Project 3 Pre-analysis Plan

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1. Objective

Estimate the effects of:

- (A) adding preservative or not
- (B) water type (tap vs filtered)

on the longevity of cut flowers kept in the office. We also record stem length (short/long) as a blocking factor and exploratory modifier. We will maintain a lab notebook and make all analyses reproducible per course guidelines.

2. Design, units, treatments, blocking, randomization

- Treatments (2×2):
    - A: Preservative = {Yes, No}
    - B: Water type = {Tap, Filtered}
- Containers: one identical bottle per 4 stems
- Blocking factors: Stem length (short/long).
- Randomization: Within each block (Length), assign stems uniformly at random to the 4 cells (equal allocation). Record a seeded assignment table for reproducibility.
- Water changes: every 3 days for all vases; observations taken at change times and on Day 0.

3. Outcomes measurement schedule

- Outcome measurement:
  - Number of dead and dying blossoms in each vase at each observation to measure the freshness.
  - From the daily blossom counts, we can further have the vase-level failure rate.

4. Analysis plan

- 4-1. Permutation Test -Permutation test on A by blocking B, stem length(short, long) -Permutation test on B by blocking A, stem length(short, long) -multiple testing if necessary

- 4-2. Regression Analysis Response variable: Number of dying and dead blossoms Explanatory variables: Number of blossoms, time, (A), (B), stem length

- 4-3. Survival Analysis -Permutation test on A by blocking B, stem length(short, long) -Permutation test on B by blocking A, stem length(short, long) We fit cox regression to the proportion of live blossoms for each treatment permutation. The P-value is computed from the quantile of the realized treatment assignment in the permutation distribution.