Homework 2

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# Simulations

## Sec 1.8 Problem 12

ppl <- c(rep(1, 2), rep(0, 33) )  
nsim <- 1000000  
  
out <- rep(NA, nsim)  
for(i in 1:nsim){  
 # Select 1 team  
 team1 <- sample(ppl, 10)  
   
 # Are both people on that team or the other team?   
 out[i] <- sum(team1) %in% c(0,2)  
}  
  
# Estimated probability  
sum(out)/length(out)

## [1] 0.57986

Check that this answer is similar to the calculated probability

(choose(33, 23) + choose(33, 8))/choose(35, 10)

## [1] 0.5798319

## Sec. 1.10 Problem 1

cards <- c(rep(1, 4), rep(0, 48))  
nsim <- 1000000  
  
out <- rep(NA, nsim)  
for(i in 1:nsim){  
 # Deal 5 cards to each of 3 people  
 deal <- sample(cards, 15)  
 # How many aces did each person get?   
   
 A <- sum(deal[1:5])  
 B <- sum(deal[6:10])  
 C <- sum(deal[11:15])  
   
 out[i] <- A == 2 | B == 2 | C == 2  
}  
  
# Estimated probability   
sum(out)/ length(out)

## [1] 0.118686

Check that it’s close to the estimated probability

3 \* choose(4, 2) \* choose(48, 3) / choose(52, 5) -   
 3 \* choose(5, 2) \* choose(5, 2) / choose(52, 4)

## [1] 0.1186813