Report for PA1

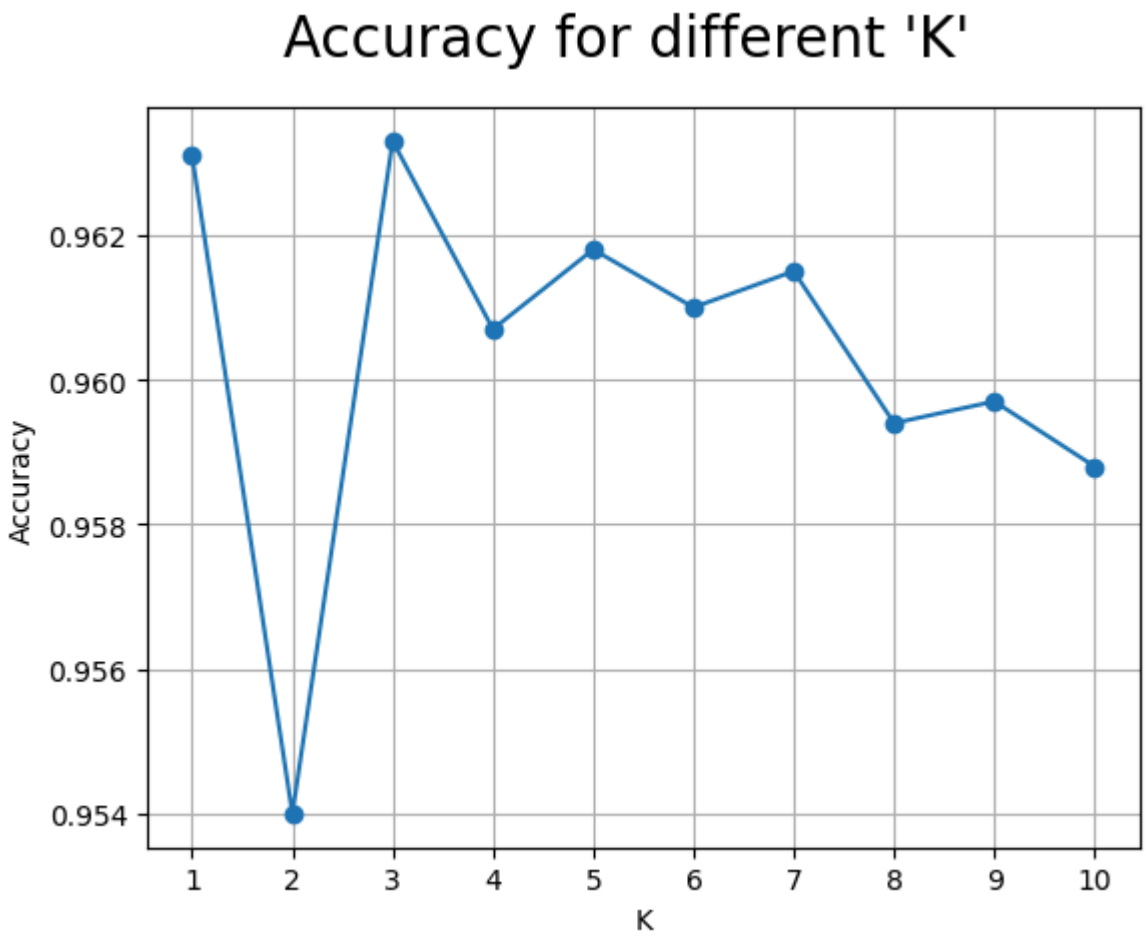
Load Data

The MNIST dataset is loaded from `tf.keras.datasets.mnist`.

