Homework two

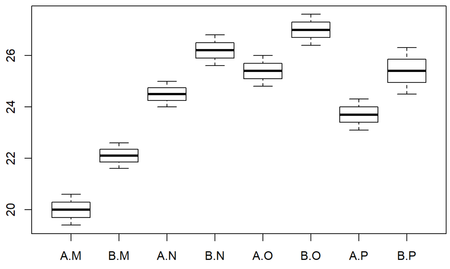
Yi Chen(yc3356)

February 3, 2018

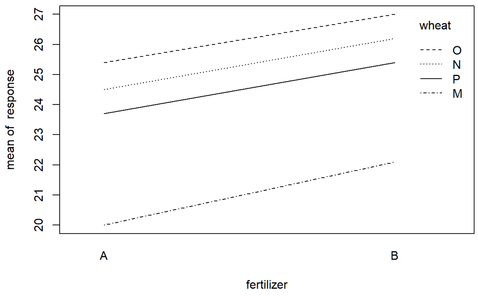
Homework Two

```
response <- c(19.4,20.6,20,25,24.5,24,24.8,26,25.4,23.1,24.3,23.7,22.6,21.6,22.1,25.6,26.8,26.2,27.6,26.4,27,25.4,24.5,26.3)

fertilizer <- c(rep("A",12),rep("B",12))
wheat <- c(rep(c(rep("M",3),rep("N",3),rep("O",3),rep("P",3)),2))
boxplot(response~fertilizer*wheat)
```




```
interaction.plot(fertilizer,wheat,response)
```



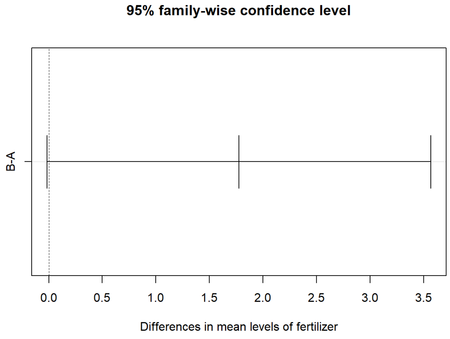

```
summary(aov(response~fertilizer*wheat))
```

```
##                Df Sum Sq Mean Sq F value   Pr(>F)
## fertilizer      1  18.90  18.904  48.63 3.14e-06 ***
## wheat           3  92.02  30.674  78.90 8.37e-10 ***
## fertilizer:wheat  3   0.22   0.074   0.19    0.902
## Residuals      16   6.22   0.389
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
summary(aov(response~fertilizer+wheat))
```

```
##             Df Sum Sq Mean Sq F value   Pr(>F)
## fertilizer   1  18.90  18.904   55.76 4.59e-07 ***
## wheat        3  92.02  30.674   90.48 1.97e-11 ***
## Residuals   19   6.44   0.339
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
fit1<-aov(response~fertilizer)
tk1<-TukeyHSD(fit1)
plot(tk1)
```




```
tk1
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = response ~ fertilizer)
##
## $fertilizer
##      diff        lwr      upr     p adj
## B-A 1.775 -0.01614443 3.566144 0.0519242
```

```
fit2<-aov(response~wheat)
tk2<-TukeyHSD(fit2)
plot(tk2)
```


```
tk2
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = response ~ wheat)
##
## $wheat
##      diff        lwr       upr     p adj
## N-M  4.30  2.4808709 6.1191291 0.0000107
## O-M  5.15  3.3308709 6.9691291 0.0000008
## P-M  3.50  1.6808709 5.3191291 0.0001557
## O-N  0.85 -0.9691291 2.6691291 0.5687888
## P-N -0.80 -2.6191291 1.0191291 0.6152451
## P-O -1.65 -3.4691291 0.1691291 0.0839841
```