HW 1

Enter your name and EID here:

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You will submit this homework assignment as a pdf file on Gradescope.

For all questions, include the R commands/functions that you used to find your answer (show R chunk). Answers without supporting code will not receive credit. Write full sentences to describe your findings.

Part 1:

The dataset `mtcars` was extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and other aspects of automobile design and performance for different cars (1973-74 models). Look up the documentation for this data frame with a description of the variables by typing **`?mtcars` in the console** pane.

Question 1: (2 pt)

Take a look at the first 6 rows of the dataset by using an `R` function in the code chunk below. Have you heard about any (or all) of these cars?

```
head(mtcars)
```

```
##                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
## Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
## Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
## Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

I've only heard of the Mazda brand, but not those specific models. I have not even heard of the other models.

Question 2: (2 pts)

How many rows and columns are there in this data frame in total?

```
nrow(mtcars)
```

```
## [1] 32
```

```
ncol(mtcars)
```

```
## [1] 11
```

There are 32 rows and 11 columns.

Question 3: (1 pt)

Save `mtcars` in your environment and name it as your `eid`. From now on, use this new object instead of the built-in dataset.

```
jy23294 <- mtcars
```

'mtcars' dataset saved and set as my eid.

Question 4: (2 pts)

When is your birthday? Using indexing, grab the row of `mpg` that corresponds to the day of your birthday (should be a number between 1 and 31).

```
jy23294[jy23294$mpg == 12, ]
```

```
##  [1] mpg  cyl  disp hp   drat wt   qsec vs   am   gear carb
## <0 rows> (or 0-length row.names)
```

Birthday: Jan-12-2001. There was no mpg value that corresponded to by birthday day 12.

Question 5: (2 pts)

Using logical indexing, count the number of rows in the dataset where the variable `mpg` takes on values greater than 30.

```
nrow(jy23294[jy23294$mpg > 30, ])
```

```
## [1] 4
```

There are 4 rows where 'mpg' is greater than 30.

Question 6: (2 pts)

Let's create a new variable called `kpl` which converts the fuel efficiency `mpg` in kilometers per liter. Knowing that 1 mpg corresponds to 0.425 kpl, complete the following code and calculate the max kpl:

```
jy23294$kpl <- jy23294$mpg * 0.425
max(jy23294$kpl)
```

```
## [1] 14.4075
```

The max kpl is 14.4075.

Part 2:

Let's quickly explore another built-in dataset: `airquality` which contains information about daily air quality measurements in New York, May to September 1973.

Question 7: (2 pts)

Calculate the mean `Ozone` (in ppb) using the `mean()` function. Why does it make sense to get this answer? *Hint: take a look at the column `Ozone` in the dataset.*

```
mean(airquality$Ozone)
```

```
## [1] NA
```

There are NA values in the Ozone column. You can't calculate mean when there are NA values, hence R gives the result "NA".

Question 8: (2 pts)

Look at the documentation for the function `mean()` by running `?mean` **in the console**. What argument should be used to find the mean value that we were not able to get in the previous question? What type of values does that argument take?

The "na.rm" argument should be used and set to TRUE. This argument takes TRUE and FALSE values.

Question 9: (2 pts)

Sometimes the R documentation does not feel complete. We wish we had more information or more examples. Find a post online (include the link) that can help you use that argument in the `mean()` function. Then finally find the mean ozone!

```r
mean(airquality$Ozone, na.rm = TRUE)
```

```
## [1] 42.12931
```

Mean ozone = 42.1293. Link to Post

Formatting: (3 pts)

Knit your file! You can knit into pdf directly or into html.

Is it working? If not, try to decipher the error message (look up the error message, consult websites such as stackoverflow or crossvalidated.

Remember to select pages for each question when submitting your pdf to Gradescope.

```
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