> **Learning Goals**
>
> - Use compound logical operators (&, |, !) to create more complex conditions and perform index selection.
> - Identify patterns in character vectors using `grep()` and `grepl()` and interpret their different outputs.
> - Clean and modify text data by substituting patterns with `sub()` and `gsub()`.
> - Apply common utility functions and operators to select, locate, and validate values in vectors.

Key Definitions

- **Compound Logical Operators:**

- `grep()`/`grepl()`:

- `sub()`/`gsub()`:

- `set.seed()`/`sample()`:

- `which()`:

- `match()`:

- `any()`/`all()`:

- `%in%`:

Practice Problems

For each task below, write the R code you would use *and* briefly describe what you expect the output to look like.

1. Let `temps <- c(48, 55, 61, 70, 73, 68, 59, 45, 64)`. Display only the temperatures that are at least 60 and below 75.

2. Using the same vector `temps`, display only the temperatures that are below 50 or above 70.

3. Let `titles <- c("Data Analysis", "Linear Models", "Intro to Data using R", "Regression Basics", "R Markdown Guide")`. Use `grep()` to return the indices of the titles that start with the pattern `"R"`.

4. Using the same vector `titles`, use `grepl()` to create a logical vector indicating which titles contain with the word `"Data"`.

5. Let `names <- c("Dr. Smith", "Mr. Lee", "Ms. Patel", "Mrs. Johnson", "Dr. Kim")`. Use `sub()` to replace only the first occurrence of `"Dr."` with `"Professor"`.

6. Let `student_grades <- c("B", "A", "C", "A", "B", "D")`. Use `%in%` to determine which student grades are either an `"A"` or a `"B"`.