

task

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```
# Load required packages
# (Only needed if you're using actual data from CSV or Excel)
# library(tidyverse)

# T-test for independent samples
scores <- data.frame(
  group = rep(c("yes", "no"), each = 15),
  score = c(85, 80, 78, 83, 81, 79, 84, 82, 87, 83, 85, 88, 80, 86, 84,
            72, 70, 69, 73, 75, 68, 71, 74, 70, 69, 72, 71, 68, 73, 70)
)
t_test_indep <- t.test(score ~ group, data = scores)
print("Independent t-test result:")

## [1] "Independent t-test result:"
print(t_test_indep)

##
## Welch Two Sample t-test
##
## data: score by group
## t = -12.683, df = 25.412, p-value = 1.709e-12
## alternative hypothesis: true difference in means between group no and group yes is not equal to 0
## 95 percent confidence interval:
## -13.94707 -10.05293
## sample estimates:
## mean in group no mean in group yes
## 71 83

# Paired t-test
bp <- data.frame(
  before = c(140, 145, 138, 142, 141, 139, 144, 143, 140, 137,
            141, 142, 139, 143, 138, 140, 144, 146, 139, 141),
  after = c(130, 132, 129, 134, 133, 130, 131, 132, 129, 128,
            131, 132, 130, 133, 129, 130, 134, 135, 130, 132)
)
t_test_paired <- t.test(bp$before, bp$after, paired = TRUE)
print("Paired t-test result:")

## [1] "Paired t-test result:"
print(t_test_paired)

##
## Paired t-test
```

```
##
## data: bp$before and bp$after
## t = 32.254, df = 19, p-value < 2.2e-16
## alternative hypothesis: true mean difference is not equal to 0
## 95 percent confidence interval:
##  9.257573 10.542427
## sample estimates:
## mean difference
##          9.9
```

```
# ANOVA test
```

```
heart_data <- data.frame(
  group = rep(c("A", "B"), each = 20),
  bpm = c(72, 70, 71, 73, 74, 72, 70, 72, 73, 71,
           70, 72, 74, 72, 71, 73, 72, 72, 73, 71,
           72, 72, 73, 71, 72, 70, 72, 74, 73, 71,
           70, 71, 72, 73, 72, 70, 72, 71, 73, 72)
)
anova_model <- aov(bpm ~ group, data = heart_data)
print("ANOVA result:")
```

```
## [1] "ANOVA result:"
```

```
summary(anova_model)
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## group         1    0.1   0.100   0.075  0.786
## Residuals    38   51.0   1.342
```

```
# Correlation test
```

```
study <- data.frame(
  attendance = c(2, 3, 4, 5, 6, 7, 8, 9, 10, 11),
  score = c(55, 60, 65, 70, 74, 78, 82, 85, 88, 90)
)
cor_result <- cor.test(study$attendance, study$score, method = "pearson")
print("Correlation test result:")
```

```
## [1] "Correlation test result:"
```

```
print(cor_result)
```

```
##
## Pearson's product-moment correlation
##
## data: study$attendance and study$score
## t = 23.988, df = 8, p-value = 9.72e-09
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.9700795 0.9984322
## sample estimates:
##          cor
## 0.9931203
```

```
# Chi-squared test
```

```
gender <- c(rep("Male", 20), rep("Female", 20))
preference <- c("Remote", "Office", "Remote", "Remote", "Remote", "Office", "Remote", "Remote", "Office",
                "Office", "Remote", "Remote", "Remote", "Remote", "Remote", "Office", "Remote", "Office", "Remote", "Remote")
```

```

        "Office", "Office", "Office", "Remote", "Office", "Remote", "Office", "Office", "Remote",
        "Remote", "Remote", "Office", "Remote", "Remote", "Office", "Office", "Remote", "Remote"
table_data <- table(gender, preference)
chi_result <- chisq.test(table_data)
print("Chi-squared test result:")

## [1] "Chi-squared test result:"
print(chi_result)

##
## Pearson's Chi-squared test with Yates' continuity correction
##
## data:  table_data
## X-squared = 1.6368, df = 1, p-value = 0.2008
# Additional ANOVA example with 3 groups
work_hours <- data.frame(
  department = rep(c("HR", "Finance", "IT"), each = 15),
  hours = c(
    38, 39, 40, 41, 39, 40, 38, 40, 39, 41, 40, 39, 38, 40, 39,
    39, 40, 41, 40, 39, 40, 38, 41, 40, 39, 40, 40, 39, 40, 39,
    40, 41, 39, 40, 40, 38, 39, 40, 41, 40, 39, 39, 40, 40, 40)
)
anova_work <- aov(hours ~ department, data = work_hours)
print("ANOVA (Work Hours by Department) result:")

## [1] "ANOVA (Work Hours by Department) result:"
summary(anova_work)

##           Df Sum Sq Mean Sq F value Pr(>F)
## department  2   0.93   0.4667   0.615  0.545
## Residuals  42  31.87   0.7587

```