Assignment 3

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Task 1

Suppose a coin toss turns up 13 heads out of 20 trials. At .05 significance level, can one reject the null hypothesis that the coin toss is fair?

Task 2

An outbreak of Salmonella-related illness was attributed to ice cream produced at a certain factory. Scientists measured the level of Salmonella in 9 randomly sampled batches of ice cream. The levels (in MPN/g) are : 0.593, 0.142, 0.329, 0.691, 0.231, 0.793, 0.519, 0.392, 0.418. Is there evidence that the mean level of Salmonella in the ice cream is greater than 0.3 MPN/g?

```
# Task 1
# Suppose a coin toss turns up 13 heads out of 20 trials. At .05 significance
# level, can one reject the null hypothesis that the coin toss is fair?

prop.test(13, 20, p=0.5, correct=FALSE)
```

```
##
##  1-sample proportions test without continuity correction
##
## data:  13 out of 20, null probability 0.5
## X-squared = 1.8, df = 1, p-value = 0.1797
## alternative hypothesis: true p is not equal to 0.5
## 95 percent confidence interval:
##  0.4328543 0.8188082
## sample estimates:
##    p
## 0.65
```

```
# Our study finds that the  chi-square=1.8,
# p=0.1797, 95% CI [0.4328543, 0.8188082]. A greater p(0.1797>0.05), fail to
# reject the null hypothesis. Therefore, At .05 significance level, we fail
to
# reject the null hypothesis that the coin toss is fair. This is strong
evidence
# that the null hypothesis is valid

# Task 2
# An outbreak of Salmonella-related illness was attributed to ice cream
produced
```

```r
# at a certain factory. Scientists measured the level of Salmonella in 9 randomly
# sampled batches of ice cream. The levels (in MPN/g) are : 0.593, 0.142, 0.329,
# 0.691, 0.231, 0.793, 0.519, 0.392, 0.418.
# Is there evidence that the mean level of Salmonella in the ice cream is greater
# than 0.3 MPN/g?

x = c(0.593, 0.142, 0.329, 0.691, 0.231, 0.793, 0.519, 0.392, 0.418)
t.test(x, alternative="greater", mu=0.3)

##
##  One Sample t-test
##
## data:  x
## t = 2.2051, df = 8, p-value = 0.02927
## alternative hypothesis: true mean is greater than 0.3
## 95 percent confidence interval:
##  0.3245133       Inf
## sample estimates:
## mean of x
## 0.4564444

# Our study finds that the  t = 2.2051, df = 8, mean is 0.4564444,
# p=0.02927, 95% CI [0.3245133, Inf]. A greater p(0.02927>0.3), fail to reject
# the null hypothesis. Therefore, At 0.3 significance level, we fail to reject
# the null hypothesis. Therefore, we have slight strong evidence that the mean
# Salmonella level in the ice cream is above 0.3 MPN/g
```