R functions for exam 1

Normal distribution

- P (x < a): pnorm(a, mean, standard_dev, lower.tail=TRUE) (TRUE is for lower-tail and FALSE is for upper-tail area)
- P (x > a): pnorm(a, mean, standard_dev, lower.tail=FALSE)
- P (Z < a') = α : a' = qnorm(α, 0, 1) or qnorm(α)
- $P(Z > z_A) = A$: z_A = qnorm(1-A, 0, 1)

One tail *t* distribution

- P (t < b): pt(b, degree of freedom, lower.tail=TRUE)
- P (t > b): pt(b, degree of freedom, lower.tail=FALSE)
- P (t < a') = α: a' = qt(α, degree of freedom, lower.tail=TRUE)

For two independent samples

To test Mean:

t.test (Quantitative Variable ~Group, data =DATA set)
t.test (DATA set $'Quantitative Variable1'~ DATA set $ 'category variable')
t.test (DATA set $'Quantitative Variable1', DATA set $'Quantitative Variable2')
t.test (DATA set $'Quantitative Variable1', DATA set $ 'category variable', var.equal = TRUE, conf.level= 0.95)

To test variance:

var.test (Quantitative Variable1 ~ category variable, data =DATA set)
var.test (DATA set $'Quantitative Variable1'~ DATA set $ 'category variable')
var.test(DATA set $'Quantitative Variable1', DATA set $'Quantitative Variable2')

One-Way ANOVA

```
#One-Way ANOVA for golf clubs example
install.packages("reshape2")
library(reshape2)
golf <- melt(ANOVA_onefactor)
colnames(golf) <- c("Club", "Distance")
golfClub <- aov(Distance~Club, data = golf)
anova (golfClub)
TukeyHSD(golfClub, conf.level = 0.95)
```

Two-Way ANOVA without interaction (randomized block design)

```
#Two-Way ANOVA without interaction (randomized block design) for restaurant rating example
install.packages("reshape2")
library(reshape2)
StackedRating <- melt(ANOVA_RandomizedBlockDesign)
colnames(StackedRating) <- c("rater", "restaurant", "rating")
AnovaRating <- aov(rating~rater+restaurant, data = StackedRating)
anova(AnovaRating)
TukeyHSD(AnovaRating, conf.level = 0.95)
```

Two-Way ANOVA with interaction

```
#Two-Way ANOVA with interaction  for loom suppliers example
ANOVA_twoFactors[, 1]<- c(rep("jetta", 5), rep("turk", 5))
stackedLoomSuppliers <- melt(ANOVA_twoFactors)
colnames(stackedLoomSuppliers) <- c(”loom", ”supplier", "strength")
loomSuppliers <- aov (strength~loom*supplier, data = stackedLoomSuppliers)
anova(loomSuppliers)
TukeyHSD(loomSuppliers, conf.level = 0.95)
```