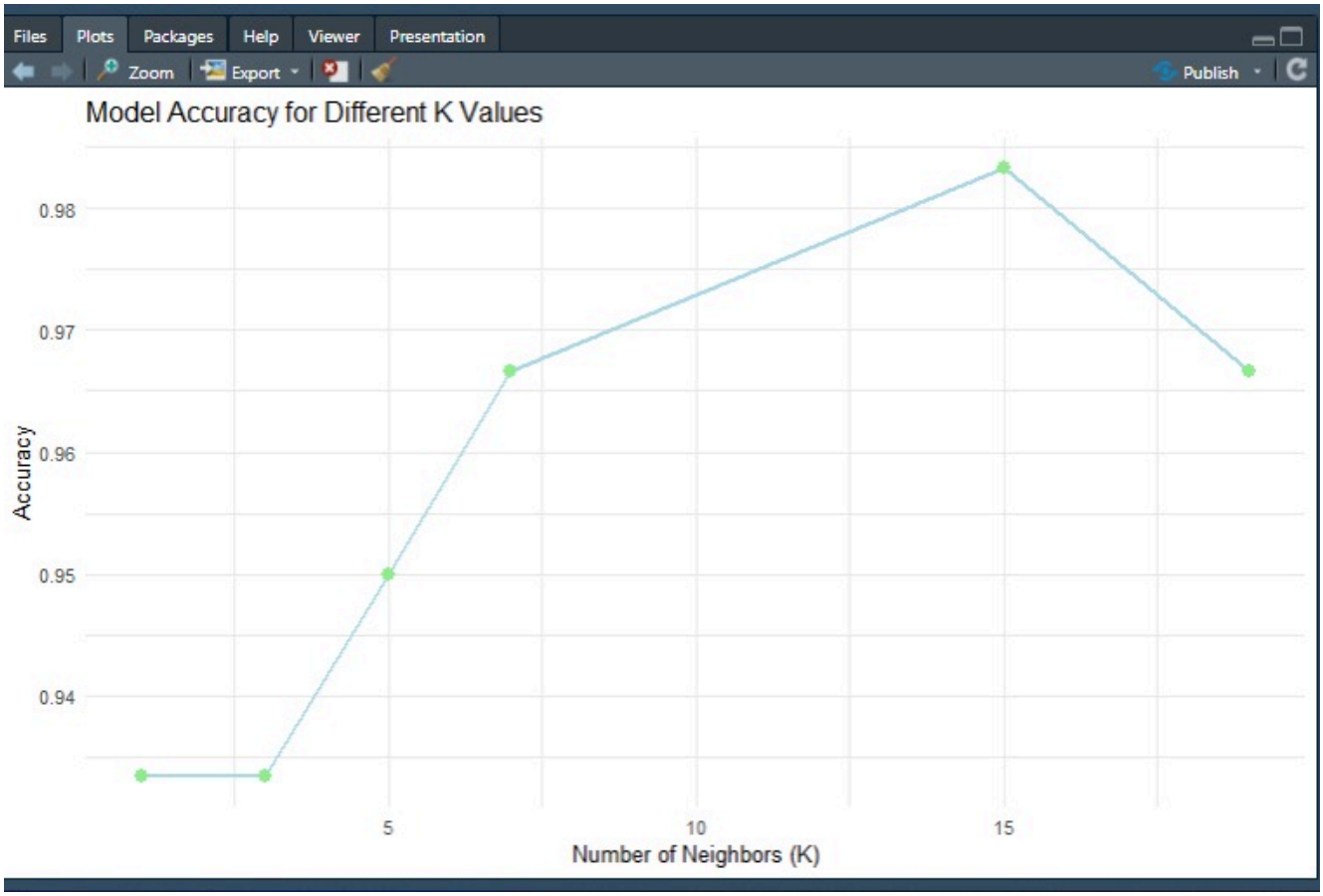
```
data("iris")
View(iris)
str(iris)



install.packages("e1071")
install.packages("caTools")
install.packages("class")



library(e1071)
library(caTools)
library(class)



data(iris)
head(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])
```

```
head(train_scale)
head(test_scale)



# Fitting KNN Model to training dataset
classifier_knn <- knn(train = train_scale,
                      test = test_scale,
                      cl = train_cl$Species,
                      k = 1)
classifier_knn



cm <- table(test_cl$Species, classifier_knn)
cm



misClassError <- mean(classifier_knn != test_cl$Species)
print(paste('Accuracy =', 1-misClassError))

# K = 3
classifier_knn <- knn(train = train_scale,
                      test = test_scale,
                      cl = train_cl$Species,
                      k = 3)
misClassError <- mean(classifier_knn != test_cl$Species)
print(paste('Accuracy =', 1-misClassError))

# K = 5
```

```
classifier_knn <- knn(train = train_scale,
                      test = test_scale,
                      cl = train_cl$Species,
                      k = 5)
misClassError <- mean(classifier_knn != test_cl$Species)
print(paste('Accuracy =', 1-misClassError))

# K = 7
classifier_knn <- knn(train = train_scale,
                      test = test_scale,
                      cl = train_cl$Species,
                      k = 7)
misClassError <- mean(classifier_knn != test_cl$Species)
print(paste('Accuracy =', 1-misClassError))

# K = 15
classifier_knn <- knn(train = train_scale,
                      test = test_scale,
                      cl = train_cl$Species,
                      k = 15)
misClassError <- mean(classifier_knn != test_cl$Species)
print(paste('Accuracy =', 1-misClassError))

# K = 19
classifier_knn <- knn(train = train_scale,
                      test = test_scale,
                      cl = train_cl$Species,
                      k = 19)
```

```
misClassError <- mean(classifier_knn != test_cl$Species)
print(paste('Accuracy =', 1-misClassError))

library(ggplot2)

# Data preparation
k_values <- c(1, 3, 5, 7, 15, 19)

# Calculate accuracy for each k value
accuracy_values <- sapply(k_values, function(k) {
  classifier_knn <- knn(train = train_scale,
                        test = test_scale,
                        cl = train_cl$Species,
                        k = k)
  1 - mean(classifier_knn != test_cl$Species)
})

# Create a data frame for plotting
accuracy_data <- data.frame(K = k_values, Accuracy = accuracy_values)

# Plotting
ggplot(accuracy_data, aes(x = K, y = Accuracy)) +
  geom_line(color = "lightblue", size = 1) +
  geom_point(color = "lightgreen", size = 3) +
  labs(title = "Model Accuracy for Different K Values",
       x = "Number of Neighbors (K)",
       y = "Accuracy") +
  theme_minimal()
```




```
> # Fitting KNN Model to training dataset
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 1)
> classifier_knn
 [1] setosa     setosa     setosa     setosa     setosa     setosa     setosa     setosa     setosa
[10] setosa     setosa     setosa     setosa     setosa     setosa     setosa     setosa     setosa
[19] setosa     setosa     versicolor virginica  versicolor versicolor versicolor versicolor versicolor
[28] versicolor virginica  versicolor versicolor versicolor versicolor versicolor versicolor versicolor
