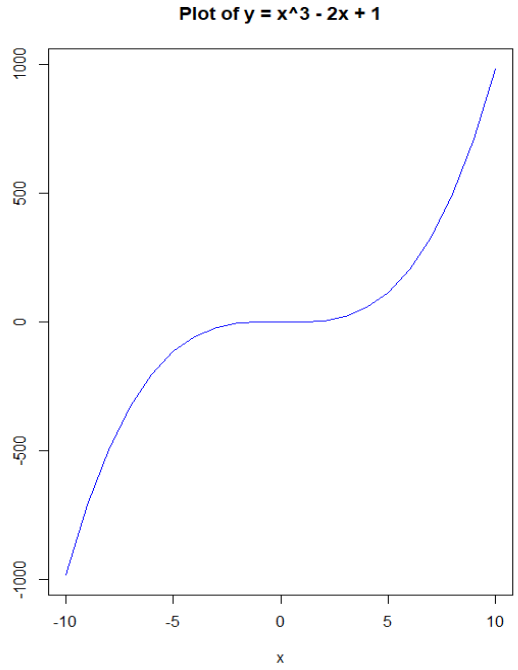
ANS:

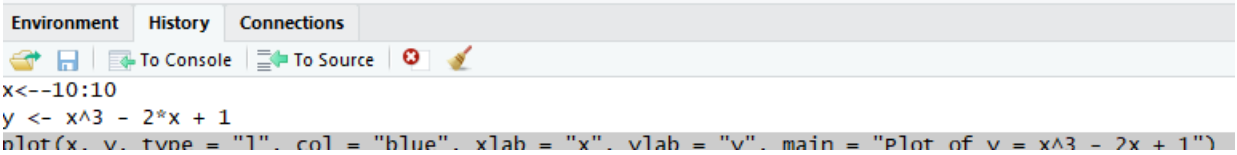
Q1.

```
> x<--10:10
> y <- x^3 - 2*x + 1
> plot(x, y, type = "l", col = "blue", xlab = "x", ylab = "y", main = "Plot of y =
x^3 - 2x + 1")
>
```

In summary, by charting the function y = x3 - 2x + 1 throughout the range of x values from -10 to 10, this code generates a visual representation of the function. The generated plot illustrates how, using the specified mathematical function, the y values change in relation to the x values.



History



Q2:

```
> euclidean_distance <- sqrt(sum((x - y)^2))
>
> dot_product <- sum(x * y)
>
```

To calculate the *Euclidean distance* and *dot product* of two vectors `x` and `y` in R, we can use:

1. **euclidean_distance <- sqrt(sum((x - y)^2))**

This calculates the Euclidean distance between vectors `x` and `y` by taking the square root of the sum of the squared differences between corresponding elements of the two vectors.

2. **dot_product <- sum(x * y)**

This calculates the dot product of vectors `x` and `y` by taking the element-wise product of the vectors and then summing the results.

History

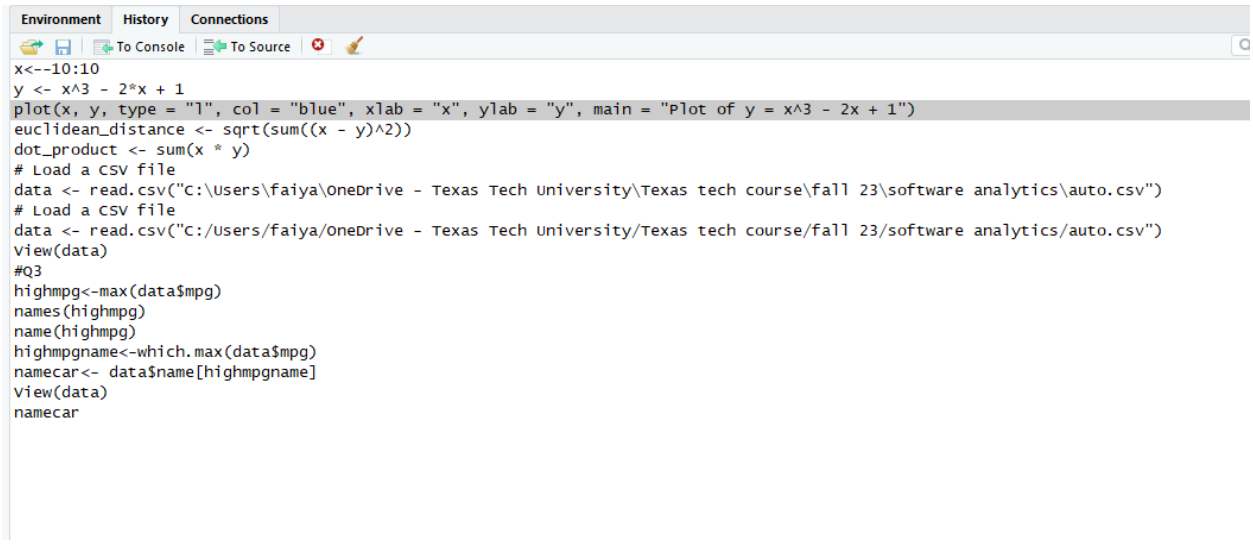
```
x<--10:10
y <- x^3 - 2*x + 1
plot(x, y, type = "l", col = "blue", xlab = "x", ylab = "y", main =
    "Plot of y = x^3 - 2x + 1")
euclidean_distance <- sqrt(sum((x - y)^2))
dot_product <- sum(x * y)
```

