Simulating Conditional Events

In this exercise, we will compute the probability of an event based on conditional probabilities.

Example

Suppose the probability of an adult Canadian experiencing a regular flu during a winter is 12% without a vaccination and with a vaccination, the infection probability is reduced to 3%. If 35% of the adult population in Canada gets vaccinated every year, what is the probability that a randomly selected Canadian adult experiences a regular flu during a winter?

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```
N <- 100
# the probabilities
pvac <- 0.35        # P(V)
pflu_vac <- 0.03    # P(F|V)
pflu_no_vac <- 0.12 # P(F|V^c)
# simulate vaccinated population with TRUE / FALSE otherwise
s_vac <- sample(
  x = c(T, F), size = N, replace = TRUE,
  # we can pass the probabilities manually
  prob = c(pvac, 1 - pvac))
# simulate flu infection based on vaccination
s_flu <- numeric(N)
for(i in 1:N) {
  # conditioned on vaccine
  if(s_vac[i])
```

```
[1] 0.06
```

Hint: After simulating vaccinated popoulations, you can use a for loop with an if / else statement to simulate flu infections. If you are familiar with `tidyverse` or `dplyr`, you can check out `rowwise` operations.

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