Unit 6 Pre-Class Warm-up

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Setup

```
n = 3
p = 0.5

sample(c(0, 1), 3, prob = c((1-p), p), replace = TRUE)
```

```
## [1] 0 1 1
```

```
trials = rbinom(n, size=3, prob=0.5)
```

The Fair Coin

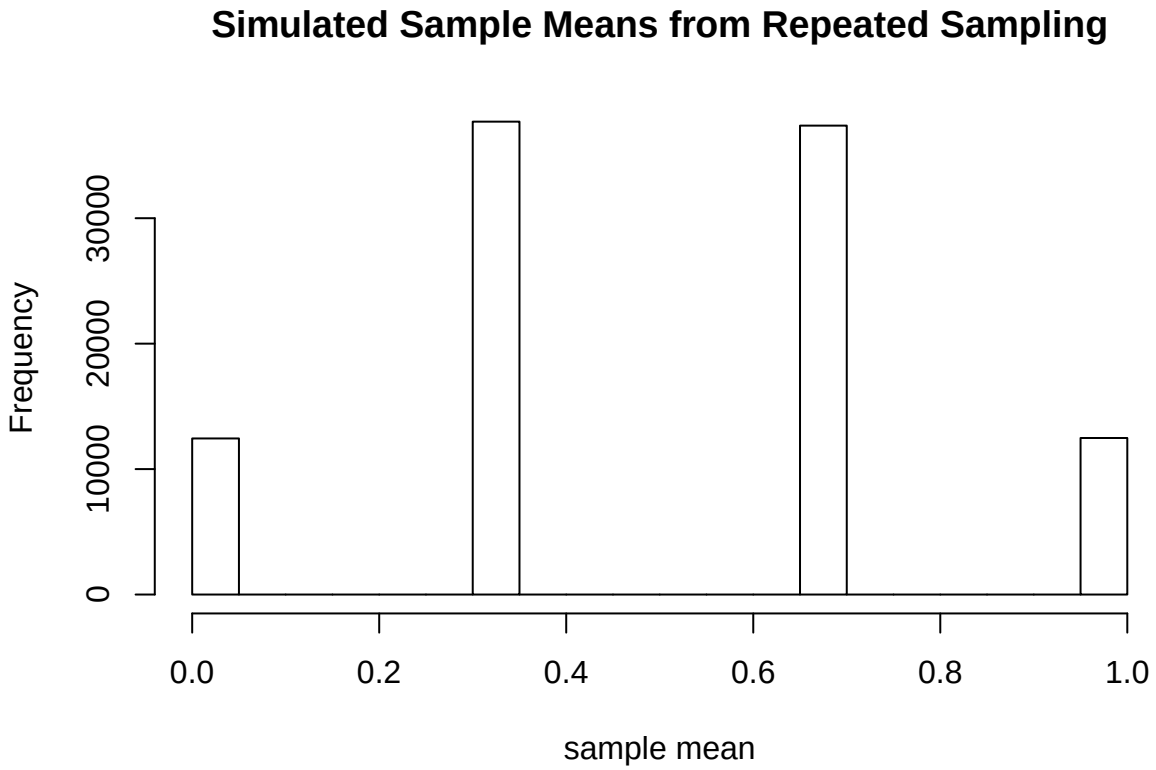
```
# Initialize variables
# Sample Size
n = 3

# Probability
p = 0.5

# Number of trials
t = 100000

execute_study <- function(n, p) {
  mean(sample(c(0, 1), n, prob = c((1-p), p), replace = TRUE))
}

# Vector for storing results
vec = c()

# Run execute_study 100,000 times
for(i in 1:t) {
  vec[i] = execute_study(3, 0.5)
}

# Calculate mean
(vec_mu = mean(vec))
```

```
## [1] 0.4996567
```

```
# Calculate standard deviation
(vec_sd = sd(vec))
```

```
## [1] 0.2883721
```

```r
hist(vec,
     main = "Simulated Sample Means from Repeated Sampling",
     xlab = "sample mean")
```



Since n = 3, there are only 4 possible choices of $\bar{X}$ values: $[0, \frac{1}{3}, \frac{2}{3}, 1]$. The histogram has a normal distribution, concentrating in the middle 2 values that are close to the μ value.