

ECS 132 HW 1

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Question 1

```
set.seed(123) # Set seed for reproducibility

# Number of repetitions for the simulation
nreps <- 100000000

# Function to simulate the probability of total being 18 given the first spin is fixed
simulate_probability <- function(first_spin, total_sum, nreps) {
  # Counter for successful trials where total equals total_sum
  success_count <- 0

  # Loop through nreps trials
  for (i in 1:nreps) {
    # Randomly sample two spins from the range 0 to 16
    other_spins <- sample(0:16, 2, replace = TRUE)

    # Calculate the sum of the spins
    total <- first_spin + sum(other_spins)

    # Check if the total matches the target total_sum
    if (total == total_sum) {
      success_count <- success_count + 1
    }
  }

  # Calculate the probability as the fraction of successful trials
  probability <- success_count / nreps
  return(probability)
}

# Calculate the probability for first spin being 5 and total being 18
prob_5 <- simulate_probability(5, 18, nreps)
cat("Probability of total 18 given first spin is 5:", prob_5, "\n")
```

You are playing a version of the roulette game, where the pockets are from 0 to 16 and even numbers are red and odd numbers are black (0 is green). You spin 3 times and add up the values you see. What is the probability that you get a total of 18 given on the first spin you spin a 5? What about an 8?

```
## Probability of total 18 given first spin is 5: 0.04844199
```

```
# Calculate the probability for first spin being 8 and total being 18
prob_8 <- simulate_probability(8, 18, nreps)
```

```
cat("Probability of total 18 given first spin is 8:", prob_8, "\n")
```

```
## Probability of total 18 given first spin is 8: 0.03803592
```