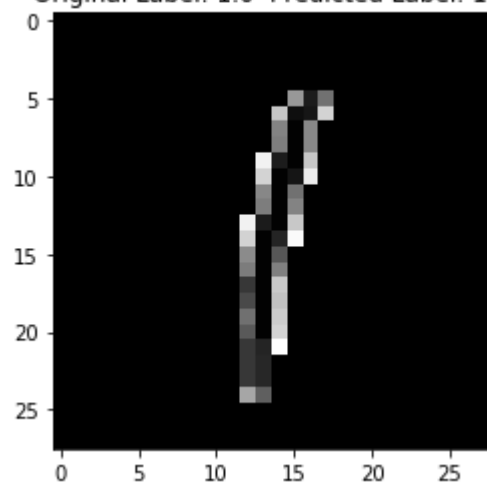Original Label: 5.0   Predicted Label: 5.0
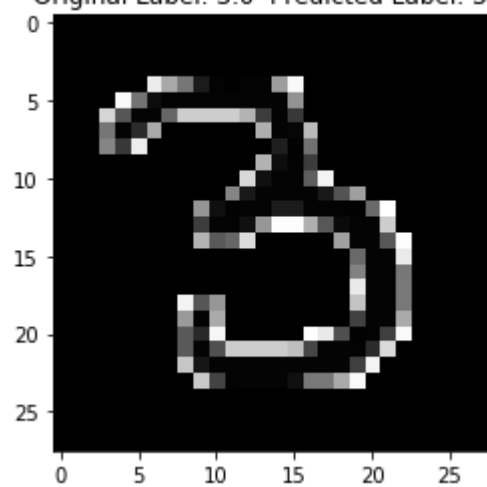


Original Label: 7.0   Predicted Label: 7.0
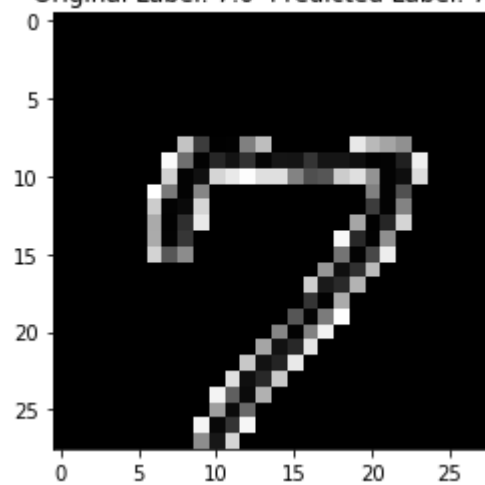


