

Final Project

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Library

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr      1.1.4      v readr      2.1.5
## v forcats    1.0.0      v stringr   1.5.1
## v ggplot2    3.5.1      v tibble    3.2.1
## v lubridate  1.9.4      v tidyr     1.3.1
## v purrr      1.0.4
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(plotly)
```

```
## Warning: package 'plotly' was built under R version 4.4.3
```

```
##
## Attaching package: 'plotly'
##
## The following object is masked from 'package:ggplot2':
##
##   last_plot
##
## The following object is masked from 'package:stats':
##
##   filter
##
## The following object is masked from 'package:graphics':
##
##   layout
```

```
library(DT)
```

```
## Warning: package 'DT' was built under R version 4.4.3
```

Data

Compiled data from iphone built-in screen-time application into a data frame

```
data=data.frame(Day = c("4/06", "4/07", "4/08", "4/09", "4/10", "4/11", "4/12", "4/13", "4/14", "4/15",  
mean(data$Screen_Time)
```

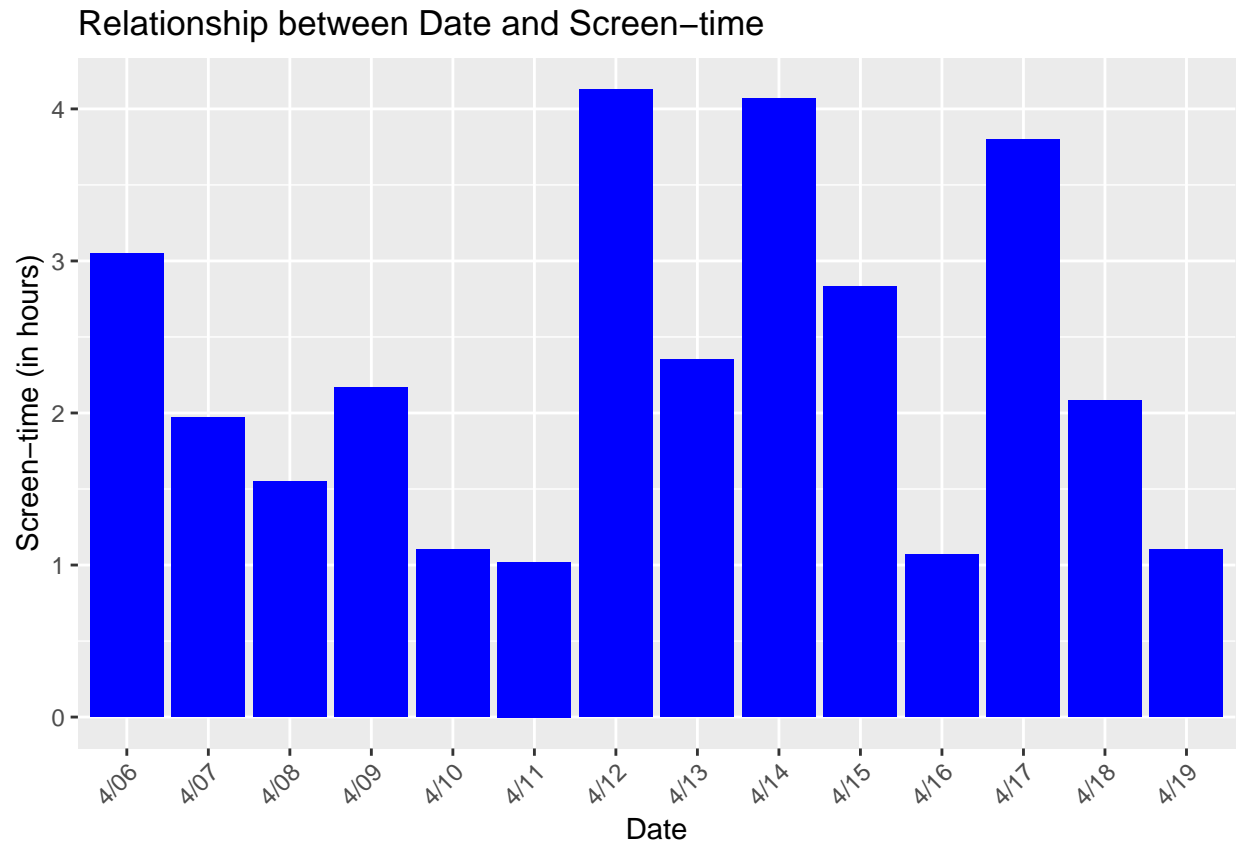
```
## [1] 2.306429
```

