GCDS Homework #01

Due: 09-08-2022

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For this homework, you will create an `R Markdown` document file that will output as an HTML file. Name it **"GCDS_HW_01_yourname"** and add your name to it. The homework will need to be submitted as a `knit` HTML file.

You should create a separate code block in `R Markdown` for each of the problems. Type text responses as text and code within code blocks/chunks.

Questions:

1 Load the `readr` and `ggplot2` libraries.

2 What is the main functionality of `readr`?

3 How to read a file

`read_csv()` requires at least one argument. What is that argument? Is the type of that object you pass to that argument a numeric object or a string/character object?

4 Load a local data frame

Load the `pressure` data set that is part of `base R` (hint: we did this with `cars` and `mtcars` data).

5 Examine a data frame

Use the `head` function to look at the first several cases/observations of the `pressure` data.

6 Create a plot

Determine what the variable names/columns are and plot any two variables as a scatterplot. You do not know how to plot a scatterplot, so I'll give you some code to help you. You should remember from previous courses that scatter plots plot the x,y coordinates for data points.

The following code uses the `ggplot2` library. If you run this code as is, you will get an error because no arguments are specified. Fix the code so it executes.

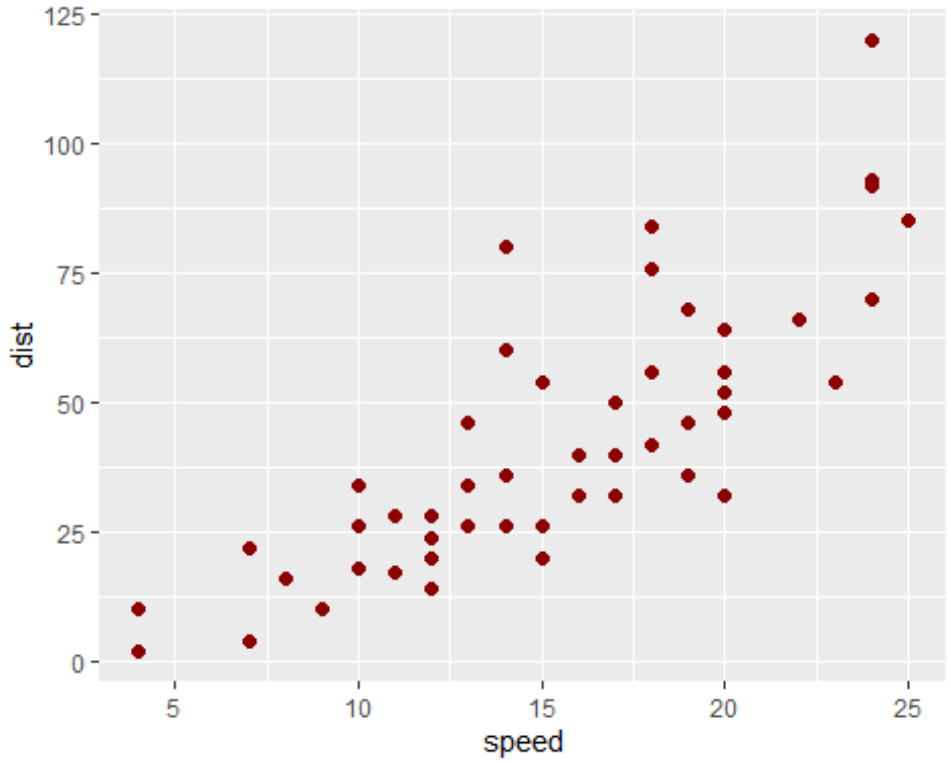
```
ggplot2::ggplot(pressure, aes(x = ?, y = ?)) + geom_point()
```

7 Modify code

Take a look at the following code and the plot it produces. Modify the code below to plot green circles for the xy points.

