Quiz for Week 2 Part B

Quiz Question 6

Load the '***mtcars***' dataset in `R` with the following code

```
library(datasets)
data(mtcars)
```

- There will be an object names '***mtcars***' in your workspace. You can find some information about the dataset by running `?mtcars`.

- How can one calculate the average miles per gallon (mpg) by number of cylinders in the car (cyl)?

Options

```
tapply(mtcars$cyl, mtcars$mpg, mean)
split(mtcars, mtcars$cyl)
mean(mtcars$mpg, mtcars$cyl)
tapply(mtcars$mpg, mtcars$cyl, mean)
```

- Cars can have either 4, 6 or 8 cylinders.

```
> table(mtcars$cyl)

 4  6  8
11  7 14
```

- using the `tapply()` function

```
> tapply(mtcars$mpg, mtcars$cyl, mean)
        4        6        8
26.66364 19.74286 15.10000
```

Quiz Question 7

Continuing with the **mtcars** dataset from Question 6, what is the absolute difference between the average horsepower of 4-cylinder cars and the average horsepower of 8-cylinder cars?

Remarks

This is another question where the `aggregate()` command comes in handy. (We will use `attach()` and `detach()` to avoid unnecessary typing)

```
> attach(mtcars)
> Smry <- aggregate(hp,by=list(Cyls=cyl),mean)
> Smry
  Cyls        x
1    4  82.63636
2    6 122.28571
3    8 209.21429
> detach(mtcars)
>
> Smry$x
[1]  82.63636 122.28571 209.21429
>
> Smry$x[3]-Smry$x[1]
[1] 126.5779
```

Quiz Question 8

What is the difference between the 'sapply()' function and the 'lapply()' function?

Options

1. There is no difference; 'sapply' and 'lapply' are two names for the same function

2. 'sapply()' always returns a 2-dimensional matrix while 'lapply' returns a list.

3. 'lapply()' always returns a list while 'sapply()' attempts to simplify the result. (**Correct**)

4. 'lapply()' always returns an atomic vector and 'sapply' always returns a list.

The question can be easily solved by reading the help files for both commands.

```
help(sapply)
```

Quiz Question 9

Consider the following function

```
f <- function(x) {
        g <- function(y) {
                y + z
        }
        z <- 4
        x + g(x)
}
```

If I then run in R

```
z <- 10
f(3)
```

What value is returned by 'f'?

Quiz Question 10

If you run `debug(ls)` what happens when you next call the 'ls' function?

1. Execution of 'ls' will suspend at the beginning of the function and you will be in the browser.

2. The 'ls' function will execute as usual. (**FALSE**)

3. The 'ls' function will return an error. (**FALSE**)

4. Execution of the 'ls' function will suspend at the 4th line of the function and you will be in the browser.

5. You will be prompted to specify at which line of the function you would like to suspend execution and enter the browser.