# Assignment-2

Group Members
Neeraj Boddeda (20CS30012)

Mohan Kishore(20CS30014)

## Report for Question-1

1) The given dataset doesn't contain any categorical features, so no label encoding is required.

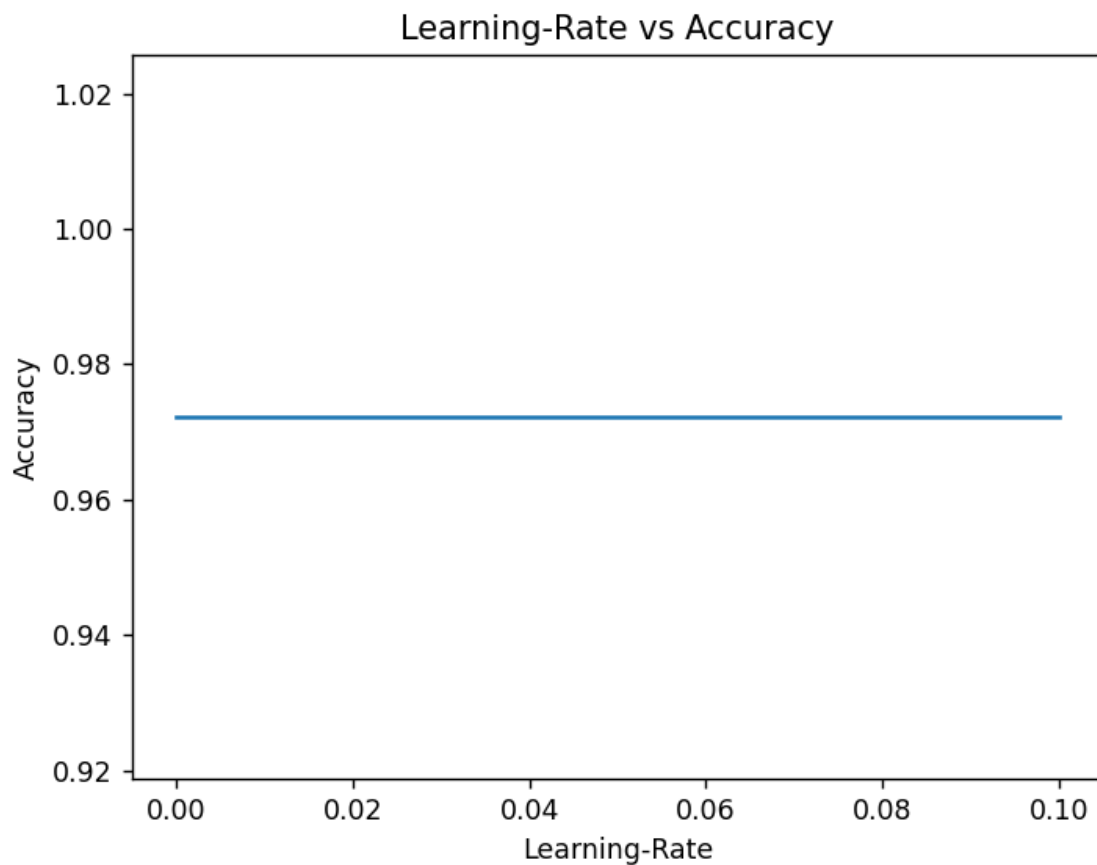2) The accuracies for each type of SVM Classifiers are as follows :

```
Accuracy for binary SVM classifier with Linear Kernel is :
 0.9166666666666666
Accuracy for binary SVM classifier with Radial Basis Function as Kernel is :
 0.9722222222222222
Accuracy for binary SVM classifier with Quadratic as Kernel is :
 0.8888888888888888
```

**NOTE:** The results may change each time we run the code as every time the data set is randomly split into train and test data.

3) MLP classifiers are built with learning rate as 0.001 and batch size 32 and stochastic gradient descent optimiser is used and the accuracies for different parameters are found as follows

```
With 1 hidden layer with 16 nodes :  0.9722222222222222

With  2 hidden layers with 256 and 16 nodes respectively :  0.9166666666666666
```

4) The best accuracy model from above MLP classifiers give same accuracy for different learning rate as 0.1, 0.01, 0.001, 0.0001 and 0.00001 for the given dataset and the graph looks like a straight line as the difference in accuracies is very less



5) The forward selection method on the best model found in part 3 gives the best set of features as follows

```
The best set of features obtained after using forward selection method on best MLP classifier obtained
Alcohol
Ash
Flavanoids
```

6) Ensemble learning (max voting technique) using SVM with quadratic, SVM with radial basis function and the best accuracy model from part 3 has the accuracy:

0.9722222222222222