Question 1

```
serial_no<-seq(1:8)
x<-seq(145,185,5)
lower_limit<-seq(145,180,5)
f<-c(4,6,28,58,64,30,5,5)
n<-sum(f)
cf<-cumsum(f)
class_interval<-c("145 - 150","150 - 155","155 - 160","160 - 165","165 - 170",
                  "170 - 175","175 - 180","180 - 185")
df<-data.frame(sno,class_interval,lower_limit,f,cf)
df
s1<-min(which(cf>=n/2))
f1<-f[s1]
h<-5
c<-cf[s1-1]
L<-x[s1]
median<-L+((n/2 - c)/f1)*h
median
```

```
> df
  sno class_interval lower_limit  f  cf
1   1       145 - 150         145  4   4
2   2       150 - 155         150  6  10
3   3       155 - 160         155 28  38
4   4       160 - 165         160 58  96
5   5       165 - 170         165 64 160
6   6       170 - 175         170 30 190
7   7       175 - 180         175  5 195
8   8       180 - 185         180  5 200
> s1<-min(which(cf>=n/2))
> f1<-f[s1]
> h<-5
> c<-cf[s1-1]
> L<-x[s1]
> median<-L+((n/2 - c)/f1)*h
> median
[1] 165.3125
```

Question 2

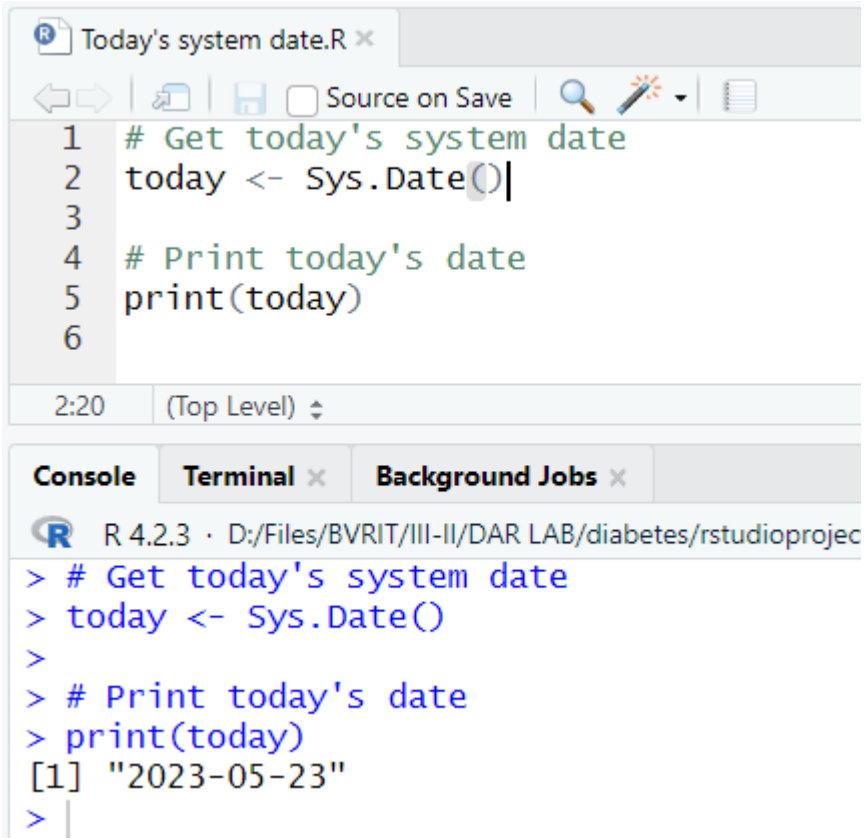
```
# install below packages if its not installed

#install.packages("caTools")

#install.packages("caret")


library(e1071)

library(caTools)

library(caret)

data(iris)

str(iris)

split <- sample.split(iris,SplitRatio=0.7)

train_cl <- subset(iris,split=="TRUE")

test_cl <- subset(iris,split=="FALSE")

train_scale <- scale(train_cl[,1:4])

test_scale <- scale(test_cl[,1:4])

set.seed(120)

classifier_cl <- naiveBayes(Species ~ ., data = train_cl)

classifier_cl

y_pred <- predict(classifier_cl,newdata = test_cl)

cm <- table(test_cl$Species, y_pred)

cm

confusionMatrix(cm)
```

