Homework 3

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Loading the data

```
df <- read.csv("homework3_data.csv")
```

Question 1: Make a recommendation to the company: Should they commit to redesigning the web site based on the criteria for success that they laid out?

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
# Summarize performance by design group
summary_stats <- df %>%
  group_by(design) %>%
  summarise(
    avg_sales = mean(sales),
    avg_nps   = mean(nps),
    .groups = "drop"
  )
print(summary_stats)
```

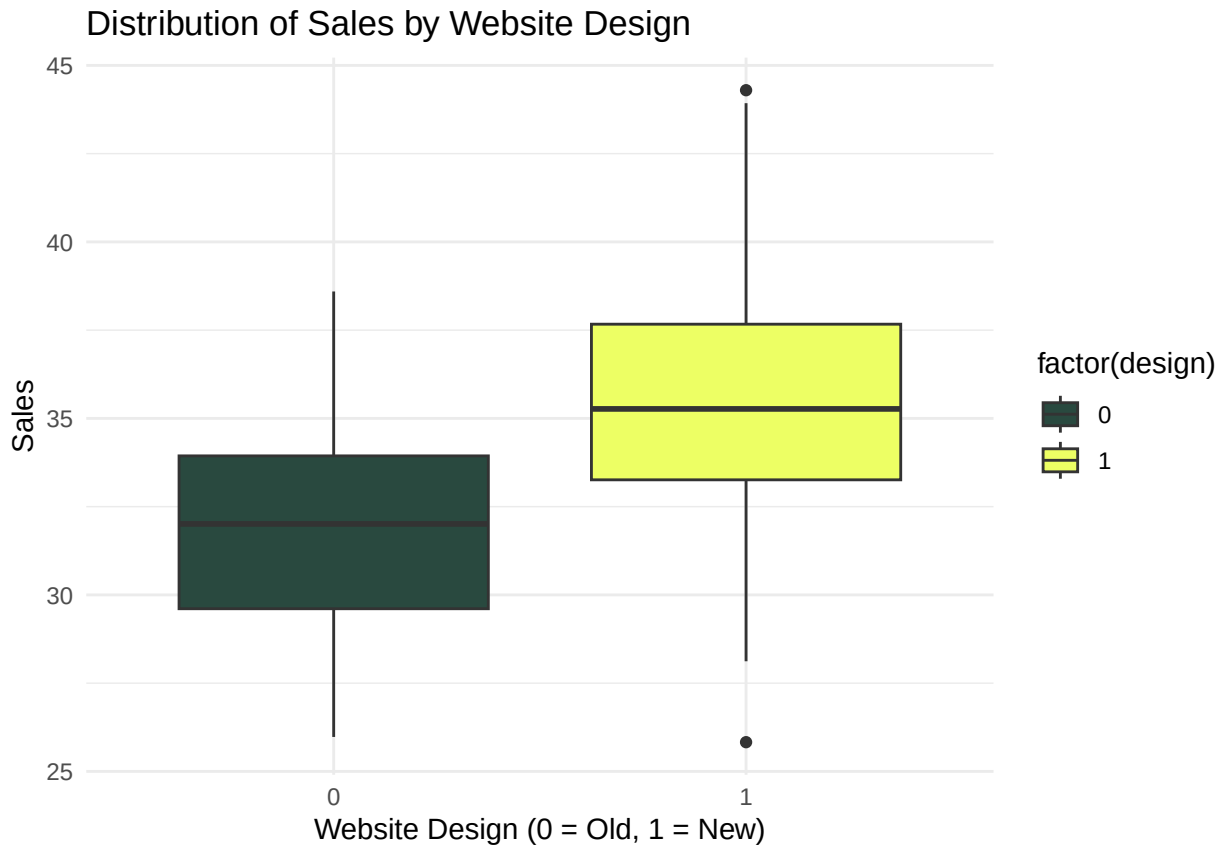
```
## # A tibble: 2 x 3
##   design avg_sales avg_nps
##    <int>     <dbl>   <dbl>
## 1      0      31.8    4.60
## 2      1      35.5    5.62
```

