Data Visualization Homework 5

Brandon Hosley

UIN: 676399238

Yanhui Guo, Ph.D

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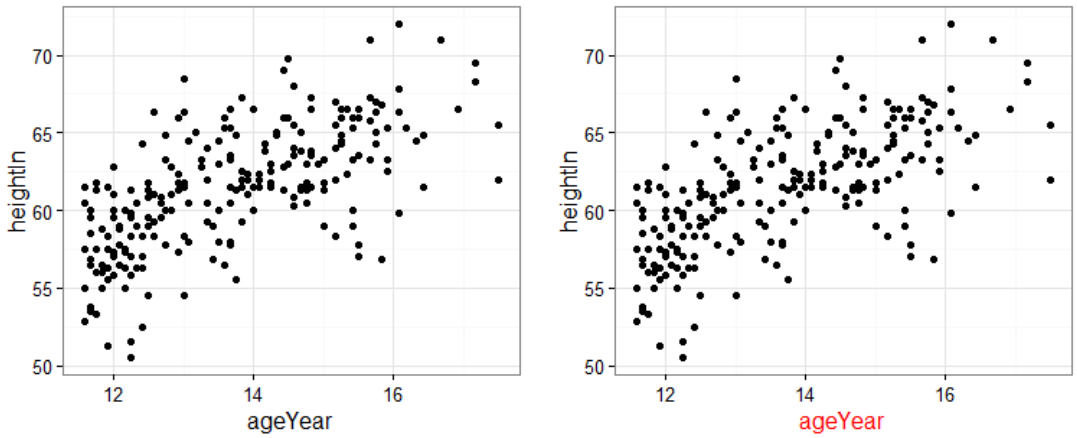
Problem 1

Please run the following two commands and observe the differences of two graphs. Write the difference and the reasons. (10 points)

```
p <-ggplot(heightweight,aes(x=ageYear,y=heightIn)) +geom_point()
# a.
p + theme(axis.title.x =element_text(colour="red")) + theme_bw()
# b.
p + theme_bw() + theme(axis.title.x =element_text(colour="red",size=12))
```



GGPlot draws in a manner similar to plain CSS; More recent commands (commands later in the code) overwrite older commands. In this example the Black and White theme overwrites the red color command in A. In B the second command overrides the BW theme for the targeted element, the X-axis Title.

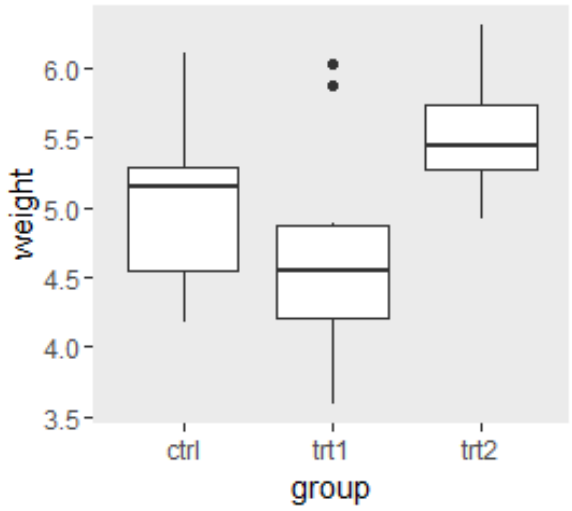
Problem 2

Use the PlantGrowth data frame to draw following graphs, respectively. Write down the used functions in ggplot2 (25 points)

```
library(gcookbook)
g <- ggplot(PlantGrowth, aes(x=group, y=weight)) + geom_boxplot()
```

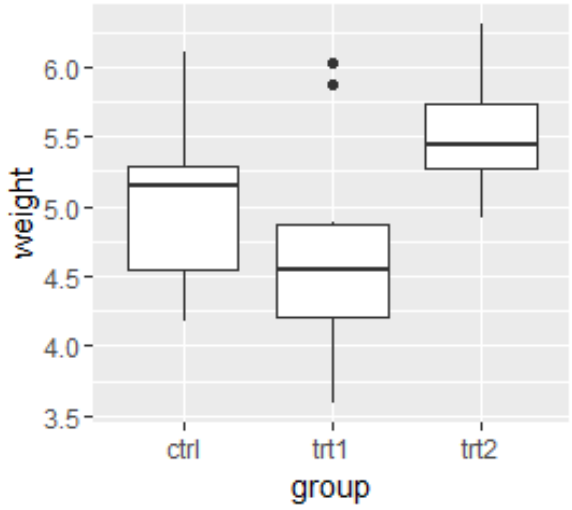
(**a**)

```
g + theme(panel.grid.minor=element_blank(), panel.grid.major=element_blank())
```



