Lab Assignment 1: Frequentist & Bayesian Comparison

For n=30, p=0.8, perform 10,000 simulations. Each simulation entails:

1. Draw n random Bernoulli variables, with parameter p. (Drawing 1 binomial(n,p) instead is ok.) (Do not report.)
2. Find 95% intervals for three methods: frequentist, uniform-prior Bayesian, Beta(8,2)-prior Bayesian. (Do not report.)
3. Record the length of each interval. (Do not report.)
4. Record whether the interval captures the true p. (Do not report.)

After 10,000 simulations are complete, find the observed coverage and average interval length for each method. These amounts should be included in your write-up.

Repeat the above, except now use n=5.

Give code for the frequentist and uniform-prior Bayesian methods. Report results. Comment on them briefly, especially the difference between Bayesian and frequentist methods at the different values of n. The whole thing should be able to fit on one page or you're doing something wrong.