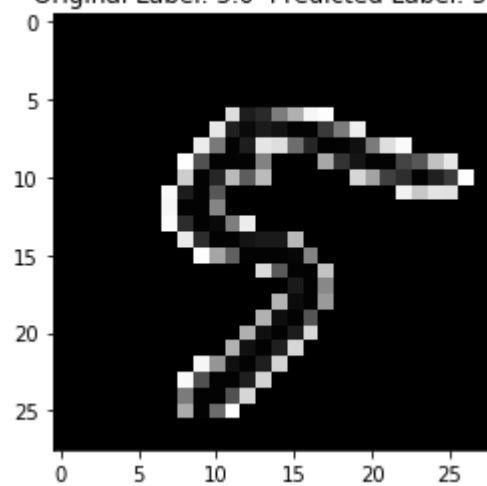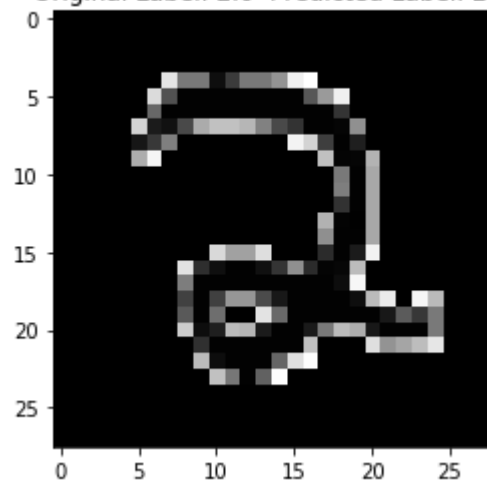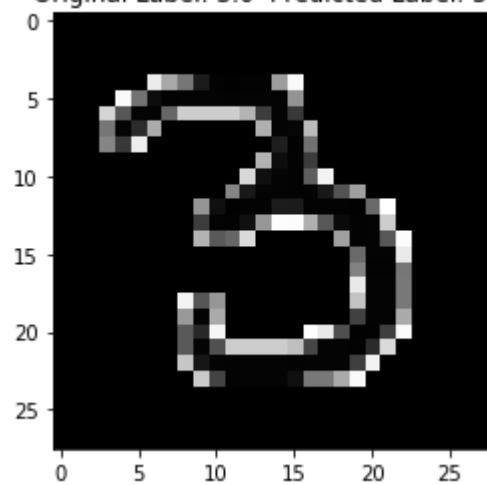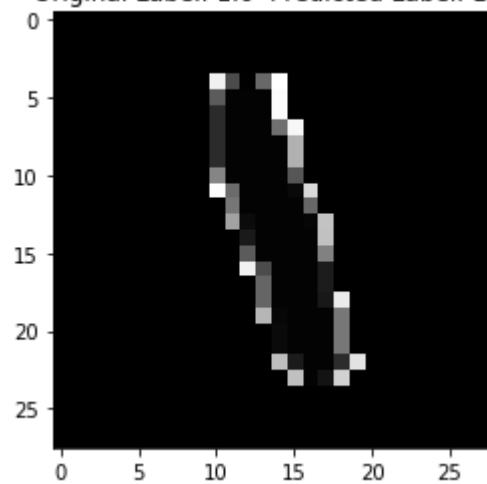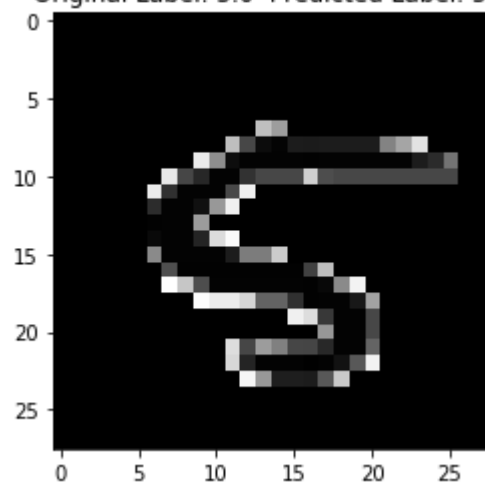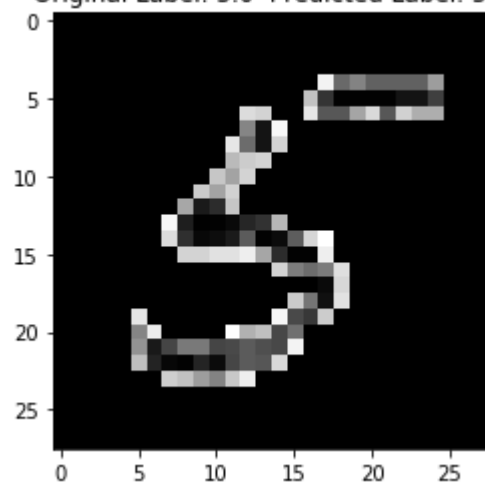Original Label: 2.0   Predicted Label: 2.0
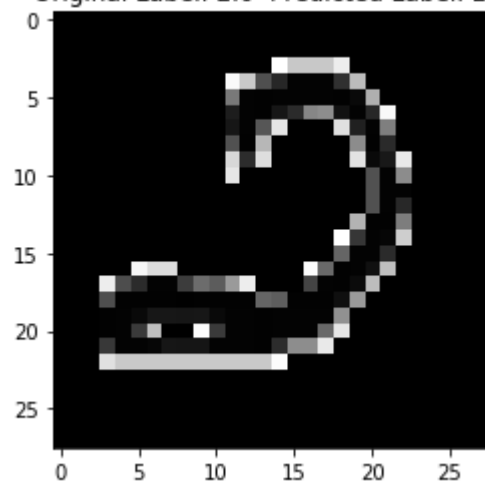
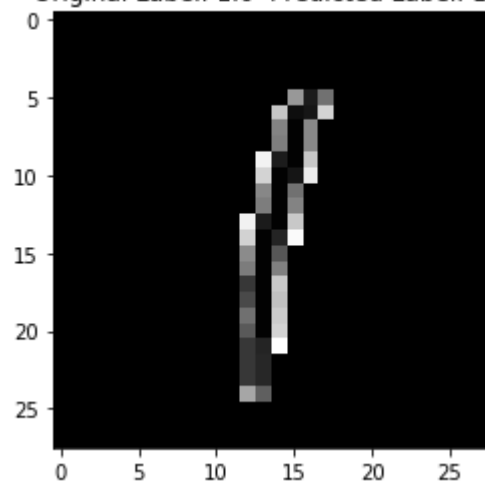Original Label: 1.0  Predicted Label: 1.0

