Project II Analysis

Setting up the enviornment - Install the packages

```
library(tidyverse)
library(broom)
library(multcomp)
library(knitr)
library(MASS)
library(tools)
import::from(multcomp, glht, mcp, contrMat)
import::from(broom, tidy)
source("util.R")
```

Data wrangling with output file generated by software

```
map_condition <- read_csv("mapcondition.csv")

# read all experiment .csv files
files = list.files(path="./experiment-data", pattern="*.csv", full.names = TRUE)

# this line can be used to read each file individually
# for (i in 1:length(files)) assign(file_path_sans_ext(files[i]), read.csv(file.path("experiment-data",

# combine all experiment data into one table
data <- files %>%
  lapply(read_csv) %>%
  bind_rows

# add IV columns
data[, "EO"] <- NA
data[, "TL"] <- NA
data[, "ES"] <- NA
data[, "SS"] <- NA

# map endIndex to condition
for(i in 1:nrow(data)){
  # starting index of table is one
  index_that_maps <- data$endIndex[i] + 1
  row_to_map <- map_condition[index_that_maps,]
  data[i,]$EO <- row_to_map$`Edge orientation`
  data[i,]$TL <- row_to_map$`Target location`
  data[i,]$ES <- row_to_map$`Edge section`
  data[i,]$SS <- row_to_map$`Side section`
}

kable(head(data, n=5), caption="A look at some rows in the experiment data")
```

Table 1: A look at some rows in the experiment data

trialId	participantId	startIndex	endIndex	ID	angle	MDC	ME	MT	distance	error	EO
0	1	1	4	5.941326	-16.16610	0	8.838021	786	998.4813	false	Ve
1	1	6	1	6.417467	1.68675	1	15.660783	704	815.3533	false	Ho
2	1	5	11	6.561114	68.67021	2	131.156101	744	1534.0812	false	Ho
3	1	1	1	5.327602	-59.82443	1	8.509538	549	561.0250	false	Ho
4	1	7	5	5.931800	-28.97901	2	35.394069	804	1104.2559	false	Ve

