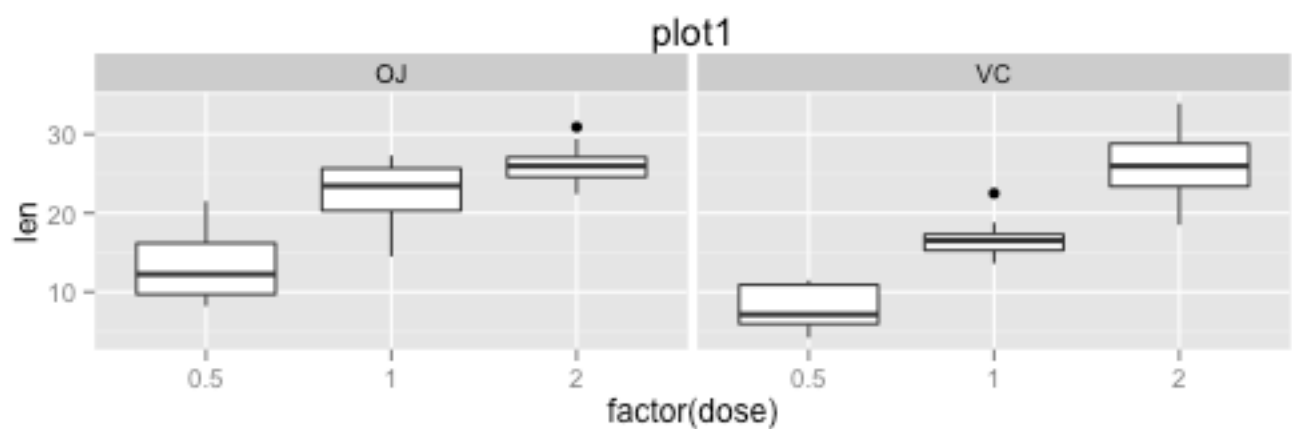


Basic inferential data analysis.

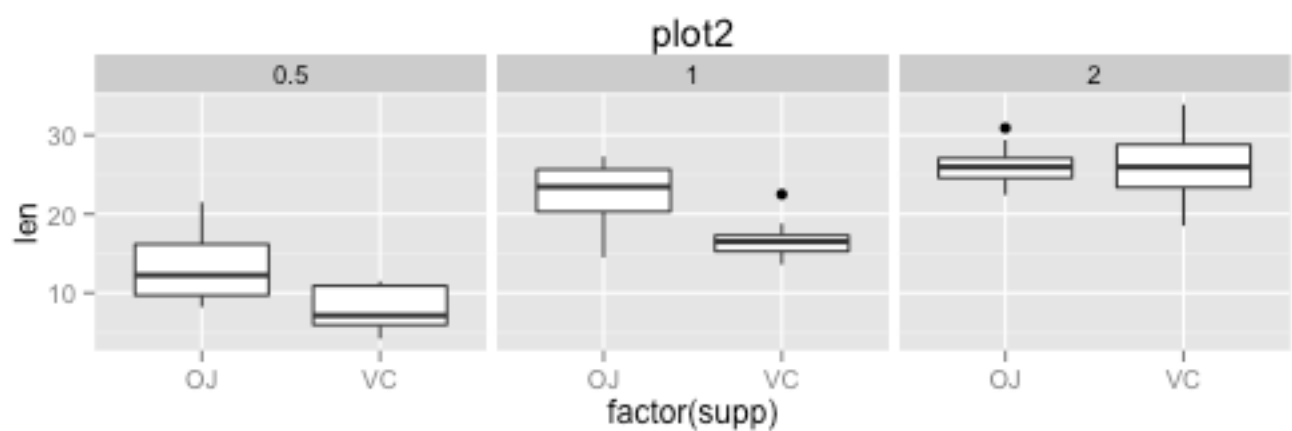
Analyze the ToothGrowth data in the R datasets package

1. Load the ToothGrowth data and perform some basic exploratory data analyses

- initial understanding of the data.(using facets)
- make boxplots to compare Tooth length with different dosage for each supplements



- make boxplot to compare Tooth length with different supplement for each dosage



- from plot1 we can see the tooth length increase along with the increase of the dosage nomatter for which supplement.
- from plot2 it is a little hard to tell wheather there is difference impact on the tooth length between VC an OJ supplements for each dosage. (can make analysis on this point later)

2.Provide a basic summary of the data.

- Calculate the mean & sd for each dosage and supplement (use the ddply)

```
## [1] 0.5 0.5 1 1 2 2
## Levels: 0.5 1 2
```

##	dose	supp	mean	sd
## 1	0.5	OJ	13.23	4.460
## 2	0.5	VC	7.98	2.747
## 3	1.0	OJ	22.70	3.911
## 4	1.0	VC	16.77	2.515
## 5	2.0	OJ	26.06	2.655
## 6	2.0	VC	26.14	4.798

3. Use confidence intervals and hypothesis tests to compare tooth growth by supp and dose.

- We have two type of supp: orange juice and vitamin C. We need to use hypothesis testing to make conclusion if both supp have the same impact on tooth length.
- use paired t-test to compare mean for two supp for each dose
- the confidence interval is for the difference between the length of toothlength under the effect of OJ and VC for each dose.

```

ToothGrowth <- transform(ToothGrowth, dose=as.factor(dose))
s <- split(ToothGrowth, list(ToothGrowth$supp, ToothGrowth$dose))
t1 <- t.test(s[[1]][[1]], s[[2]][[1]], paired = TRUE, alternative =
"greater")#dose= 0.5
t2 <- t.test(s[[3]][[1]], s[[4]][[1]], paired = TRUE, alternative =
"greater")#dose = 1
t3 <- t.test(s[[5]][[1]], s[[6]][[1]], paired = TRUE, alternative =
"greater")#dose = 2

```

- the confidence level for dose 0.5 is 2.0196, ∞ , and the p-value is 0.0077
- the confidence level for dose 0.5 is 2.7064, ∞ , and the p-value is 0.0041
- the confidence level for dose 0.5 is -3.5231, ∞ , and the p-value is 0.5165

4. State your conclusions and the assumptions needed for your conclusions.

assumptions:

- the hypothesis is: both supp have the same impact on tooth length.
- the alternative hypothesis is: OJ can promote the growth of toothlength than VC.
- significance level: 0.05

conclusions:

- OJ have more impact on the growth of toothlength under dose equals to 0.5 or 1. But can't get this conclusion when dose equals to 2. We need further research.