Based on the company's criteria for success (increasing sales and improving customer satisfaction), the redesign meets and exceeds the benchmarks. The company should commit to rolling out the redesigned website.

Question 2: Provide supporting evidence for your recommendation. You can use any statistical tools you want, but (a) you must use at least 2 graphical presentations that support your recommendation; (b) You must estimate how much sales will increase/decrease if the redesign is done; and (c) you must address the question of whether the redesign will lead to an average increase in sales of at least $1.80 per customer.

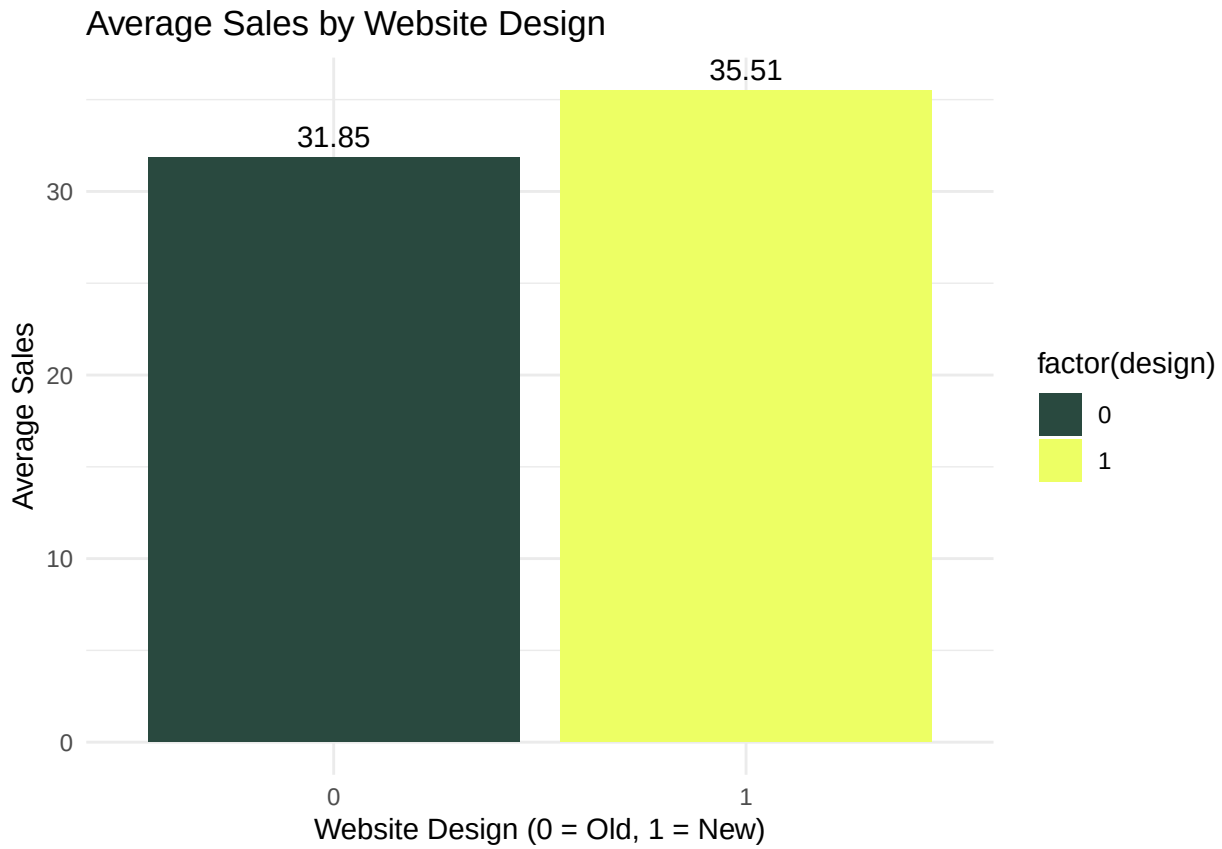
Part (a)- Graphical Evidence