Task 1: KNN

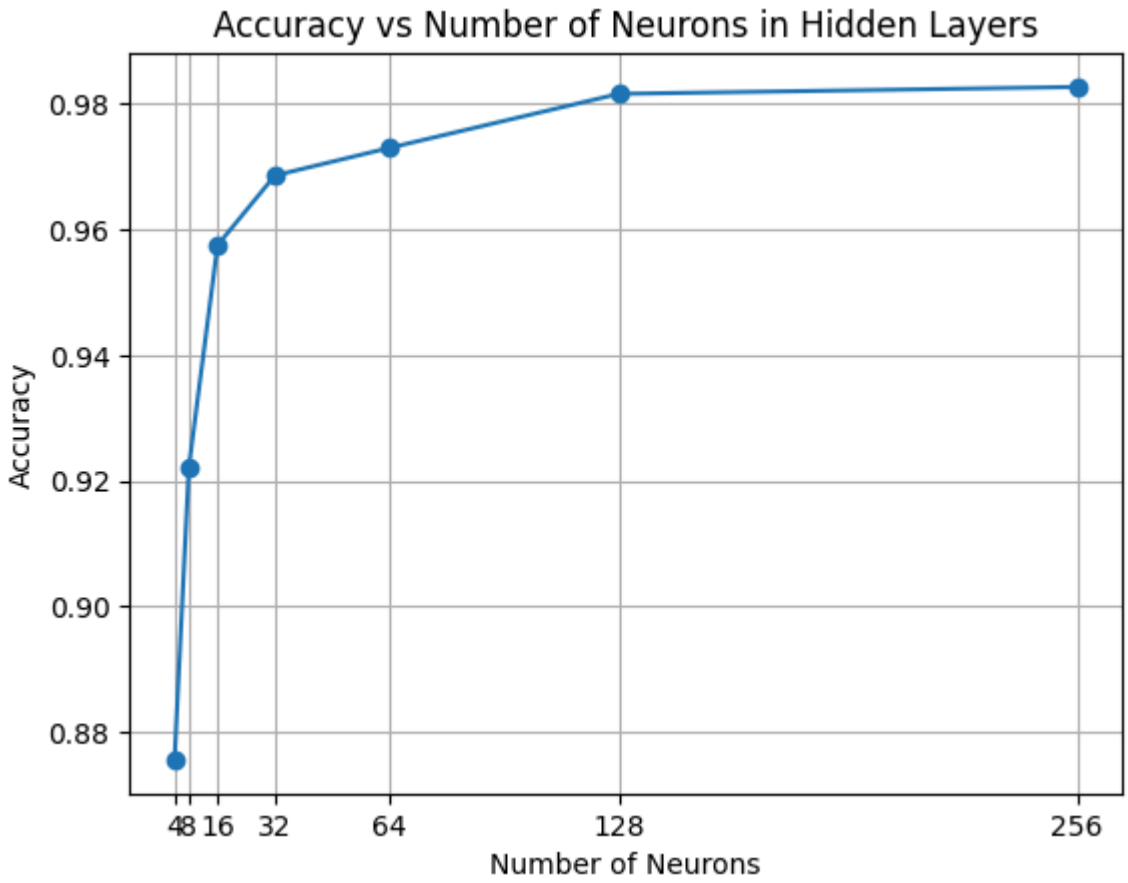
The KNeighborsClassifier is applied to find the KNN. The parameter `n_neighbors` is set to `k` which can be modified in for loop. The parameter `weights` is set to solve the tie problem.

The accuracy if find the nearest neighbor as reference is **0.9631**. The curve of accuracy versus K from 1 to 10 is shown below.



Task 2: MLP

Sequential model is applied to construct MLP. The accuracy and number of neurons curve is shown below.The highest accuracy(256 neurons) is **0.9827**.



Task 3: CNN

Due to the image size of 28×28 instead of 32×32, the padding of the first convolutional layer is set to `valid` to align with LeNet model.

The accuracy of LeNet-5 on MNIST is **0.9890999794006348** with test loss **0.042650774121284485**.

Task 4: CAN

For the given 32 channel CAN model, the accuracy is **0.9889**. Other number of channels are also tried and the accuracy is as follows.

```
Accuracy with 8 channels: 0.9741
Accuracy with 16 channels: 0.9859
Accuracy with 32 channels: 0.9889
Accuracy with 64 channels: 0.9938
Accuracy with 128 channels: 0.9943
```