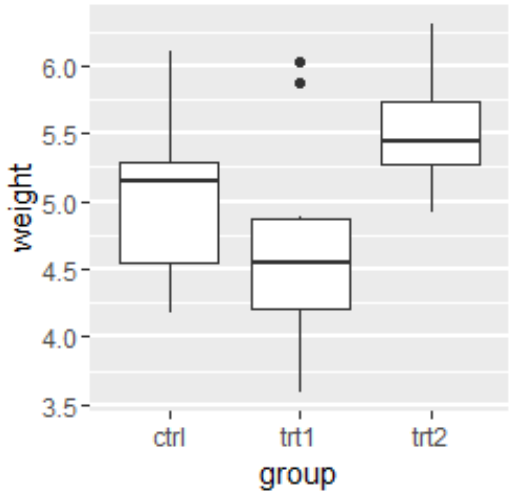
(**b**)

g



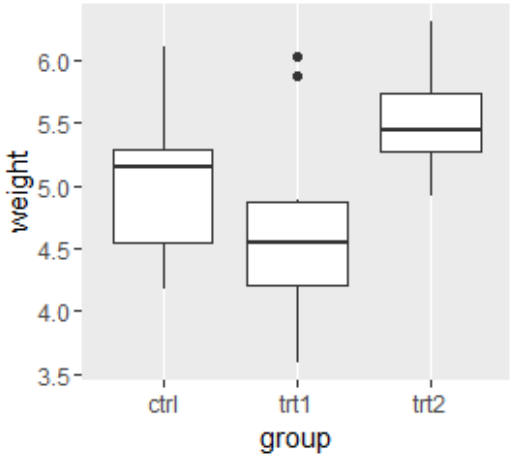
(**c**)

```
g + theme(
        panel.grid.minor.x=element_blank(),
        panel.grid.major.x=element_blank(),
        panel.grid.minor.y=element_line(size=0.5),
        panel.grid.major.y=element_line(size=1))
```



(**d**)

```
g + theme(panel.grid.minor.y=element_blank(), panel.grid.major.y=element_blank())
```



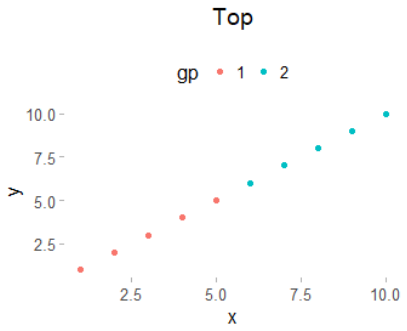
Problem 3

Please use the DF1 data frame to draw following graphs, respectively. Write down the used functions in ggplot2 (40 points)

```
DF1 <- data.frame(x = 1:10, y = 1:10, gp = factor(rep(1:2, each = 5)))
p0 <- ggplot(DF1, aes(x = x, y = y, colour = gp)) + geom_point()
# Formatting Asthetics
p0 <- p0 + theme_light() + theme(
        panel.grid.major=element_blank(),
        panel.grid.minor=element_blank(),
        panel.border=element_blank(),
        legend.key=element_blank())
```

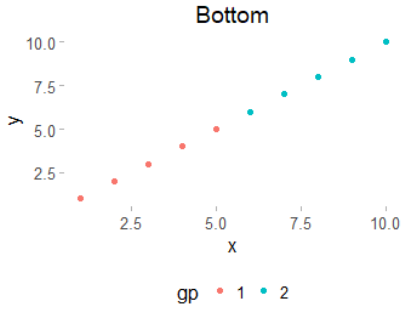
(**a**)

```
p0 + ggtitle("Top") + theme(legend.position="top")
```



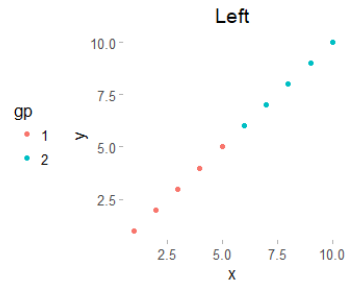
(**b**)

```
p0 + ggtitle("Bottom") + theme(legend.position="bottom")
```



