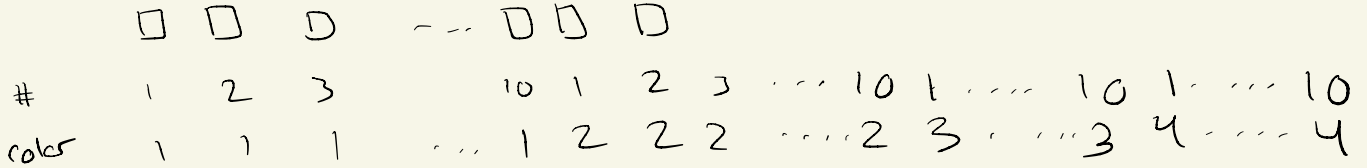
Final Exam Review

Q 28 Final exam review questions

40 cards, 4 different colors. Each color has 10 cards # 1 - 10. Pick two cards (w/ out replacement)

Want: probability that the two cards have different #s and different colors

40 cards



card_numbers <- rep(1:10, 4)

card_colors <- rep(1:4, each = 10) <- 1,1,1,...,1 (10 times), 2,2,2,...,2 (10 times), ...

```
nsim <- 1000
results <- rep(NA, nsim)
card_numbers <- rep(1:10, 4)
card_colors <- rep(1:4, each = 10)
```

<- 1,1,1,...,1 (10 times), 2,2,2,...,2 (10 times), ...

```
for(i in 1:nsim){
    cards_drawn <- sample(1:40, 2, replace = F)
    results[i] <- (card_numbers[cards_drawn[1]] != card_numbers[cards_drawn[2]])
        & (card_colors[cards_drawn[1]] != card_colors[cards_drawn[2]])
}

mean(results)
```

```
f1(g1(3))
```

Exercise 9.

```
f1 <- function(n, groups){
  x <- matrix(1, nrow=n, ncol=n)
  unique_groups = unique(groups)
  means <- matrix(nrow = length(unique_groups), ncol = n)
  for(i in 1:length(unique_groups)){
    means[i,] <- colMeans(x[groups == unique_groups[i],])
  }

  return(means)
}

f1(5, groups = c(1, 1, 2, 2, 2))
```