

STA 220 - Data and Web Technologies for Data Analysis - Lab 2

Draw a random sample of 5 letters without replacement from the first five letters of the English alphabet:

```
sample(LETTERS[1:5], 5, replace = FALSE)
## [1] "E" "D" "C" "B" "A"
```

What is the probability that the sample contains at least one of all five letters, i.e., at least one “A”, at least one “B”, at least one “C”, at least one “D”, AND at least one “E”?

Write a function to *estimate* the probability by performing many independent replications of the experiment and counting how often the event in question occurs.

Solution

The probability is 1.

```
my_simulator.s <- function(n_reps, n_ltrs, n_sample) {
  if(n_ltrs < n_sample){print("you can't take a sample without replacement larger than the population")}
  else{n_successes <- 0 # Initialize counter
    for (i in 1:n_reps) {
      x <- sample(LETTERS[1:n_ltrs], n_sample, replace = FALSE)
      is_success <- all(LETTERS[1:n_ltrs] %in% x)
      n_successes <- n_successes + is_success
    }
    n_successes / n_reps}
}

my_simulator.s(10000, 5, 5)
## [1] 1
```