Sharat\_Sripada\_HW2.R

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2020-01-26

#  
# Course: IST-687  
# Name: Sharat Sripada  
# Homework #2  
# Due Date: 1/26/2020  
# Date Submitted: 1/26/2020  
#  
  
data()  
myCars <- mtcars

# Get index of max hp/horse-power  
MaxhpIndex <- which.max(myCars$hp)  
  
# Get the max-hp value  
Maxhpval <- myCars[MaxhpIndex, 4]  
  
# Verify if there are >1 cars with hp equals Maxhpval  
if (length(row.names(myCars[myCars$hp == Maxhpval,])) > 1) ">1 cars" else "=1 cars"

## [1] "=1 cars"

# Get the car-name with max-hp   
Maxhpcar <- row.names(myCars[MaxhpIndex,])  
  
# Print the car-name with max-hp & the corresponding hp  
cat(Maxhpcar, "has max hp", Maxhpval)

## Maserati Bora has max hp 335

# Get index of max mpg/mile per gallon  
MaxmpgIndex <- which.max(myCars$mpg)  
  
# Get the max-mpg value  
Maxmpgval <- myCars[MaxmpgIndex, 1]  
  
# Verify if there are >1 cars with hp equals Maxmpgval  
if (length(row.names(myCars[myCars$mpg == Maxmpgval,])) > 1) ">1 cars" else "=1 cars"

## [1] "=1 cars"

# Get the car-name with max-mpg   
Maxmpgcar <- row.names(myCars[MaxmpgIndex,])  
  
# Print the car-name with max-mpg & the corresponding hp  
cat(Maxmpgcar, "has max mpg", Maxmpgval)

## Toyota Corolla has max mpg 33.9

# Sort based on mpg  
myCars[order(myCars$mpg),]

## mpg cyl disp hp drat wt qsec vs am gear carb  
## Cadillac Fleetwood 10.4 8 472.0 205 2.93 5.250 17.98 0 0 3 4  
## Lincoln Continental 10.4 8 460.0 215 3.00 5.424 17.82 0 0 3 4  
## Camaro Z28 13.3 8 350.0 245 3.73 3.840 15.41 0 0 3 4  
## Duster 360 14.3 8 360.0 245 3.21 3.570 15.84 0 0 3 4  
## Chrysler Imperial 14.7 8 440.0 230 3.23 5.345 17.42 0 0 3 4  
## Maserati Bora 15.0 8 301.0 335 3.54 3.570 14.60 0 1 5 8  
## Merc 450SLC 15.2 8 275.8 180 3.07 3.780 18.00 0 0 3 3  
## AMC Javelin 15.2 8 304.0 150 3.15 3.435 17.30 0 0 3 2  
## Dodge Challenger 15.5 8 318.0 150 2.76 3.520 16.87 0 0 3 2  
## Ford Pantera L 15.8 8 351.0 264 4.22 3.170 14.50 0 1 5 4  
## Merc 450SE 16.4 8 275.8 180 3.07 4.070 17.40 0 0 3 3  
## Merc 450SL 17.3 8 275.8 180 3.07 3.730 17.60 0 0 3 3  
## Merc 280C 17.8 6 167.6 123 3.92 3.440 18.90 1 0 4 4  
## Valiant 18.1 6 225.0 105 2.76 3.460 20.22 1 0 3 1  
## Hornet Sportabout 18.7 8 360.0 175 3.15 3.440 17.02 0 0 3 2  
## Merc 280 19.2 6 167.6 123 3.92 3.440 18.30 1 0 4 4  
## Pontiac Firebird 19.2 8 400.0 175 3.08 3.845 17.05 0 0 3 2  
## Ferrari Dino 19.7 6 145.0 175 3.62 2.770 15.50 0 1 5 6  
## Mazda RX4 21.0 6 160.0 110 3.90 2.620 16.46 0 1 4 4  
## Mazda RX4 Wag 21.0 6 160.0 110 3.90 2.875 17.02 0 1 4 4  
## Hornet 4 Drive 21.4 6 258.0 110 3.08 3.215 19.44 1 0 3 1  
## Volvo 142E 21.4 4 121.0 109 4.11 2.780 18.60 1 1 4 2  
## Toyota Corona 21.5 4 120.1 97 3.70 2.465 20.01 1 0 3 1  
## Datsun 710 22.8 4 108.0 93 3.85 2.320 18.61 1 1 4 1  
## Merc 230 22.8 4 140.8 95 3.92 3.150 22.90 1 0 4 2  
## Merc 240D 24.4 4 146.7 62 3.69 3.190 20.00 1 0 4 2  
## Porsche 914-2 26.0 4 120.3 91 4.43 2.140 16.70 0 1 5 2  
## Fiat X1-9 27.3 4 79.0 66 4.08 1.935 18.90 1 1 4 1  
## Honda Civic 30.4 4 75.7 52 4.93 1.615 18.52 1 1 4 2  
## Lotus Europa 30.4 4 95.1 113 3.77 1.513 16.90 1 1 5 2  
## Fiat 128 32.4 4 78.7 66 4.08 2.200 19.47 1 1 4 1  
## Toyota Corolla 33.9 4 71.1 65 4.22 1.835 19.90 1 1 4 1

# Logic-1: Use a combination of (mpg, hp) to order the data -> pick the middle value  
# Order the data  
newdata <- myCars[order(myCars$mpg, myCars$hp),]  
  
# Select the middle value and print the car-name  
newdata[length(row.names(myCars))/2,]

## mpg cyl disp hp drat wt qsec vs am gear carb  
## Merc 280 19.2 6 167.6 123 3.92 3.44 18.3 1 0 4 4

row.names(newdata[length(row.names(myCars))/2,])

## [1] "Merc 280"

# Logic-2: Calculate a ratio of mpg/hp & create a new column -> order it -> pick the midlle value  
  
# Create a new column with ratio mpg/hp  
myCars$MpgHpRatio <- myCars$mpg/myCars$hp  
  
# Order the data  
newdata <- myCars[order(myCars$MpgHpRatio), ]  
  
# Select the middle value and print the car-name  
newdata[length(row.names(myCars))/2,]

## mpg cyl disp hp drat wt qsec vs am gear carb MpgHpRatio  
## Merc 280C 17.8 6 167.6 123 3.92 3.44 18.9 1 0 4 4 0.1447154

row.names(newdata[length(row.names(myCars))/2,])

## [1] "Merc 280C"

# Using scale in its default form to normalize the mpg and hp columns  
# Scale funtionality:  
# Z-score = (x - u) / SD  
myCars$mpgscale <- scale(myCars$mpg)  
myCars$hpscale <- scale(myCars$hp)  
  
# Order based on column mpgscale, hpscale  
newdata <- myCars[order(myCars$mpgscale, myCars$hpscale),]  
  
# Select the middle value and print the car-name  
newdata[length(row.names(myCars))/2,]

## mpg cyl disp hp drat wt qsec vs am gear carb MpgHpRatio  
## Merc 280 19.2 6 167.6 123 3.92 3.44 18.3 1 0 4 4 0.1560976  
## mpgscale hpscale  
## Merc 280 -0.1477738 -0.3454858

row.names(newdata[length(row.names(myCars))/2,])

## [1] "Merc 280"