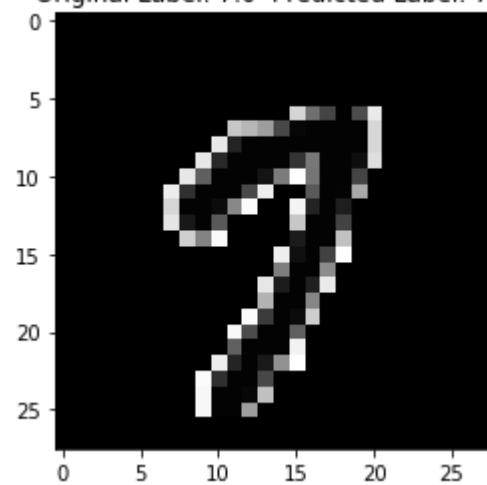Original Label: 3.0  Predicted Label: 3.0

Original Label: 5.0  Predicted Label: 5.0

Original Label: 2.0  Predicted Label: 2.0
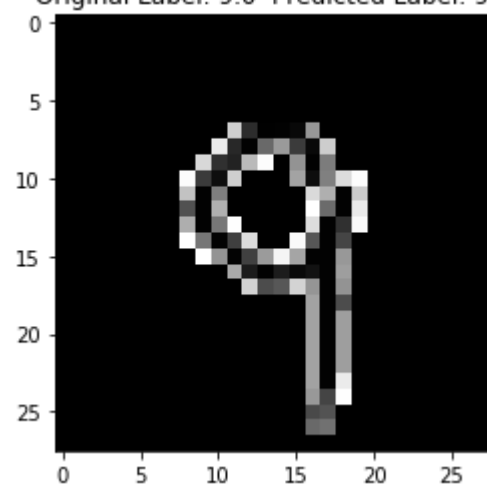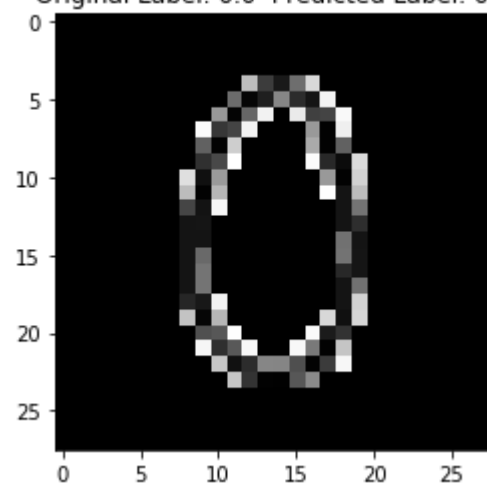


