EX.NO: 8 **REGISTER NO: 210701271**

DATE:

IMPLEMENT SVM/DECISION TREE CLASSIFICATION TECHNIQUES AIM:

To implement SVM/Decision tree classification techniques.

PROGRAM CODE:

SVM IN R:

```
# Install and load the e1071 package (if not already installed)
install.packages("e1071")  library(e1071)  # Load the iris
dataset
data(iris)
# Inspect the first few rows of the dataset  head(iris)
# Split the data into training (70%) and testing (30%) sets  set.seed(123)
# For reproducibility
sample_indices <- sample(1:nrow(iris), 0.7 * nrow(iris))
train_data <- iris[sample_indices, ]  test_data <- iris[-
sample_indices, ]
# Fit the SVM model
svm_model <- svm(Species ~ ., data = train_data, kernel = "radial")
# Print the summary of the model
summary(svm_model)
# Predict the test set
predictions <- predict(svm_model, newdata = test_data)
# Evaluate the model's performance
confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species)
print(confusion_matrix)  # Calculate accuracy
accuracy <- sum(diag(confusion_matrix)) /
sum(confusion_matrix)  cat("Accuracy:", accuracy * 100, "%\n")
```

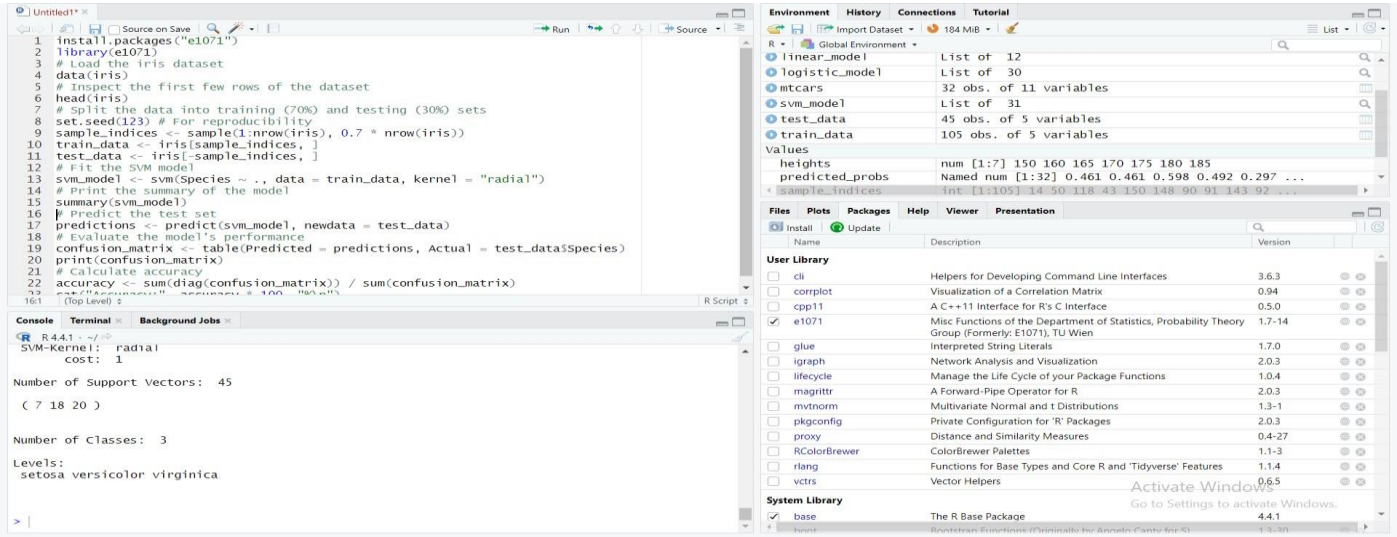
Decision tree in R:

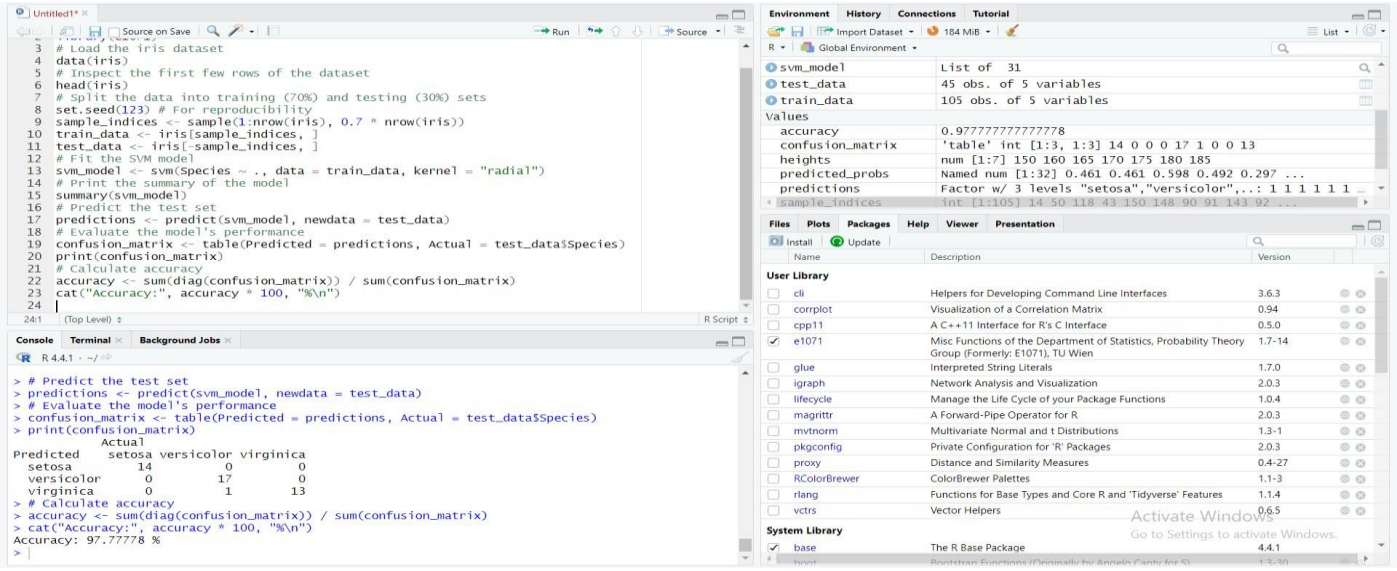
```
# Install and load the rpart package (if not already installed)
install.packages("rpart")  library(rpart)
# Load the iris dataset
data(iris)
# Split the data into training (70%) and testing (30%) sets  set.seed(123)
# For reproducibility
sample_indices <- sample(1:nrow(iris), 0.7 * nrow(iris))
train_data <- iris[sample_indices, ]  test_data <- iris[-
sample_indices, ]  # Fit the Decision Tree model
tree_model <- rpart(Species ~ ., data = train_data, method = "class")
# Print the summary of the model
summary(tree_model)  #
Plot the Decision Tree
plot(tree_model)
text(tree_model, pretty = 0)  #
Predict the test set
```

```
predictions <- predict(tree_model, newdata = test_data, type = "class")
# Evaluate the model's performance
confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species)
print(confusion_matrix)  # Calculate accuracy
accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
cat("Accuracy:", accuracy * 100, "%\n")
```

