Untitled

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```r
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ---------------------- tidyverse 2.0.0 --
## v dplyr     1.1.4      v readr     2.1.5
## v forcats   1.0.0      v stringr   1.5.1
## v ggplot2   3.5.1      v tibble    3.2.1
## v lubridate 1.9.3      v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ---------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```r
library(ggplot2)
library(readxl)
library(ggplot2)
```

```r
final_data_001 <- read_excel("final data.001.xlsx")
```

```r
Mathematics <- final_data_001$Mathematics
Programming <- final_data_001$Programming

# Perform Welch Two-Sample t-test (one-tailed)
t_test_result <- t.test(Programming, Mathematics, alternative = "greater", var.equal = FALSE)

# Display the result
print(t_test_result)
```

```
##
##  Welch Two Sample t-test
##
## data:  Programming and Mathematics
## t = -0.84031, df = 25.228, p-value = 0.7957
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
##  -22.3072       Inf
## sample estimates:
## mean of x mean of y
##  62.14286  69.50000
```

```r
# Calculate means and standard errors
means <- c(mean(Programming), mean(Mathematics))
std_errors <- c(sd(Programming) / sqrt(length(Programming)), sd(Mathematics) / sqrt(length(Mathematics)))

# Create a data frame for plotting
plot_data <- data.frame(
  Subject = c("Programming", "Mathematics"),
  Mean = means,
  SE = std_errors
)

# Plot the bar chart with error bars
ggplot(plot_data, aes(x = Subject, y = Mean, fill = Subject)) +
  geom_bar(stat = "identity", position = "dodge", width = 0.7) +
  geom_errorbar(aes(ymin = Mean - SE, ymax = Mean + SE), width = 0.2) +
  labs(title = "Average Study Time by Subject", y = "Average Time (Minutes)", x = "Subject") +
  theme_minimal() +
  scale_fill_manual(values = c("lightcoral", "lightgreen"))
```