

Title: Rcode for week 6 Joint Exercise

Subtitle: POLI502 Models of Political Analysis

Author: Conor Craig

Date: 10-03-2023

```
# set seed for replication
set.seed(1)
# create an empty vector to store the birthday matches
match <- 0
# number of person we're looking for matches from
n <- 100
# number of simulations ran (went low due to my computer)
sam = 1000
# Actual simulation code
for(i in 1:sam) {
  # 1:365 is choosing a random number between 1 - 365
  # n is the number of elements within the sample
  bdays <- sample(1:365, n, replace = TRUE)
  # birthdays are put on a table so that matches can be determined.
  bday_2 <- table(bdays)
  #this is saying that if there are three or more matches, to add it to the match vector
  if(any(bday_2 >= 3)) {
    match <- match + 1
  }
}
#the number of matches divided by the number of simulations to determine the probability
birth_match <- match /sam
print (birth_match)
```

```
## [1] 0.665
```

```
# set seed for replication
set.seed(90)
# creating empty vectors to store values
stay_wins <- 0
switch_wins <- 0
# number of simulations
sims <- 1000
# actual simulation code
for (i in 1:sims) {
  # the right door and the first choice are both a random door 1 - 3
  right_door <- sample(1:3, 1)
  first_choice <- sample(1:3, 1)
  # the revealed door is different (setdiff) from the first door and right door
  revealed_door <- sample(setdiff(1:3, c(first_choice, right_door)), 1)
  # the remaining door can either be the right door or another goat but can't be the
  # first door or the revealed door
  remaining_door <- setdiff(1:3, c(first_choice, revealed_door))
  # if else statement used to tally up the wins from staying and the wins from switching
  if (first_choice == right_door) {
    # number of wins by staying
    stay_wins <- stay_wins + 1
  }
}
```

```
    } else {  
      # number of wins by swtiching  
      switch_wins <- switch_wins + 1  
    }  
  }  
  # Calculate the probabilities of winning by staying and by switching  
  prob_stay <- stay_wins / sims  
  prob_switch <- switch_wins / sims  
  
  print(prob_stay)
```

```
## [1] 0.321
```

```
print(prob_switch)
```

```
## [1] 0.679
```