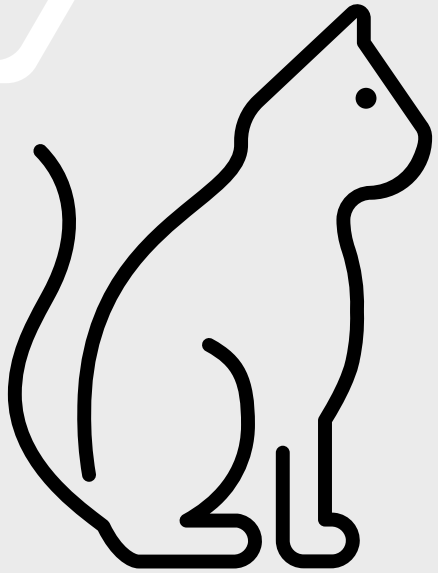
Practice 4
Hypothesis Testing



ALY 6010

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Introduction

Assumptions about the data in this test

The t-test of two samples is done to know if there is a significant difference between the two samples. These two samples can be independent, as seen in the first example. The second two samples are related. We will do the paired test as in the second example.

We will use t-test to because:

The data set record is less than 30
The population standard deviation is not known.
The data is normally distributed.

Part 1 Male and Female Cats Body Weight

Introduction and Problem Statement

We want to know if the average male cat's body weight and the average female cat's body weight difference is insignificant. (**NULL Hypothesis**).

Null Hypothesis: $H_0 : \mu_1 - \mu_2 = \mu_0$

Alternative Hypothesis: $H_1 : \mu_1 - \mu_2 \neq \mu_0$

Alternate Hypothesis : The difference is significant.

We **reject** the null hypothesis because the p-value.**0024 <.05** significance level at a **95%** confidence interval.

We conclude that the difference is significant between the female cat's weight and the male cat's weight at 95% confidence level .

```
        Paired t-test

data:  sample1 and sample2
t = -4.1717, df = 9, p-value = 0.002406
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -10.024741  -2.975259
sample estimates:
mean of the differences
                  -6.5
```

Part 2 Sleep Readings in Two Weeks-Paired Test

Introduction and Problem Statement

We want to know if the meditation influences the sleep quality .
We will assume that the mediation has no effect. (**NULL Hypothesis**).

Null Hypothesis: $H_0 : \mu_1 - \mu_2 = \mu_0$

Alternative Hypothesis: $H_1 : \mu_1 - \mu_2 \neq \mu_0$

Alternate Hypothesis : The meditation affects the sleep quality.

We **reject** the null hypothesis because the p-value.**0833 <.05** significance level at a **95%** confidence interval.

The meditation affects the sleeping quality .

```
        Paired t-test

data:  first_sample and second_sample
t = -1.9481, df = 9, p-value = 0.08322
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -1.33995222  0.09995222
sample estimates:
mean of the differences
                  -0.62
```

Part 2 Sleep Readings in Two Weeks-Paired Test

Continued

NULL Hypothesis Meditation doesn't affect the sleeping quality
Alternate Hypothesis: Meditation affects the sleeping quality.

Null Hypothesis: $H_0 : \mu_1 - \mu_2 = \mu_0$

Alternative Hypothesis: $H_1 : \mu_1 - \mu_2 \neq \mu_0$

If we choose the confidence level to be **90%.**

Our finding will not change because p-value is .**08<.1** the significance level. We reject the null hypothesis at **90%** confidence level as well.

The meditation affects the sleeping quality at **90%** confidence level.

```
data:  first_sample and second_sample
t = -1.9481, df = 9, p-value = 0.08322
alternative hypothesis: true difference in means is not equal to 0
90 percent confidence interval:
 -1.20340497 -0.03659503
sample estimates:
mean of the differences
                 -0.62
```