MD2201: Data Science

Name of the student: Bhavin Patil   **Roll No. 78**

Div: D   **Batch: B-3**

Date of performance:

Experiment No.3

Title: Hypothesis Testing

Aim: i. To perform hypothesis testing for single sided tail.
    ii. To perform hypothesis testing for Two-sided tail.

Software used: Programming language R.

Code Statement:
1. Suppose the manufacturer claims that the mean lifetime of a ball bearing is 10000hours. The auditing team stated that the mean lifetime is less than what is claimed. On the basis of a randomly chosen sample of 50 ball bearings as given in the dataset, at 0.05 significance level, can we reject the claim of the manufacturer? What will be your interpretation if the significance level is made as 0.01? Consider the data set titled "Hypothesis_csv1.csv".

2. The nutrition label on a bag of potato chips says that a one ounce (28 gram) serving of potato chips has 130 calories and contains ten grams of fat, with three grams of saturated fat. A random sample of 35 bags yielded a sample mean of 134 calories with a standard deviation of 17 calories. Is there evidence that the nutrition label does not provide an accurate measure of calories in the bags of potato chips? We have verified the independence, sample size,and skew conditions are satisfied. Take alpha as 5% and 1%.

Code:
```
cat("\n*Question 1*\n\n")
f <- read.csv("Hypothesis_csv1.csv")
x1 <- mean(f$Life_Hrs)
s <- sd(f$Life_Hrs)
se <- s/sqrt(50)
p1<- pnorm(x1,10000,se)

cat("\n\nMean:",x1)
cat("\n\nStandard Error:",se)
cat("\n\nP Value for Ball bearing Example",p1)

if(p1 < 0.05){
 cat("\n\nReject null Hypothesis for 0.05")
 }else{
```

```
.       cat("\n\nDo not Reject null Hypothesis for 0.05")
        }

        if(p1 < 0.01){
          cat("\n\nReject null Hypothesis for 0.01")
        }else{
          cat("\n\nDo not Reject null Hypothesis for 0.01")
        }




        cat("\n\n*Question 2*\n")

        se2<-17/sqrt(35)
        pn <- 2*pnorm(134,130,se2,lower.tail = F)
        cat("\n\nP Value of potato chip case study: ",pn)
        if(pn > 0.05){
          cat("\n\nReject null Hypothesis for 0.05")
        }else{
          cat("\n\nDo not Reject null Hypothesis for 0.05")
        }
        if(pn < 0.01){
          cat("\n\nReject null Hypothesis for 0.01")
        }else{
          cat("\n\nDo not Reject null Hypothesis for 0.01")
        }
}
```

Results:

Question 1

Mean: 9965.001

Standard Error: 18.69222

P Value for Ball bearing Example 0.03057603

Reject null Hypothesis for 0.05

Do not Reject null Hypothesis for 0.01

.*Question 2*

P Value of potato chip case study: 0.1639167

Reject null Hypothesis for 0.05

Do not Reject null Hypothesis for 0.01

Conclusion: We have successfully performed hypothesis testing for single sided tail and two sided tail for the given case study.