```r
# Lab 2
download.file("https://www.openintro.org/data/csv/starbucks.csv", destfile="sbux.csv")
starbucks_data = read.csv(file="./sbux.csv", header=TRUE, sep=",")

# Homework Exercises
# 1. Use a confidence interval to estimate the true proportion of bakery items at a typical Starbucks outlet.
items = length(starbucks_data$type)
bakery_items = sum(starbucks_data$type == "bakery")
proportion = bakery_items/items
confidence_interval = prop.test(proportion, items, conf.level=0.9)
print(confidence_interval$conf.int)

# 2. Estimate the true mean grams of fat in items sold at Starbucks locations.
fat_items = starbucks_data$fat
t.test(fat_items)

# 3. Estimate the true mean grams of carbohydrates in items sold at Starbucks.
carb_items = starbucks_data$carb
t.test(carb_items)

# 4. Is the true mean calorie content in a typical Starbucks food item below 300? Carry out a hypothesis test
# to find out.
calorie_items = starbucks_data$calories
t.test(calorie_items, mu = 300, alternative = "less")

# 5. Compute a matching confidence interval to check whether the mean calorie content is below 300.
t.test(calorie_items, mu = 300, conf.level=0.9)

# 6. Is the true mean fat content in a typical Starbucks food item below 20 grams? Use a hypothesis test to
# infer a conclusion.
t.test(fat_items, mu = 20, alternative = "less")
```

```
[1] 4.942137e-06 5.679299e-02
attr(,"conf.level")
[1] 0.9


        One Sample t-test

data:  fat_items
t = 17.025, df = 76, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 12.15576 15.37671
sample estimates:
mean of x
 13.76623


        One Sample t-test

data:  carb_items
t = 23.788, df = 76, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 41.11337 48.62689
sample estimates:
mean of x
 44.87013


        One Sample t-test

data:  calorie_items
t = 3.2338, df = 76, p-value = 0.9991
alternative hypothesis: true mean is less than 300
95 percent confidence interval:
     -Inf 358.8261
sample estimates:
mean of x
 338.8312
```

```
        One Sample t-test

data:  calorie_items
t = 3.2338, df = 76, p-value = 0.001809
alternative hypothesis: true mean is not equal to 300
90 percent confidence interval:
 318.8362 358.8261
sample estimates:
mean of x
 338.8312


        One Sample t-test

data:  fat_items
t = -7.7093, df = 76, p-value = 1.979e-11
alternative hypothesis: true mean is less than 20
95 percent confidence interval:
     -Inf 15.11268
sample estimates:
mean of x
 13.76623
```