Also, make a second plot that swaps the x and y variables, changes the size of the points, and plots a square instead of a circle for each data point.

```
ggplot(cars, aes(x = speed, y = dist)) +
  geom_point(shape = "circle",
             color = "darkred",
             size = 2
             )
```



8 Write data to disk

Use `write_csv()` to write a data frame with file extension `.csv` (to your to your local "GCDS/data" directory on your computer). You will see that we can use `data.frame()` to create a silly data frame, which you can save. When saving data files, remember that you need to specify both the *data frame* object and the *name of the file* as arguments. Importantly, the file name you chose will also need to include the *path* to the subdirectory in which you need to save the file. In other words, you'll need **directorypath/filename + file extension**

If you query `R` using ?readr::write_csv you'll see an example at the bottom on the help page. Note, however, that there is no subdirectory in that function call.

```
write_csv(mtcars, "mtcars.csv")
```

Check also whether you need to pass the data frame object or the file name first. Remember that `R` will by default save to your *working directory*. We set this the other day as "GCDS". You may wish to see whether your working directory includes a "/" at the end of the name by checking what your working directory by checking `getwd()`. The "/" is used to separate directories.

Data Frame:

```
my_first_data_frame <- data.frame(
  student = c("Bill", "Sally", "Tanya"),   # this is a string vector with 3
```

```
elements`
  age     = c(22, 21, 19)
)
```

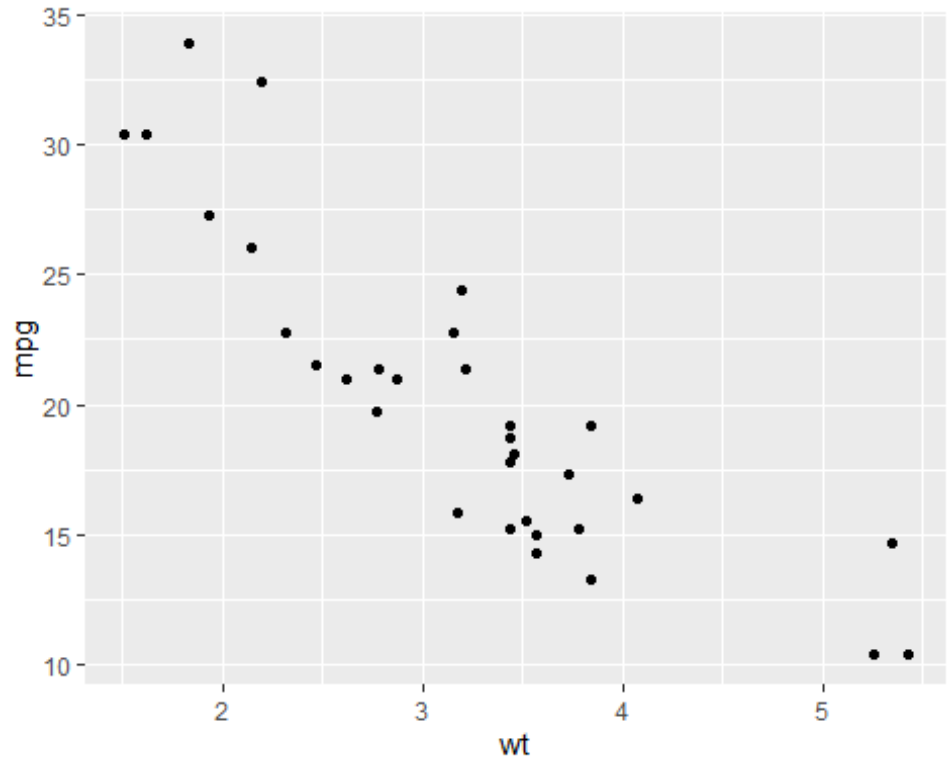
If you wanted to write this data frame to your "data" directory as a `.csv` file, what would your code look like? Type it as text below.

9 Interpreting data

Based on the following plot, what can you tell about the slope?

```
library(magrittr)   # loading magrittr for using %>%

mtcars %>%
  ggplot(., aes(x = wt, y = mpg)) +
  geom_point()
```



10 Thinking of regression

Notice how changing the *aesthetics*, `aes()` in the following code illustrates how cars that have 4, 6, or 8 cylinder engines are represented differently in the plot. Do you believe a single statistical model might fit the data if broken out by cylinder size? Why or why not? Hint: Consider mentally fitting regression lines through the separate points.

Type your answer as text.

```
mtcars %>%
  dplyr::mutate(cyl = as.factor(cyl)) %>%  # changing cylinder var to a
factor
  ggplot(., aes(x = wt,                    # x variable
                y = mpg)) +                # y variable
  geom_point(aes(color = cyl))             # make geom_point colors = cyl
variable
```