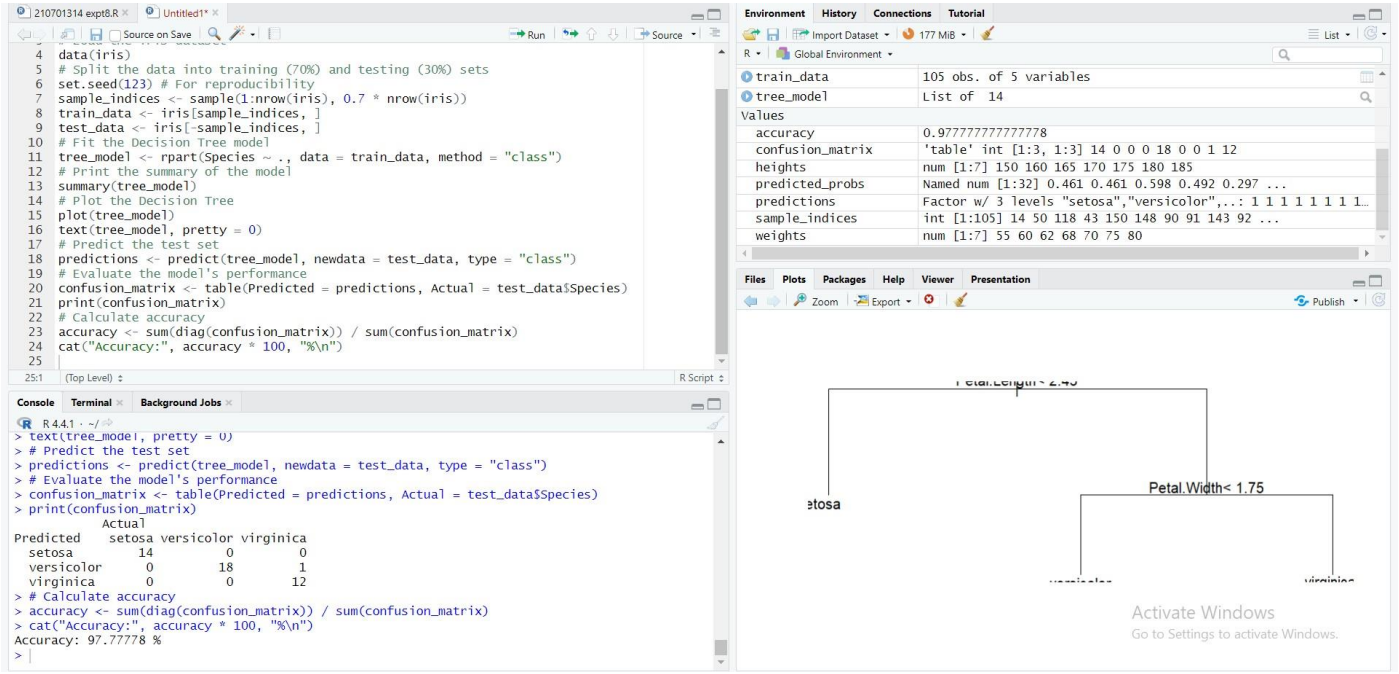
OUTPUT:

SVM in R:





Decision Tree in R:



```
data(iris)
# Split the data into training (70%) and testing (30%) sets
set.seed(123) # For reproducibility
sample_indices <- sample(1:nrow(iris), 0.7 * nrow(iris))
train_data <- iris[sample_indices, ]
test_data <- iris[-sample_indices, ]
# Fit the Decision Tree model
tree_model <- rpart(Species ~ ., data = train_data, method = "class")
# Print the summary of the model
summary(tree_model)
# Plot the Decision Tree
plot(tree_model)
text(tree_model, pretty = 0)
# Predict the test set
predictions <- predict(tree_model, newdata = test_data, type = "class")
# Evaluate the model's performance
confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species)
print(confusion_matrix)
# Calculate accuracy
accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
cat("Accuracy:", accuracy * 100, "%\n")
```

```
> text(tree_model, pretty = 0)
> # Predict the test set
> predictions <- predict(tree_model, newdata = test_data, type = "class")
> # Evaluate the model's performance
> confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species)
> print(confusion_matrix)
            Actual
Predicted    setosa versicolor virginica
  setosa         14          0         0
  versicolor      0         18         1
  virginica       0          0        12
> # Calculate accuracy
> accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
> cat("Accuracy:", accuracy * 100, "%\n")
Accuracy: 97.77778 %
>
```

train_data	105 obs. of 5 variables
tree_model	List of 14
Values	
accuracy	0.977777777777778
confusion_matrix	'table' int [1:3, 1:3] 14 0 0 0 18 0 0 1 12
heights	num [1:7] 150 160 165 170 175 180 185
predicted_probs	Named num [1:32] 0.461 0.461 0.598 0.492 0.297 ...
predictions	Factor w/ 3 levels "setosa","versicolor",..: 1 1 1 1 1 1 1 1...
sample_indices	int [1:105] 14 50 118 43 150 148 90 91 143 92 ...
weights	num [1:7] 55 60 62 68 70 75 80

RESULT:

Thus the implementation of SVM/Decision tree classification techniques done successfully.