# Assignment3.R

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2021-03-07

```
#Assignment 3 Fundamentals of Machine Learning
#Data comes From UniversalBank.csv

library(utils)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(class)
library(caret)
```

```
## Loading required package: lattice

## Loading required package: ggplot2
```

```
library(FNN)
```

```
##
## Attaching package: 'FNN'

## The following objects are masked from 'package:class':
##
##     knn, knn.cv
```

```
library(e1071)
library(reshape2)

WD<-setwd("C:/Users/Jason/Documents/MSBA/Fundamentals for Machine Learning/Assignment2")
Bank<-read.csv("UniversalBank.csv", header = TRUE)
```

```r
Bank2 <- Bank[, c(10,13,14)] #Keeping Personal Loan, CC & Online

Bank2$CC_and_Online <- ifelse(Bank2$CreditCard == 1 & Bank2$Online ==1, 1, 0)

set.seed(123)
Train_Index = createDataPartition(Bank2$Personal.Loan, p=0.6, list = FALSE)
Train_Data = Bank2[Train_Index,]
Test_Data = Bank2[-Train_Index,]


PLbyCC_and_online <- table(Train_Data$CC_and_Online, Train_Data$Personal.Loan)
PLbyOnline <-table(Train_Data$Online, Train_Data$Personal.Loan)
PLbyCC <- table(Train_Data$CreditCard, Train_Data$Personal.Loan)

PLbyCC_and_online
```

```
##
##        0    1
##   0 2247  221
##   1  475   57
```

```r
PLbyOnline
```

```
##
##        0    1
##   0 1102   99
##   1 1620  179
```

```r
PLbyCC
```

```
##
##        0    1
##   0 1930  187
##   1  792   91
```

```r
57/(57+221) #P(Online=1 & CC=1 | P=1)
```

```
## [1] 0.205036
```

```r
179/(179+99) #P(Online=1 | P=1)
```

```
## [1] 0.6438849
```

```r
91/(187+91) #P(CC=1 | P=1)
```

```
## [1] 0.3273381
```

```r
(221+57)/(3000) #P(PL=1)
```

```
## [1] 0.09266667
```

```r
792/(792+1930) #P(CC=1 | P=0)
```

```
## [1] 0.2909625
```

```r
1620/(1620+1102) #P(Online=1 | P=0)
```

```
## [1] 0.5951506
```

```r
(475+2247)/3000 #P(P=0)
```

```
## [1] 0.9073333
```

```r
PLnb<-naiveBayes(Personal.Loan ~., data = Train_Data)
nbpred <- predict(PLnb, Train_Data)
#NBtable<-table(nbpred, Train_Data$Personal.Loan)
#not sure why this won't work?  Feedback on this would be greatly appreciated
```