

# Airplane Problem Monte Carlo Simulation

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*#Problem: one hundred people line up to board an airplane. Each has a boarding pass with assigned seat.*

```
set.seed(100)
sample_size <- 10000
count <- 0

for(i in 1:sample_size) {
  #create array for passengers, list for seats, list for available seats
  passengers <- array(1:100, dim = c(1, 100))
  seats <- as.list(rep(0, 100))
  available_seats <- 1:100
  #set first passenger to sit in a random seat. Domain: a random seat from 1-100
  passengers[1] <- floor(runif(1, 1, 100))

  for(j in 1:100) {
    if(seats[passengers[j]] == 0) {
      seats[passengers[j]] <- 1
      available_seats <- available_seats[available_seats!=passengers[j]]
    } else {
      #new seat to sit in is generated randomly. Domain: a random seat that is available
      passengers[j] <- sample(available_seats, 1, replace = T)
      seats[passengers[j]] <- 1
      available_seats <- available_seats[available_seats!=passengers[j]]
    }
  }
  #deterministic calculation: count = count + 1 if last passenger is in his original seat
  if(passengers[100] == 100) {
    count = count + 1
  }
}
#aggregation of results
print(count/sample_size)
```

```
## [1] 0.5093
```