[37] versicolor versicolor versicolor versicolor virginica  virginica  virginica  virginica  virginica
[46] virginica  virginica  versicolor virginica  virginica  virginica  virginica  virginica  versicolor
[55] virginica  virginica  virginica  virginica  virginica  virginica
Levels: setosa versicolor virginica
>
>
> cm <- table(test_cl$Species, classifier_knn)
> cm
            classifier_knn
             setosa versicolor virginica
  setosa         20          0         0
  versicolor      0         18         2
  virginica       0          2        18
>
>
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.933333333333333"
> # K = 3
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 3)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.933333333333333"
>
> # K = 5
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 5)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.95"
```

```
The downloaded binary packages are in
        C:\Users\Student\AppData\Local\Temp\RtmpMHtCrL\downloaded_packages
>
>
> library(e1071)
> library(caTools)
> library(class)
>
>
> data(iris)
> head(iris)
  Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2  setosa
2          4.9         3.0          1.4         0.2  setosa
3          4.7         3.2          1.3         0.2  setosa
4          4.6         3.1          1.5         0.2  setosa
5          5.0         3.6          1.4         0.2  setosa
6          5.4         3.9          1.7         0.4  setosa
> 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])
>
>
> head(train_scale)
  Sepal.Length Sepal.Width Petal.Length Petal.Width
2   -1.0878207 -0.05556229    -1.316362   -1.333546
3   -1.3257402  0.39903828    -1.372617   -1.333546
4   -1.4446999  0.17173799    -1.260107   -1.333546
7   -1.4446999  0.85363885    -1.316362   -1.198237
8   -0.9688609  0.85363885    -1.260107   -1.333546
9   -1.6826194 -0.28286258    -1.316362   -1.333546
> head(test_scale)
   Sepal.Length Sepal.Width Petal.Length Petal.Width
1    -0.9664683  0.91775243    -1.354158   -1.272374
5    -1.0893245  1.15107932    -1.354158   -1.272374
6    -0.5978999  1.85105998    -1.183823   -1.022889
10   -1.2121806 -0.01555513    -1.297380   -1.397117
11   -0.5978999  1.38440621    -1.297380   -1.272374
15   -0.1064753  2.08438687    -1.467714   -1.272374
> # Fitting KNN Model to training dataset
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
```

```
> # K = 7
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 7)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.966666666666667"
>
> # K = 15
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 15)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.983333333333333"
>
> # K = 19
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 19)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.966666666666667"
> # K = 3
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 3)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.933333333333333"
>
> # K = 5
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 5)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.95"
>
> # K = 7
> classifier_knn <- knn(train = train_scale,
+                       test = test_scale,
+                       cl = train_cl$Species,
+                       k = 7)
> misClassError <- mean(classifier_knn != test_cl$Species)
> print(paste('Accuracy =', 1-misClassError))
[1] "Accuracy = 0.966666666666667"
```