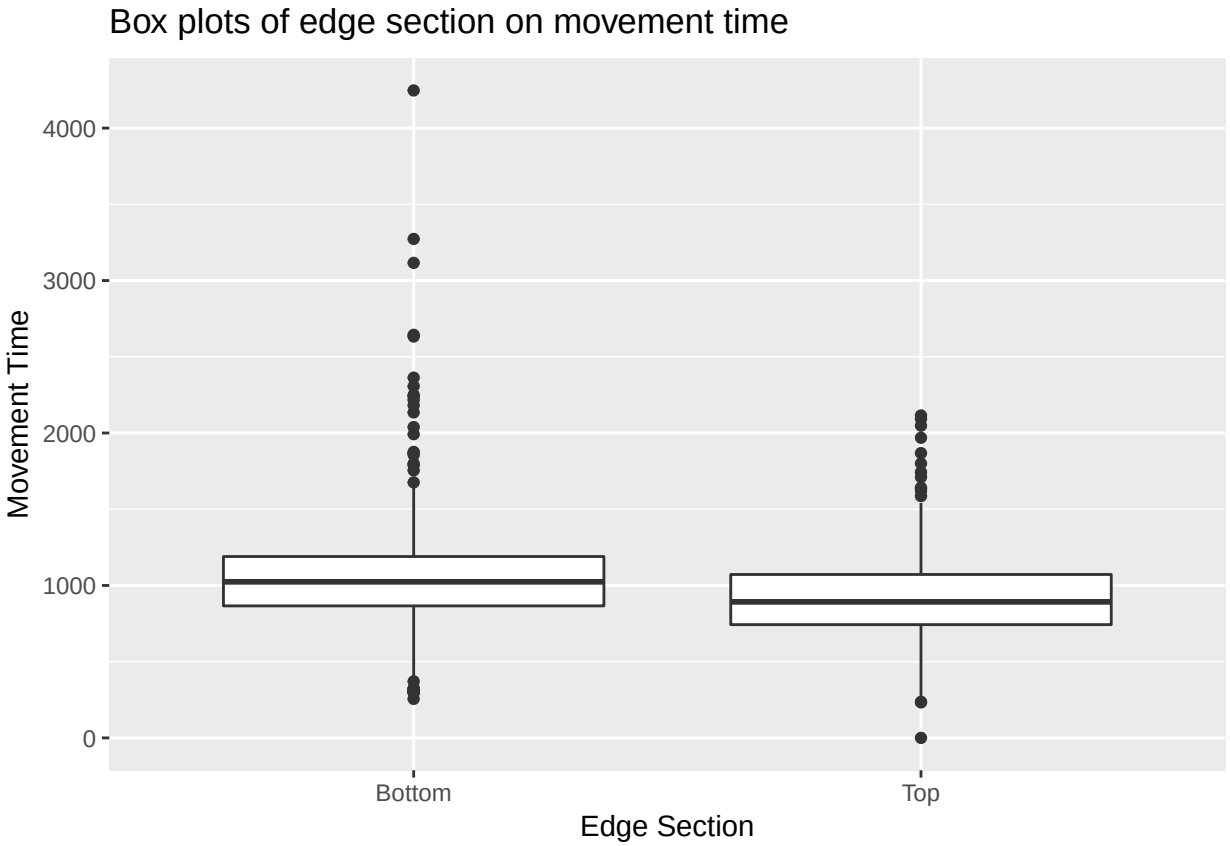
Visualizing the data

Addressing our first hypothesis

H1: It is faster to move to targets on the top edge of the screen rather than the bottom edge.

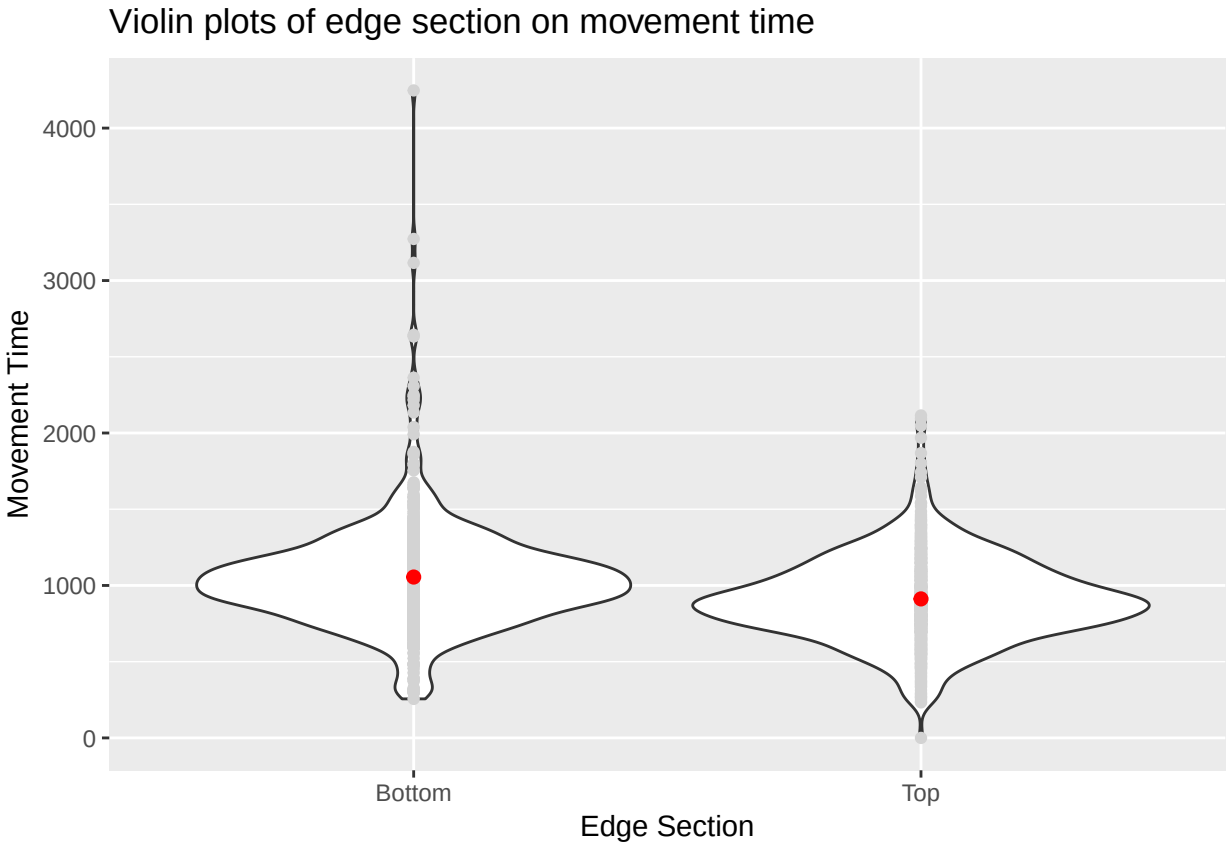
```
# to address the first hypothesis, we group by Edge Orientation (Horizontal) and Edge Section (Top and
data_horizontal_edge <- data[data$EO == "Horizontal",]

# Boxplot
data_horizontal_edge %>%
  ggplot(aes(x = ES, y = MT)) +
  geom_boxplot() +
  labs(title = "Box plots of edge section on movement time", x = "Edge Section", y = "Movement Time")
```




```
# Violin plot
h1_violin_plot <-
  data_horizontal_edge %>%
  ggplot(aes(x = ES, y = MT)) +
  geom_violin() +
  geom_point(color = "lightgray") +
  labs(title = "Violin plots of edge section on movement time", x = "Edge Section", y = "Movement Time")

h1_violin_plot + stat_summary(fun.y=mean, geom="point", size=2, color="red")
```

