Homework 2

R Code-Unexecuted

```
#Copy mtcars into a new variable called myCars
myCars <- mtcars

#-------------------------
#STEP 1: What is the hp?

#1 What is the highest hp?
which.max(myCars$hp)

#2 Which car has the highest hp?
myCars[31,]

#-------------------------
#STEP 2: Explore mpg

#3 What is the highest mpg?
max(myCars$mpg)

#4 Which car has the highest mpg?
rownames(myCars[which.max(myCars$mpg),])

#5 Create a sorted dataframe, based on mpg
myCarsMPG <- myCars[order(-myCars$mpg),]
myCarsMPG

#-------------------------
#STEP 3: Which car has the "best" combination of mpg and hp?
```

```
#6 Which logic did you use?
myCarsMPG[1:10,]
#The car with the highest hp from the top 10 of the highest mpg cars

#7 Which car?
#Lotus Europa
myCarsMPG[myCarsMPG$hp==113,]

#-------------------------
#STEP 4: Which car has the best combo of mpg and hp where they are given equal weight?
mean(myCars$mpg)
mean(myCars$hp)

myCarsMPG$scaledMPG <- scale(myCars$mpg)
myCarsMPG$scaledHP <- scale(myCars$hp)
myCarsMPG[order(-myCarsMPG$scaledMPG),]
myCarsMPG[order(-myCarsMPG$scaledHP),]

#I'm going to say the top results when sorted by scaled mpg, since this is still subjective.
#I'm valuing mpg over hp, so the "best" combo is the Mercedes 280C.
#If you value hp, the "best" combo is the Cadillac Fleetwood, which only has mpg of 10.4, and
that's terrible!
#So, I'm going with the Mercedes 280C, based on scaled mpg.
#If I eyeball it based on sorted mpg (not scaled), I'd say the Ferrari Dino.
```

R Code-Executed

```
> #Copy mtcars into a new variable called myCars
> myCars <- mtcars
> #1 What is the highest hp?
> which.max(myCars$hp)
[1] 31
> #2 Which car has the highest hp?
> myCars[31,]
              mpg cyl disp  hp drat   wt qsec vs am gear carb
Maserati Bora  15   8  301 335 3.54 3.57 14.6  0  1    5    8
> #3 What is the highest mpg?
> max(myCars$mpg)
[1] 33.9
> #4 Which car has the highest mpg?
> rownames(myCars[which.max(myCars$mpg),])
[1] "Toyota Corolla"
> #5 Create a sorted dataframe, based on mpg
> myCarsMPG <- myCars[order(-myCars$mpg),]
> myCarsMPG
                  mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Toyota Corolla   33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
Fiat 128         32.4   4  78.7  66 4.08 2.200 19.47  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 X1-9        27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
Porsche 914-2    26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
Merc 240D        24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
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
Toyota Corona    21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
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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
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
Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
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
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
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
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
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
> #6 Which logic did you use?
> myCarsMPG[1:10,]
                   mpg cyl  disp  hp drat    wt  qsec vs am gear carb
Toyota Corolla 33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
Fiat 128       32.4   4  78.7  66 4.08 2.200 19.47  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 X1-9      27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
Porsche 914-2  26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
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Merc 240D      24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
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
Toyota Corona  21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
> #7 Which car?
> #Lotus Europa
> myCarsMPG[myCarsMPG$hp==113,]
              mpg cyl disp  hp drat    wt qsec vs am gear carb
Lotus Europa 30.4   4 95.1 113 3.77 1.513 16.9  1  1    5    2
> #-------------------------
> #STEP 4: Which car has the best combo of mpg and hp where they are given equal weight?
> mean(myCars$mpg)
[1] 20.09062
> mean(myCars$hp)
[1] 146.6875
> myCarsMPG$scaledMPG <- scale(myCars$mpg)
> myCarsMPG$scaledHP <- scale(myCars$hp)
> myCarsMPG[order(-myCarsMPG$scaledMPG),]
                   mpg cyl  disp  hp drat    wt  qsec vs am gear carb   scaledMPG    scaledHP
Merc 280C          17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4  2.29127162 -1.19142477
Hornet Sportabout  18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2  2.04238943 -1.17683962
Valiant            18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1  1.71054652 -1.38103178
Chrysler Imperial  14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4  1.71054652 -0.49133738
AMC Javelin        15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2  1.19619000 -1.17683962
Maserati Bora      15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8  0.98049211 -0.81221077
Datsun 710         22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1  0.71501778 -1.23518023
Honda Civic        30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2  0.44954345 -0.78304046
Merc 230           22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2  0.44954345 -0.75387015
Merc 450SL         17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3  0.23384555 -0.72469984
Lotus Europa       30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2  0.21725341 -0.53509284
Lincoln Continental 10.4  8 460.0 215 3.00 5.424 17.82  0  0    3    4  0.21725341 -0.54967799
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Toyota Corolla      33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1  0.15088482 -0.53509284
Fiat 128           32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1  0.15088482 -0.53509284
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4 -0.06481307  0.41294217
Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1 -0.14777380 -0.34548584
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3 -0.14777380  0.41294217
Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1 -0.23073453  0.41294217
Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2 -0.33028740 -0.60801861
Hornet 4 Drive      21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1 -0.38006384 -0.34548584
Mazda RX4           21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4 -0.46302456  0.48586794
Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2 -0.61235388  0.48586794
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4 -0.71190675  1.71102089
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3 -0.76168319  0.04831332
Mazda RX4 Wag       21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4 -0.81145962  0.48586794
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4 -0.81145962  0.04831332
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4 -0.84464392  2.74656682
Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2 -0.89442035  1.21512565
Merc 240D           24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2 -0.96078893  1.43390296
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2 -1.12671039  1.43390296
Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6 -1.60788262  0.85049680
Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4 -1.60788262  0.99634834
> myCarsMPG[order(-myCarsMPG$scaledHP),]
                   mpg cyl  disp  hp drat    wt  qsec vs am gear carb   scaledMPG    scaledHP
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4 -0.84464392  2.74656682
Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4 -0.71190675  1.71102089
Merc 240D           24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2 -0.96078893  1.43390296
Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2 -1.12671039  1.43390296
Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2 -0.89442035  1.21512565
Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4 -1.60788262  0.99634834
Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6 -1.60788262  0.85049680
Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2 -0.61235388  0.48586794
Mazda RX4           21.0   6 160.0 110 3.90 2.620 16.46  0  1    4    4 -0.46302456  0.48586794
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Mazda RX4 Wag       21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4 -0.81145962  0.48586794
Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1 -0.23073453  0.41294217
Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3 -0.14777380  0.41294217
Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4 -0.06481307  0.41294217
Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3 -0.76168319  0.04831332
Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4 -0.81145962  0.04831332
Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1 -0.14777380 -0.34548584
Hornet 4 Drive      21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1 -0.38006384 -0.34548584
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4  1.71054652 -0.49133738
Toyota Corolla      33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1  0.15088482 -0.53509284
Fiat 128            32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1  0.15088482 -0.53509284
Lotus Europa        30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2  0.21725341 -0.53509284
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4  0.21725341 -0.54967799
Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2 -0.33028740 -0.60801861
Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3  0.23384555 -0.72469984
Merc 230            22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2  0.44954345 -0.75387015
Honda Civic         30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2  0.44954345 -0.78304046
Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8  0.98049211 -0.81221077
Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2  2.04238943 -1.17683962
AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2  1.19619000 -1.17683962
Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4  2.29127162 -1.19142477
Datsun 710          22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1  0.71501778 -1.23518023
Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1  1.71054652 -1.38103178
>
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