```
library(ggplot2)
library(dplyr)

#SweetGreen company color selection
custom_colors <- c("#29493F", "#EDFF64")

# Boxplot of sales by design
ggplot(df, aes(x = factor(design), y = sales, fill = factor(design))) +
  geom_boxplot() +
  scale_fill_manual(values = custom_colors) +
  labs(x = "Website Design (0 = Old, 1 = New)", y = "Sales",
       title = "Distribution of Sales by Website Design") +
  theme_minimal()
```




```
# Bar chart of average sales and NPS
summary_stats <- df %>%
  group_by(design) %>%
  summarise(
    avg_sales = mean(sales),
```

```
    avg_nps   = mean(nps),
    .groups = "drop"
  )

ggplot(summary_stats, aes(x = factor(design), y = avg_sales, fill = factor(design))) +
  geom_col(position = "dodge") +
  scale_fill_manual(values = custom_colors) +
  geom_text(aes(label = round(avg_sales, 2)), vjust = -0.5) +
  labs(x = "Website Design (0 = Old, 1 = New)", y = "Average Sales",
       title = "Average Sales by Website Design") +
  theme_minimal()
```



Part (b) - Estimated Sales Change From the group means:

35.5−31.8 3.66 35.5−31.8 3.66

On average, sales are expected to increase by about $3.66 per customer if the redesign is implemented.

Part (c) - Does the redesign lead to an average increase in sales of at least $1.80 per customer. Yes. The estimated increase ($3.66) is greater than the benchmark of $1.80. Thus, the redesign more than satisfies the company's stated goal for sales improvement.

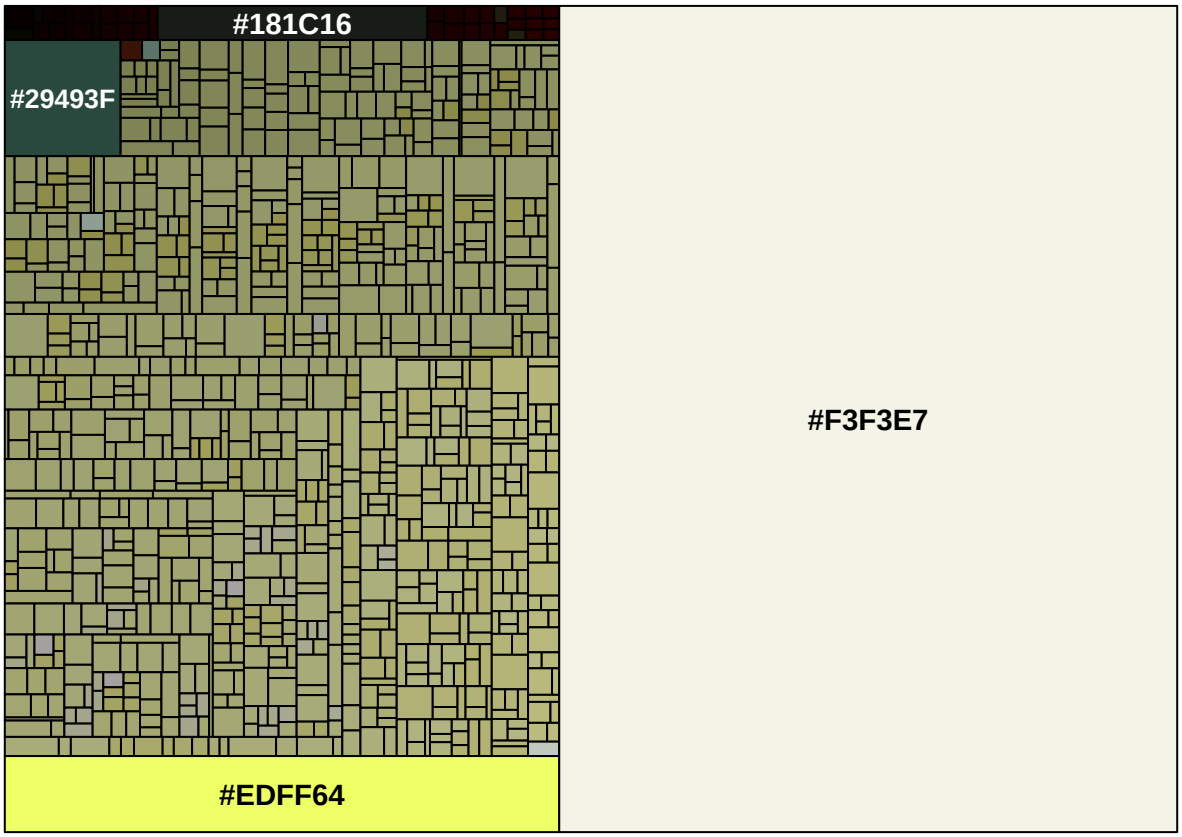
Based on the graphical evidence, the redesign should be adopted. It leads to higher sales and improved NPS, with an expected sales gain of about $3.66 per customer, comfortably exceeding the $1.80 threshold.

Question 3:

```
library(colorfindr)
company_website <- get_colors("~/Desktop/Screenshot 2025-09-25 at 12.20.52 AM.png")
company_website
```

```
## # A tibble: 718,831 x 3
##    col_hex col_freq col_share
##    <chr>      <int>     <dbl>
##  1 #F3F3E7   544818  0.157
##  2 #EDFF64    44992  0.0130
##  3 #29493F    14354  0.00414
##  4 #181C16     9823  0.00283
##  5 #999E6E     1968  0.000567
##  6 #989D6D     1902  0.000548
##  7 #9A9F6F     1841  0.000531
##  8 #979C6C     1707  0.000492
##  9 #969B6B     1537  0.000443
## 10 #9BA070     1513  0.000436
## # i 718,821 more rows
```

```
plot_colors(company_website[1:1000, ])
```



Question 4: Consider your final recommendation as the primary statement. State an alternative statement and make a fault tree for that statement

Based on the evidence, the final recommendation is that the company should commit to the redesign, as it produces an average sales increase of about $3.66 per customer and higher NPS, comfortably exceeding the

$1.80 threshold for success. An alternative statement, however, is that the redesign should not be adopted, since the observed improvements may be due to chance, limited sample size, or external factors, and thus may not represent a sustainable long-term benefit.