Q3:

```
> highmpgname<-which.max(data$mpg)
> namecar<- data$name[highmpgname]
> View(data)
> namecar
[1] mazda glc
```

We can find the highest mpg as **mazda glc** by doing the code analysis.

History

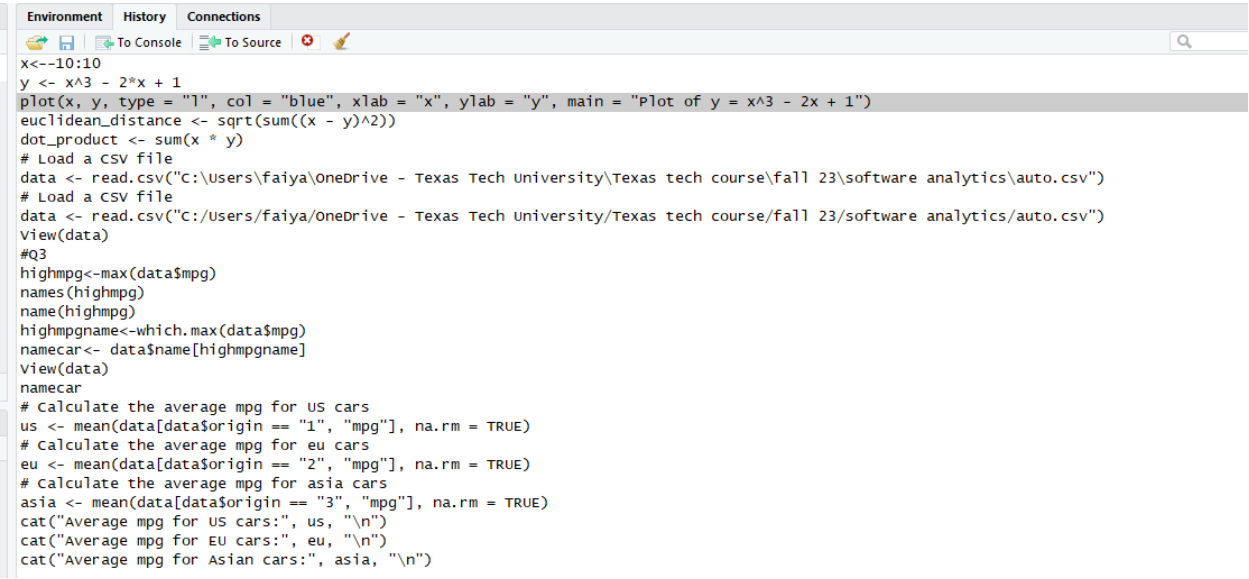


Q4:

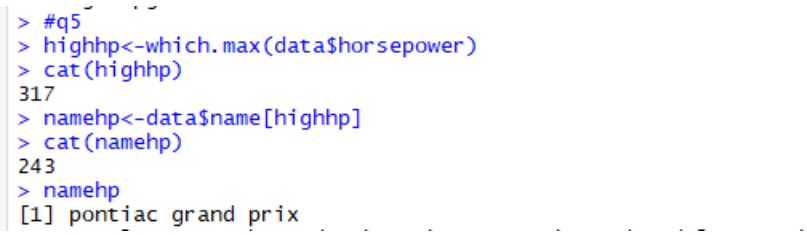
```
> # Calculate the average mpg for US cars
> us <- mean(data[data$origin == "1", "mpg"], na.rm = TRUE)
> # Calculate the average mpg for eu cars
> eu <- mean(data[data$origin == "2", "mpg"], na.rm = TRUE)
> # Calculate the average mpg for asia cars
> asia <- mean(data[data$origin == "3", "mpg"], na.rm = TRUE)
> cat("Average mpg for US cars:", us, "\n")
Average mpg for US cars: 20.03347
> cat("Average mpg for EU cars:", eu, "\n")
Average mpg for EU cars: 27.60294
> cat("Average mpg for Asian cars:", asia, "\n")
Average mpg for Asian cars: 30.45063
```

The average car mpg for US, EU & Asia are 20.03347, 27.60294 & 30.45063. So it confirms Asian cars are more fuel efficient because 30.45063 mpg is higher than the other competitors.

History



Q5;



From the analysis, Pontiac grand prix has the highest horsepower.

History

```
Environment | History | Connections
To Console | To Source
x<--10:10
y <- x^3 - 2*x + 1
plot(x, y, type = "l", col = "blue", xlab = "x", ylab = "y", main = "Plot of y = x^3 - 2x + 1")
euclidean_distance <- sqrt(sum((x - y)^2))
dot_product <- sum(x * y)
# Load a CSV file
data <- read.csv("C:\Users\faiya\OneDrive - Texas Tech University\Texas tech course\fall 23\software analytics\auto.csv")
# Load a CSV file
data <- read.csv("C:/Users/faiya/OneDrive - Texas Tech University/Texas tech course/fall 23/software analytics/auto.csv")
View(data)
#Q3
highmpg<-max(data$mpg)
names(highmpg)
name(highmpg)
highmpgname<-which.max(data$mpg)
namecar<- data$name[highmpgname]
View(data)
namecar
# Calculate the average mpg for US cars
us <- mean(data[data$origin == "1", "mpg"], na.rm = TRUE)
# Calculate the average mpg for eu cars
eu <- mean(data[data$origin == "2", "mpg"], na.rm = TRUE)
# Calculate the average mpg for asia cars
asia <- mean(data[data$origin == "3", "mpg"], na.rm = TRUE)
cat("Average mpg for US cars:", us, "\n")
cat("Average mpg for EU cars:", eu, "\n")
cat("Average mpg for Asian cars:", asia, "\n")
#q5
highhp<-which.max(data$horsepower)
cat(highhp)
namehp<-data$name[highhp]
cat(namehp)
namehp
```

Q6:

```
>
> #q6
> modelpy<-table(data$model_year)
> mostmpc<- names(modelpy[which.max(modelpy)])
> print(mostmpc)
[1] "73"
> cat("The year with the most car models is:", mostmpc, "\n")
The year with the most car models is: 73
>
```