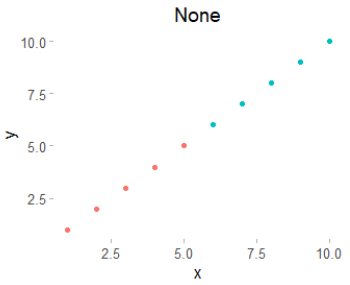
(c)

```
p0 + ggtitle("Left") + theme(legend.position="left")
```



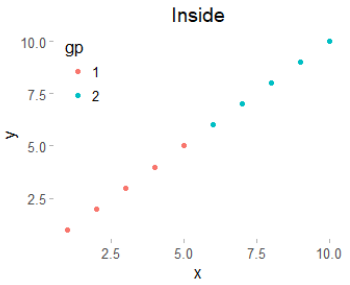
(d)

```
p0 + ggtitle("None") + theme(legend.position="none")
```



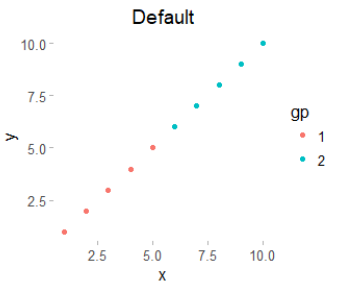
(e)

```
p0 + ggtitle("Inside") + theme(legend.position=c(0.1,0.8))
```



(f)

```
p0 + ggtitle("Default")
```



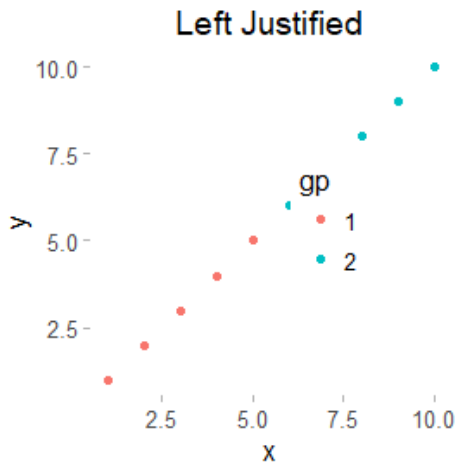
Problem 4

Please use the DF1 data frame to draw following graphs, respectively. Write down the used functions in ggplot2 (25 points)

```
DF1 <- data.frame(x = 1:10, y = 1:10, gp = factor(rep(1:2, each = 5)))
p0 <- ggplot(DF1, aes(x = x, y = y, colour = gp)) + geom_point()
# Aesthetic Formatting
p0 <- p0 + theme_light() + theme(
    panel.grid.major=element_blank(),
    panel.grid.minor=element_blank(),
    panel.border=element_blank(),
    legend.key=element_blank(),
    legend.position=c(0.5,0.5))
```

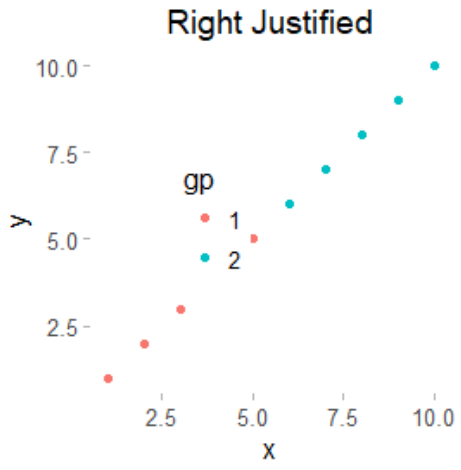
(**a**)

```
p0 + ggtitle("Left Justified") + theme(legend.justification="left")
```



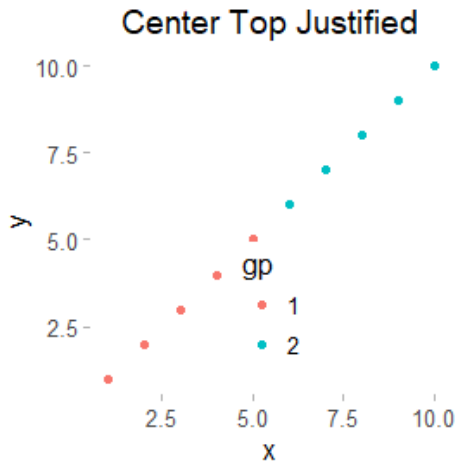
(**b**)

```
p0 + ggtitle("Right Justified") + theme(legend.justification="right")
```



(c)

```
p0 + ggtitle("Center Top Justified") + theme(legend.justification=c(0.5,1))
```



(d)

```
p0 + ggtitle("Bottom Left Justified") + theme(legend.justification=c(0,0))
```