Assignment 1

Your Name

2025-06-13

Goal of this assignment

The goal of this assignment is to (i) review a few basic concepts and to (ii) make sure that you can knit an `Rmd` document with the basic features that will be needed throughout this course. Please complete exercises (1) and (2), rename the `Rmd` file to "Assignment1_YourLastName.Rmd" (e.g., "Assignment1_Smith.Rmd"), your name in the header, and knit the Rmd to an html file or pdf file. Please submit that html or pdf file on CANVAS by Friday, June 20th midnight. You may work in pairs, but each one of you will have to submit your own file.

1. Using your own words, describe a randomized complete block design (RCBD) in 3-5 sentences. Then write out a statistical model (using mathematical notation) that could be fitted to data generated by an RCBD.

Some ideas you could mention in your description: what assumptions are made under an RCBD, why are blocks useful, what could go wrong if we don't include blocks in the statistical model, describe the steps to design an RCBD, describe when you use RCBDs in your research, etc.

For the model, you can use LaTeXcode embedded in your Rmd, or paste a picture. You can check the raw Rmd files from the lectures (including LaTeXcode) at https://github.com/stat720/summer2025/tree/main/_notes. Otherwise, you can check out the Rmd cheatsheet or the `knitr::include_graphics()` function.

2. Edit the R code below:

- Silence the `messages` and `warnings`: your submitted pdf or html should include the code, but not the warnings/messages seen below.
- Print a summary of `model1`.
- Find and print the value for $\hat{\sigma}^2$ estimated in `model1`.

```
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 1.9.4     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 error
```

```
library(agridat)
data("omer.sorghum")
```

```r
df <- omer.sorghum %>% filter(env == "E3")
model1 <- lm(yield ~ 1 + gen + rep, data = df)
```