Original Label: 3.0  Predicted Label: 3.0



Original Label: 1.0  Predicted Label: 1.0

Original Label: 5.0  Predicted Label: 5.0



Original Label: 5.0  Predicted Label: 5.0



Original Label: 1.0  Predicted Label: 1.0

**Original Label: 7.0  Predicted Label: 7.0**



**Original Label: 9.0  Predicted Label: 9.0**



**Original Label: 0.0  Predicted Label: 0.0**

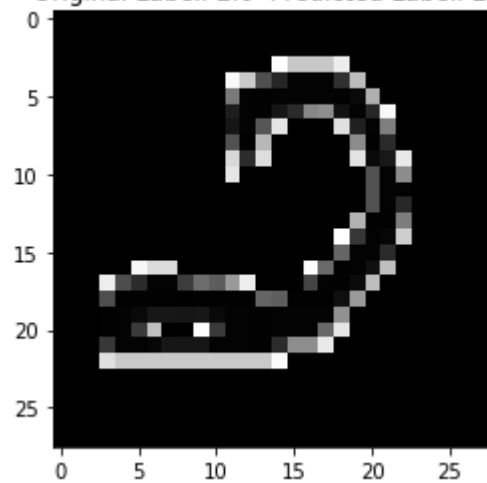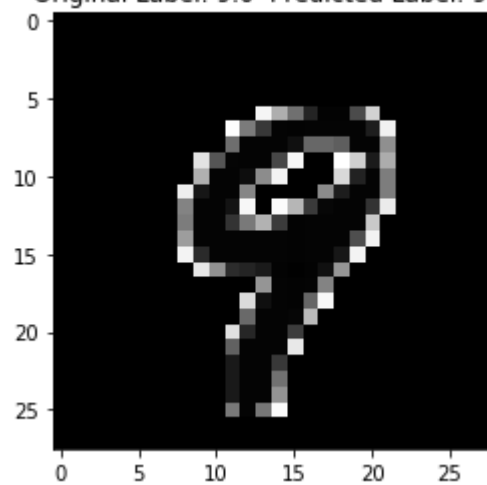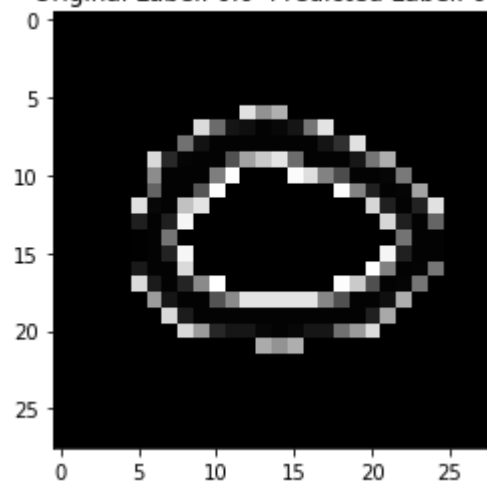Original Label: 2.0  Predicted Label: 2.0



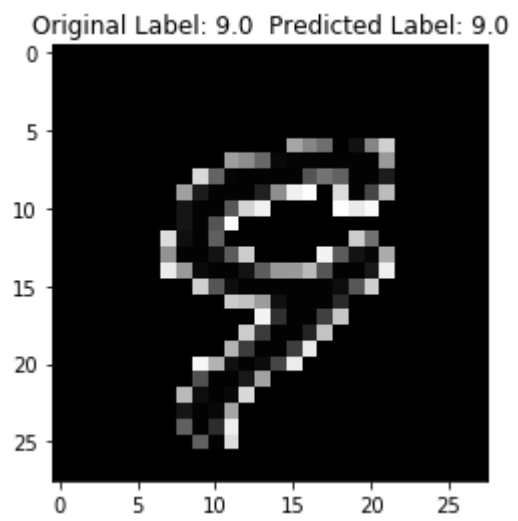Original Label: 9.0  Predicted Label: 9.0



Original Label: 0.0  Predicted Label: 0.0

Original Label: 9.0  Predicted Label: 9.0

The Models Accuracy is 0.8762

In [2]: