

Helpful R code for homework 2

Use the help command to see what these commands do.

The command `rbinom(n,k,p)` returns the total number of heads on n experiments where each experiment has k coin flips.

```
### generate n coin flips each having prob p and plot
p <- .3
n <- 1000
x <- rbinom(n,1,p)    ### n experiments, each with one coin flip
p.empirical <- cumsum(x)/(1:n)
### cumsum computes the cumulative sum
### If you don't see what this is doing,
### try it for n=5 and look carefully.
par(mfrow=c(2,2))    ### put 4 plots per page
plot(1:n,p.empirical,type='l',lwd=3,
     xlab='number of coin flips', ylab='',ylim=c(0,1))
lines(1:n,rep(p,n),lty=3,col=2,lwd=3) ### add the true value of p
```

To simulate 1 experiment with k flips:

```
X <- rbinom(1,k,p)    ### sum of k flips
```

To simulate $nsim$ experiments with k flips:

```
nsim <- 1000
output <- rep(0,nsim)
for(i in 1:nsim){
  output[i] <- rbinom(1,k,p)
}
print(mean(output))
print(k*p)
```

Here is a better way to do the same thing:

```
nsim <- 1000
output <- rbinom(nsim,k,p)
hist(output)          ### draw a histogram of the output
plot(table(output))   ### another way to plot it
print(mean(output))
print(k*p)
```