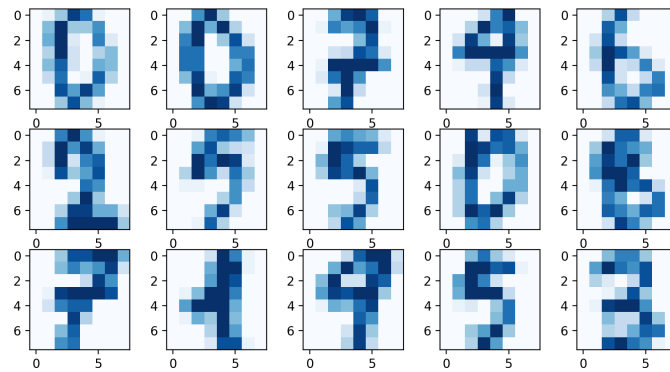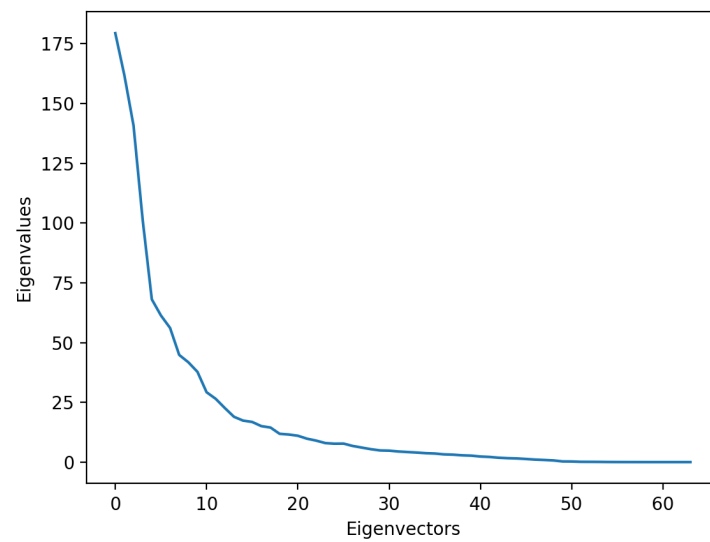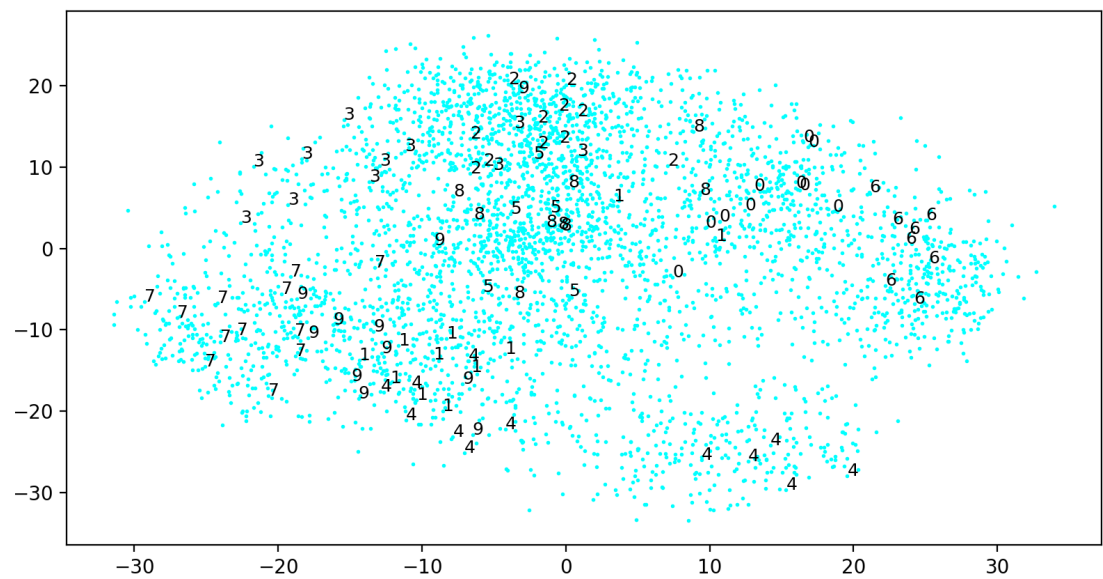**Homework #6 – Brian King**