```
data
```

```
##      Day Screen_Time  
## 1 4/06          3.05  
## 2 4/07          1.97  
## 3 4/08          1.55  
## 4 4/09          2.17  
## 5 4/10          1.10  
## 6 4/11          1.02  
## 7 4/12          4.13  
## 8 4/13          2.35  
## 9 4/14          4.07  
## 10 4/15          2.83  
## 11 4/16          1.07  
## 12 4/17          3.80  
## 13 4/18          2.08  
## 14 4/19          1.10
```

Graphical Visualization

```
myplotbar=data%>%ggplot(aes(x=Day, y=Screen_Time))+  
  geom_col(fill="blue")+  
  labs(title = "Relationship between Date and Screen-time", x="Date", y="Screen-time (in hours)") +  
  theme(axis.text.x = element_text(angle=45, hjust = 1))  
myplotbar
```

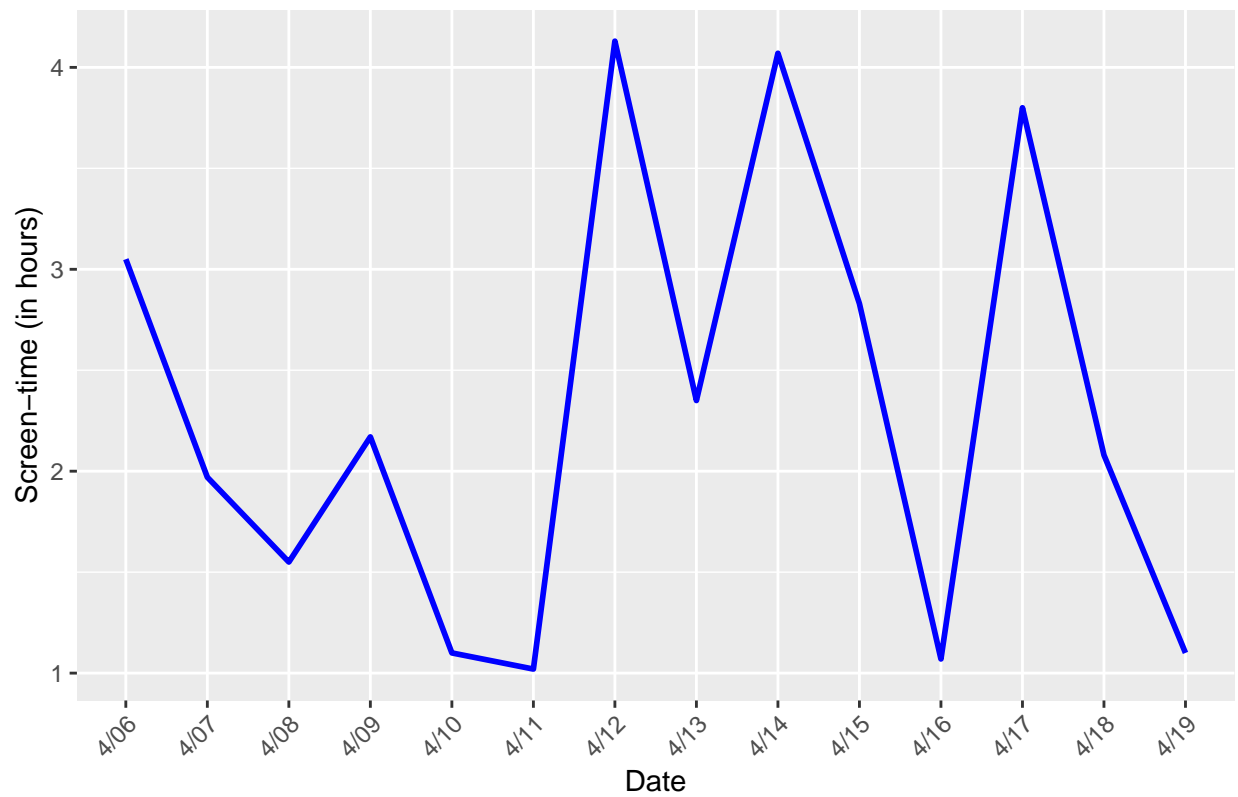


```
myplotLine=ggplot(data = data, aes(x=Day, y=Screen_Time, group = 1))+
  geom_line(color="blue", size=1)+
  labs(title = "Relationship between Date and Screen-time", x="Date", y="Screen-time (in hours)")+
  theme(axis.text.x = element_text(angle=45, hjust = 1))
```