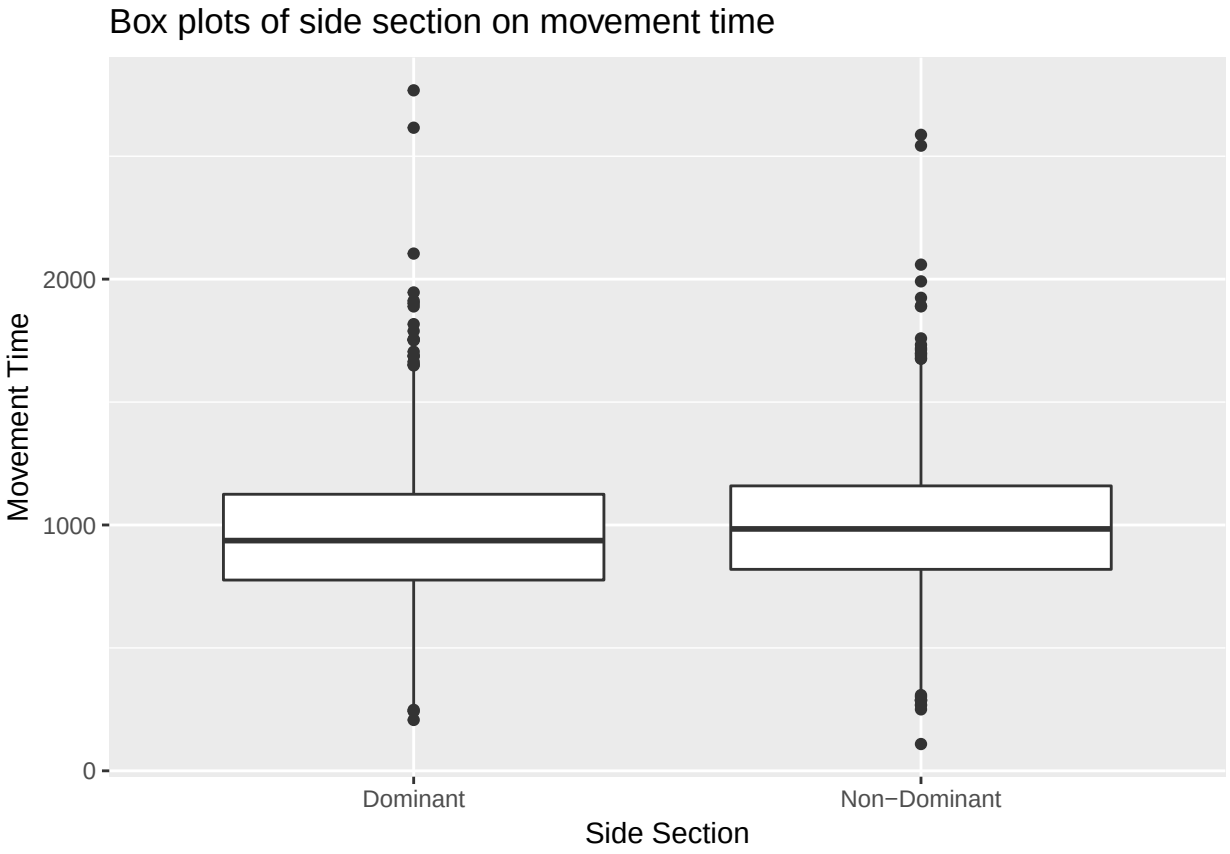


Addressing our second hypothesis

H2: For left-handed participants it is faster to move to targets on the right edge of the screen rather than the left edge, whereas for the right-handed participants it is faster to move to targets at the left edge of the screen rather than the right edge.