1. Visual Imagery of first 15 objects of training data.
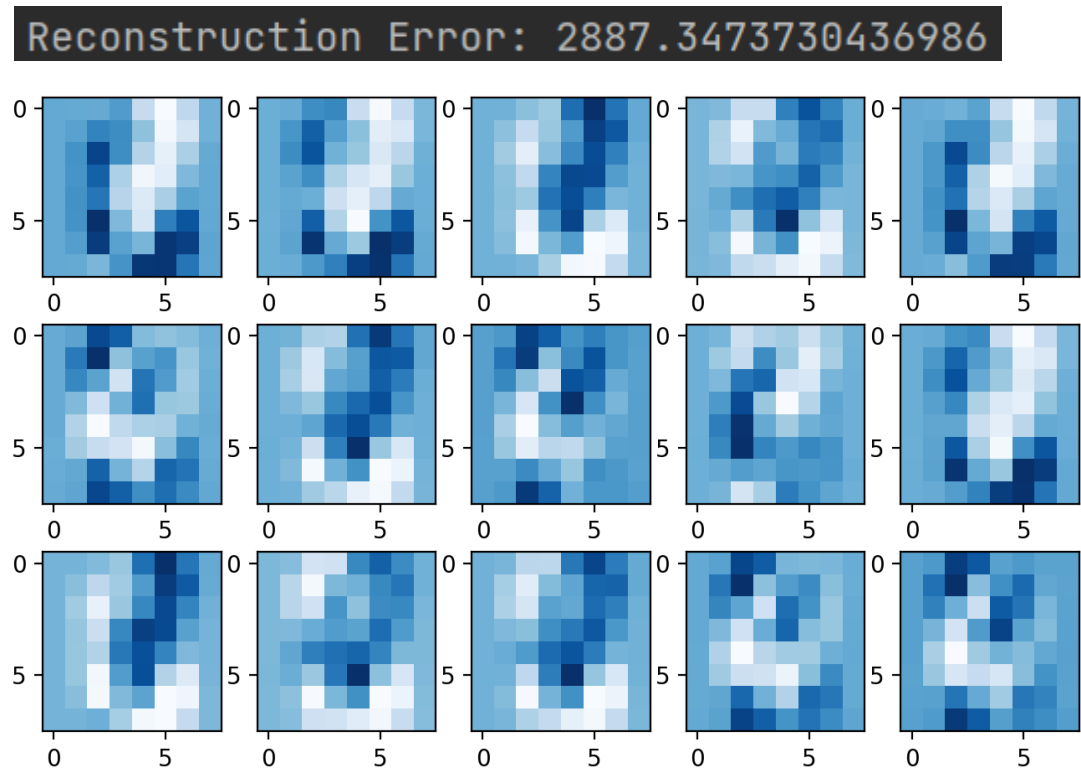

2. Scree plot for training data.

3. Plot of two largest eigenvectors

4. Reconstructed digit images.

Reconstruction Error: 2887.3473730436986

5. Trained nearest mean classifier results on test data. These results match the graph from question 3, as the numbers with the highest accuracies have more discernable clusters when using feature extraction.

```
Using all 64 Dimensions:
Accuracy for number 0 is 98.31460674157303%
Accuracy for number 1 is 74.72527472527473%
Accuracy for number 2 is 88.70056497175142%
Accuracy for number 3 is 88.52459016393442%
Accuracy for number 4 is 91.16022099447514%
Accuracy for number 5 is 93.95604395604396%
Accuracy for number 6 is 96.68508287292818%
Accuracy for number 7 is 94.97206703910615%
Accuracy for number 8 is 79.3103448275862%
Accuracy for number 9 is 87.22222222222223%

Using feature extraction:
Accuracy for number 0 is 82.58426966292134%
Accuracy for number 1 is 61.53846153846154%
Accuracy for number 2 is 60.451977401129945%
Accuracy for number 3 is 63.387978142076506%
Accuracy for number 4 is 85.6353591160221%
Accuracy for number 5 is 10.989010989010989%
Accuracy for number 6 is 85.6353591160221%
Accuracy for number 7 is 83.24022346368714%
Accuracy for number 8 is 24.137931034482758%
Accuracy for number 9 is 10.555555555555555%
```