Homework 1 Solution

Nick Beauchamp, Ryszard Czerminski and Hao-En Kao

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This is an example of a homework assignment solution. It is written in RMarkdown and LaTeX, and was knit to PDF. It is most useful to look at the .Rmd file that produced the PDF. You may use that .Rmd file as a template for you own homework assignments.(This means it's ok not to use, don't worry)

Note that these solutions are incorrect! Do not just copy these answers as solutions for problem set #1.

1. Create two vectors named u and v both of length 3 and filled with random integers in 1-9 range.

```
u <- sample(9,3)
v <- sample(9,3)
u
```

```
## [1] 5 9 6
```

```
v
```

```
## [1] 8 4 1
```

2.a. Create a 2 by 3 matrix (i.e. two rows and three columns) with random permutation of integers from 1:6 as its elements, and call it m

```
m <- matrix(data=sample(6), nrow=2, ncol=3)
m
```

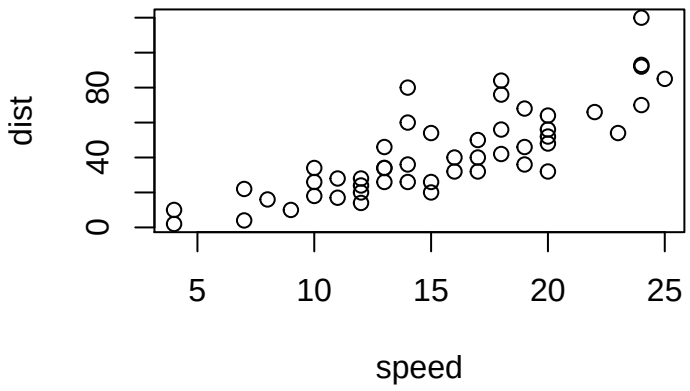
```
##      [,1] [,2] [,3]
## [1,]    5    3    4
## [2,]    2    6    1
```

2.b. What is m times u?

```
mu <- m %*% u
```

3.

```
plot(cars)
```



4. Using latex equation notation in your .Rmd file, write out the quadratic formula, so that in your html file it looks pretty and like the version we all learned in high school. (Eg, see the box in the top right of Quadratic equation wikipedia page)

$$\frac{\sqrt{10 \pm x^7}}{2 - \alpha}$$

More examples:

```
alpha <- 3
beta <- 5
a <- 3
b <- 4
c <- 5
mu <- 100
sigma <- 5
n <- 5
x <- rnorm(n, mu, sigma)
x = round(x, 3)
```

1. inline R code and LaTeX: $\alpha = 3$ and $\beta = 5$ and $\gamma = 7$
2. use of R snippets in LaTeX equations:
   - Pythagoras Theorem: $a^2 + b^2 = c^2$, and an example: $3^2 + 4^2 = 5^2$
   - Sample mean: $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i = \frac{1}{5}\sum_{i=1}^{5} x_i \simeq \frac{1}{5}(103.396 + \cdots + 98.519) = 99.66$
3. inline equation: $e^{i\phi} = cos\phi + isin\phi$
4. verbatim: `$E = m c ^2$` : $E = mc^2$

and now itemize:

- highlight: *highlighted text*
- color text: this text is green

Dos and Dont's

Don't use regular R-code blocks for your main commentary:

```
# Suspendisse eu nunc. Aliquam dignissim urna sit amet mauris. Cras commodo, urna ut porttitor
# venenatis, arcu metus sodales risus, vitae gravida sapien ligula in est. Donec
# vulputate sollicitudin wisi. Donec vehicula, est id interdum ornare, nibh tellus
# consectetuer justo, a ultrices felis erat at lectus.
```

Do use regular text for that:

Suspendisse eu nunc. Aliquam dignissim urna sit amet mauris. Cras commodo, urna ut porttitor venenatis, arcu metus sodales risus, vitae gravida sapien ligula in est. Donec vulputate sollicitudin wisi. Donec vehicula, est id interdum ornare, nibh tellus consectetuer justo, a ultrices felis erat at lectus.