**Key points**

* We can run a Monte Carlo simulation to confirm that a 95% confidence interval contains the true value of p 95% of the time.
* A plot of confidence intervals from this simulation demonstrates that most intervals include p, but roughly 5% of intervals miss the true value of p.

**Code: Monte Carlo simulation**

Note that to compute the exact 95% confidence interval, we would use qnorm(.975)\*SE\_hat instead of 2\*SE\_hat.

B <- 10000  
inside <- replicate(B, {

X <- sample(c(0,1), size = N, replace = TRUE, prob = c(1-p, p))

X\_hat <- mean(X)  
 SE\_hat <- sqrt(X\_hat\*(1-X\_hat)/N)

between(p, X\_hat - 2\*SE\_hat, X\_hat + 2\*SE\_hat) # TRUE if p in confidence interval

})

mean(inside)