```
## Warning: Using 'size' aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use 'linewidth' instead.
## This warning is displayed once every 8 hours.
## Call 'lifecycle::last_lifecycle_warnings()' to see where this warning was
## generated.
```

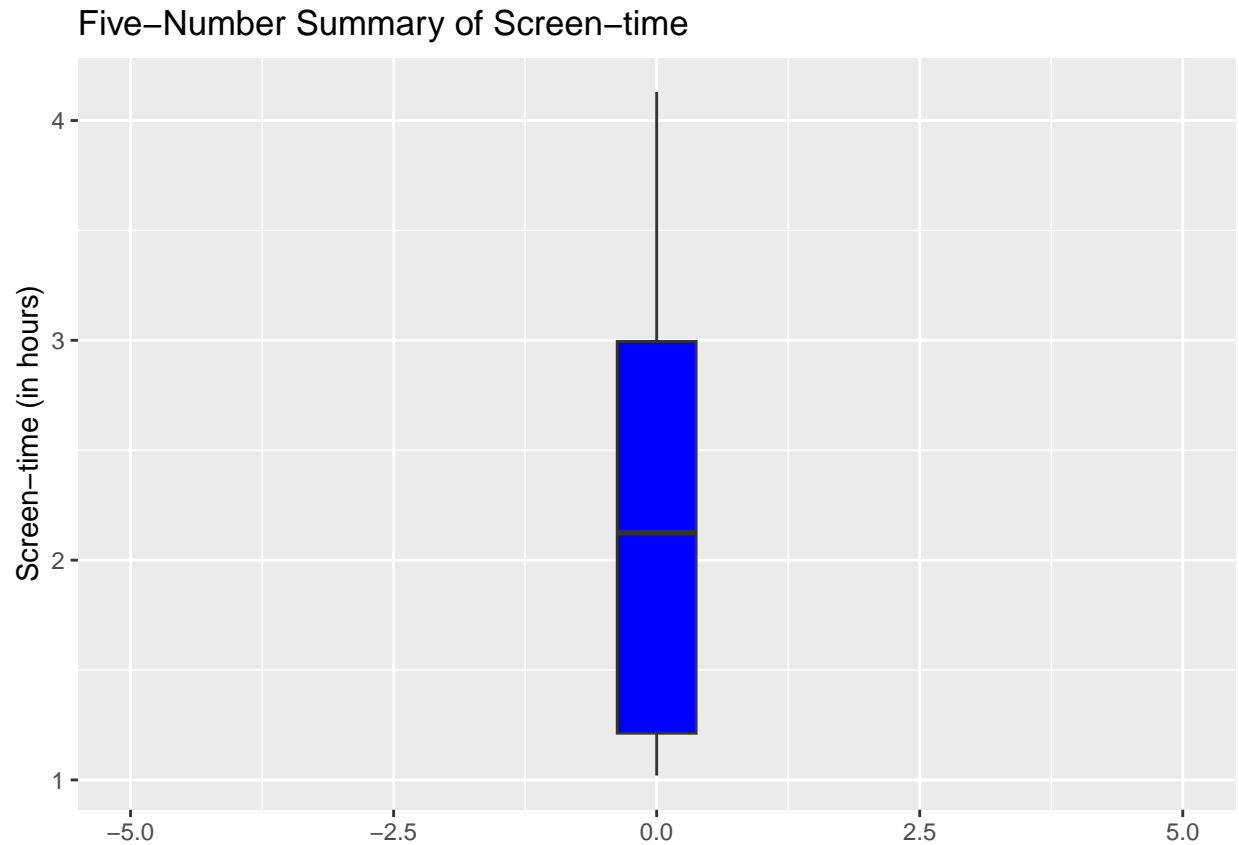
```
myplotLine
```

Relationship between Date and Screen-time



```
myplotBox=ggplot(data)+  
  geom_boxplot(aes(y=Screen_Time), fill="blue")+  
  labs(title = "Five-Number Summary of Screen-time", y="Screen-time (in hours)")+  
  xlim(-5,5)
```

```
myplotBox
```



μ : my true average daily cellular screen-time

Hypothesis

$H_o : \mu = 4.5$ vs $H_a : \mu < 4.5$ at $\alpha = 0.05$

Testing

```
t.test(data$Screen_Time, mu=4.5, alternative = "less")
```

```
##
## One Sample t-test
##
## data: data$Screen_Time
## t = -7.3197, df = 13, p-value = 2.917e-06
## alternative hypothesis: true mean is less than 4.5
## 95 percent confidence interval:
##      -Inf 2.837143
## sample estimates:
## mean of x
## 2.306429
```

Conclusion

$p - \text{value} < \alpha$. At the 5% significance level, we reject H_o , and accept H_a . We have sufficient evidence to conclude that my daily average cellular screen-time is significantly lower than the national average daily cellular screen-time or $H_a : \mu < 4.5$.