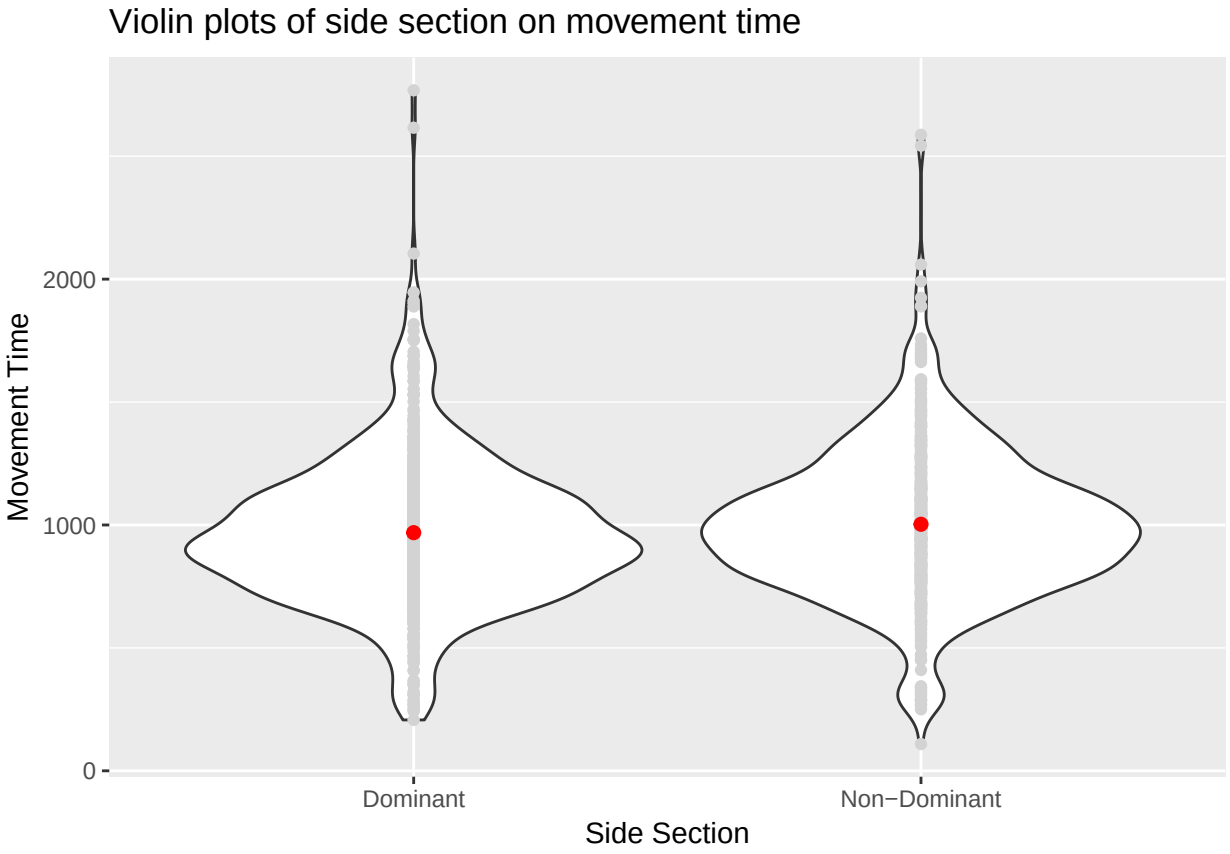
```
# to address the second hypothesis, we group by Edge Orientation (Vertical) and Side Section (Dominant
data_vertical_edge <- data[data$EO == "Vertical",]

# Boxplot
data_vertical_edge %>%
  ggplot(aes(x = SS, y = MT)) +
  geom_boxplot() +
  labs(title = "Box plots of side section on movement time", x = "Side Section", y = "Movement Time")
```




```
# Violin plot
h2_violin_plot <-
  data_vertical_edge %>%
  ggplot(aes(x = SS, y = MT)) +
  geom_violin() +
  geom_point(color = "lightgray") +
  labs(title = "Violin plots of side section on movement time", x = "Side Section", y = "Movement Time")

h2_violin_plot + stat_summary(fun.y=mean, geom="point", size=2, color="red")
```


Violin plots of side section on movement time
Movement Time
2000
1000
0
Dominant
Non−Dominant
Side Section