p8105_hw4_wl2829

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Problem1

Problem 2

a) Generate descriptive statistics for each group and comment on the differences observed.

```
cbp_ptsd =
  read_csv("./data/Crash.csv")
```

```
## Rows: 10 Columns: 3
```

```
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## dbl (3): pedestrian, bicycle, car
```

```
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

The mean PTSD score of each type of crash

```
lapply(cbp_ptsd, mean, na.rm = T)
```

```
## $pedestrian
## [1] 37.875
##
## $bicycle
## [1] 32.5
##
## $car
## [1] 23.42857
```

The mode PTSD score of each type of crash

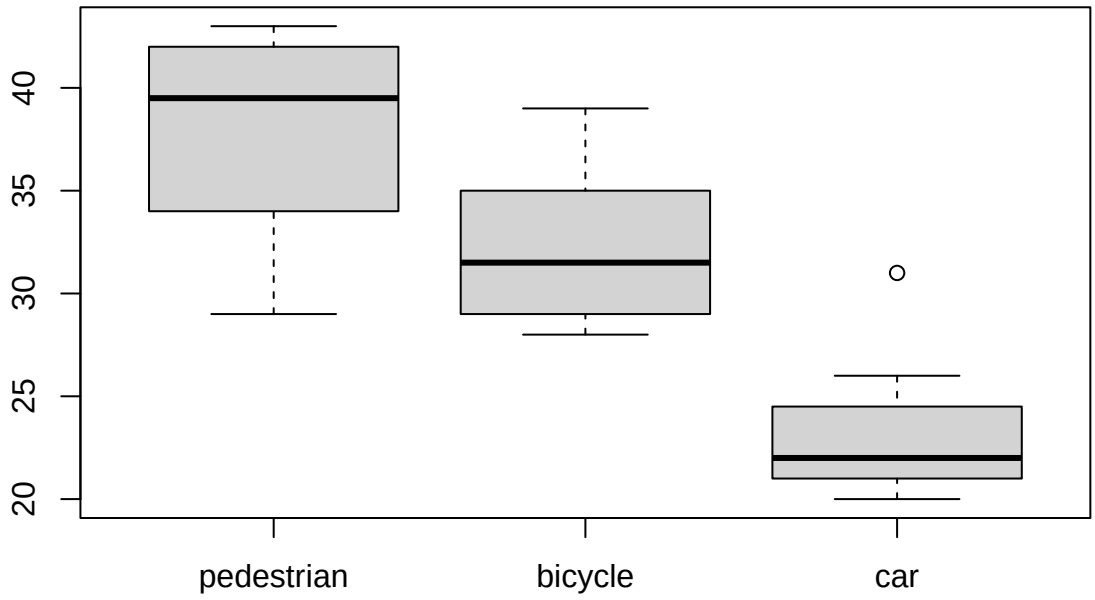
```
modefunc = function(x){
    tabresult = tabulate(x)
    themode = which(tabresult == max(tabresult))
    if(sum(tabresult == max(tabresult))>1) themode = NA
    return(themode)
}

apply(cbp_ptsd, 2, modefunc)
```

```
## pedestrian    bicycle        car
##         42         NA         21
```

The median PTSD score of each type of crash

```
cbp_ptsd %>%
  boxplot()
```




```
summary(cbp_ptsd)
```

```
##    pedestrian       bicycle          car
##  Min.   :29.00   Min.   :28.0   Min.   :20.00
##  1st Qu.:36.00   1st Qu.:29.5   1st Qu.:21.00
##  Median :39.50   Median :31.5   Median :22.00
##  Mean   :37.88   Mean   :32.5   Mean   :23.43
```

```
##  3rd Qu.:42.00   3rd Qu.:34.5   3rd Qu.:24.50
##  Max.   :43.00   Max.   :39.0   Max.   :31.00
##  NA's   :2                      NA's   :3
```

b) Using a type I error of 0.01, obtain the ANOVA table. State the hypotheses, test statistic, critical value, and decision interpreted in the context of the problem.

```
cbp_anova =
  cbp_ptsd %>%
  pivot_longer(
    pedestrian:car,
    names_to = "group",
    values_to = "score"
  ) %>%
  na.omit() %>%
  mutate(group = factor(group))

res_aov = aov(score ~ group, data = cbp_anova)

summary(res_aov)
```

```
##             Df Sum Sq Mean Sq F value   Pr(>F)
## group        2  790.4   395.2   19.53 1.33e-05 ***
## Residuals   22  445.1    20.2
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

c) Based on your response in part b), perform pairwise comparisons with an appropriate adjustment (e.g., Bonferroni, Tukey, and Dunnett – 'below average' as reference). Report your findings.

```
pairwise.t.test(cbp_anova$score, cbp_anova$group, p.adjust.method="bonferroni")
```

```
##
##  Pairwise comparisons using t tests with pooled SD
##
## data:  cbp_anova$score and cbp_anova$group
##
##            bicycle car
## car        0.0014  -
## pedestrian 0.0586  9.1e-06
##
## P value adjustment method: bonferroni
```

Problem 3