OUTPUT:

```
> str(iris)
'data.frame':   150 obs. of  5 variables:
 $ Sepal.Length: num  5.1 4.9 4.7 4.6 5 5.4 4.6 5 4.4 4.9 ...
 $ Sepal.Width : num  3.5 3 3.2 3.1 3.6 3.9 3.4 3.4 2.9 3.1 ...
 $ Petal.Length: num  1.4 1.4 1.3 1.5 1.4 1.7 1.4 1.5 1.4 1.5 ...
 $ Petal.Width : num  0.2 0.2 0.2 0.2 0.2 0.4 0.3 0.2 0.2 0.1 ...
 $ Species     : Factor w/ 3 levels "setosa","versicolor",..: 1 1 1 1 1 1 1 1 1 1 ...
```

```
> classifier_cl

Naive Bayes Classifier for Discrete Predictors

Call:
naiveBayes.default(x = X, y = Y, laplace = laplace)

A-priori probabilities:
Y
    setosa versicolor  virginica
 0.3333333  0.3333333  0.3333333


Conditional probabilities:
            Sepal.Length
Y                [,1]      [,2]
  setosa     4.973333 0.3084257
  versicolor 5.966667 0.4929386
  virginica  6.520000 0.6764002

            Sepal.Width
Y                [,1]      [,2]
  setosa     3.426667 0.3561609
  versicolor 2.776667 0.2712466
  virginica  2.976667 0.3607304

            Petal.Length
Y                [,1]      [,2]
  setosa     1.453333 0.1775957
  versicolor 4.243333 0.4328600
  virginica  5.496667 0.5505379

            Petal.Width
Y                 [,1]       [,2]
  setosa     0.2333333 0.09222661
  versicolor 1.3233333 0.19419743
  virginica  1.9900000 0.27586853

> cm
           y_pred
            setosa versicolor virginica
  setosa         20          0         0
  versicolor      0         19         1
  virginica       0          1        19
> confusionMatrix(cm)
Confusion Matrix and Statistics

           y_pred
            setosa versicolor virginica
  setosa         20          0         0
  versicolor      0         19         1
  virginica       0          1        19

Overall Statistics

               Accuracy : 0.9667
                 95% CI : (0.8847, 0.9959)
    No Information Rate : 0.3333
    P-Value [Acc > NIR] : < 2.2e-16

                  Kappa : 0.95

 Mcnemar's Test P-Value : NA

Statistics by Class:

                     Class: setosa Class: versicolor Class: virginica
Sensitivity                 1.0000            0.9500           0.9500
Specificity                 1.0000            0.9750           0.9750
Pos Pred Value              1.0000            0.9500           0.9500
Neg Pred Value              1.0000            0.9750           0.9750
Prevalence                  0.3333            0.3333           0.3333
Detection Rate              0.3333            0.3167           0.3167
Detection Prevalence        0.3333            0.3333           0.3333
Balanced Accuracy           1.0000            0.9625           0.9625
```

Question 3


Today's system date.R
Source on Save
1 # Get today's system date
2 today <- Sys.Date()
3
4 # Print today's date
5 print(today)
6
2:20
(Top Level)
Console
Terminal
Background Jobs
R 4.2.3 · D:/Files/BVRIT/III-II/DAR LAB/diabetes/rstudioprojec
> # Get today's system date
> today <- Sys.Date()
>
> # Print today's date
> print(today)
[1] "2023-05-23"
>

Question 4

```
# Load the mtcars dataset

data(mtcars)

# Create a boxplot of "mpg" by "cyl"

boxplot(mpg ~ cyl, data = mtcars, xlab = "Miles per Gallon", ylab = "Number of Cylinders")
```