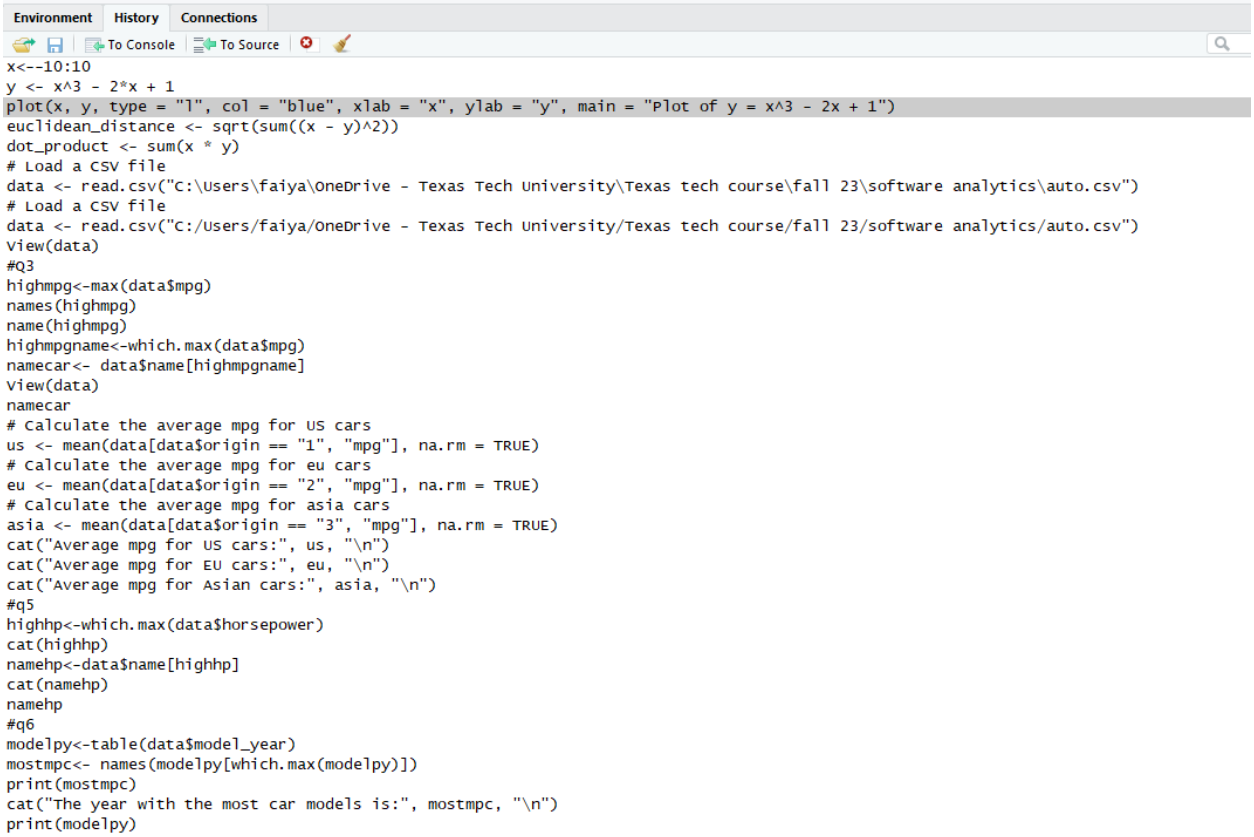
```
> print(modelpy)

70 71 72 73 74 75 76 77 78 79 80 81 82
29 27 28 40 26 30 34 28 36 29 27 28 30
```

From the given query we can see, the model year ranges from 70 to 82.

The year with the most car is the model year 73.

History


Environment
History
Connections
To Console
To Source
x<--10:10
y <- x^3 - 2*x + 1
plot(x, y, type = "l", col = "blue", xlab = "x", ylab = "y", main = "Plot of y = x^3 - 2x + 1")
euclidean_distance <- sqrt(sum((x - y)^2))
dot_product <- sum(x * y)
# Load a CSV file
data <- read.csv("C:\Users\faiya\OneDrive - Texas Tech University\Texas tech course\fall 23\software analytics\auto.csv")
# Load a CSV file
data <- read.csv("C:/Users/faiya/OneDrive - Texas Tech University/Texas tech course/fall 23/software analytics/auto.csv")
View(data)
#Q3
highmpg<-max(data$mpg)
names(highmpg)
name(highmpg)
highmpgname<-which.max(data$mpg)
namecar<- data$name[highmpgname]
View(data)
namecar
# Calculate the average mpg for US cars
us <- mean(data[data$origin == "1", "mpg"], na.rm = TRUE)
# Calculate the average mpg for eu cars
eu <- mean(data[data$origin == "2", "mpg"], na.rm = TRUE)
# Calculate the average mpg for asia cars
asia <- mean(data[data$origin == "3", "mpg"], na.rm = TRUE)
cat("Average mpg for US cars:", us, "\n")
cat("Average mpg for EU cars:", eu, "\n")
cat("Average mpg for Asian cars:", asia, "\n")
#q5
highhp<-which.max(data$horsepower)
cat(highhp)
namehp<-data$name[highhp]
cat(namehp)
namehp
#q6
modelpy<-table(data$model_year)
mostmpc<- names(modelpy[which.max(modelpy)])
print(mostmpc)
cat("The year with the most car models is:", mostmpc, "\n")
print(modelpy)