Coding Problem 2

2023-09-02

```r
# Possible outcomes for passengers getting on or off the bus (0 and 1)
s = c(0, 1)
```

```r
# Corresponding probabilities for passengers getting on or off
p_on = c(0.8, 0.2)
p_off= c(0.5, 0.4, 0.1)
```

```r
simulate_bus_occupancy = function() {
  bus_occupancy = 0
  for (current_stop in 1:10) {
    # Simulate passengers getting off the bus
    passengers_getting_off = sum(sample(s, bus_occupancy, replace = TRUE, prob = p_on))
    bus_occupancy = bus_occupancy - passengers_getting_off

    # Simulate passengers getting on the bus
    passengers_getting_on = sample(0:2, size=1, prob = p_off )
    bus_occupancy = bus_occupancy + passengers_getting_on
  }
  return(bus_occupancy)
}
```

```r
nsimulation = 100000

simulated_data = replicate(nsimulation, simulate_bus_occupancy())

probability = mean(simulated_data==0)
probability
```

```
## [1] 0.05377
```