Writing a Simulation Function in R

Here's an example of a simulation for spinning a roulette wheel.

```
> roulette <- function(nspins){
+ # this function simulates a number of bets on red in
+ # a roulette wheel and reports a variety of statistics
+ wins <- c()
+ #initialize the vector that will store the outcomes
+ wheel <- c(rep(1,18),rep(-1,20))
+ #this defines the "wheel", which gives us 1 dollar 18/38
of the time
+ for (i in 1:nspins){
+ wins <- c(wins, sample(wheel,1))}
+ # for each spin, draw a sample from the wheel, and store
it, appending it
+ # to the past outcomes.
+ total <- cumsum(wins)
+ # keep a running total of winnings
+ avg <- total/1:nspins
+ #keep a running total of average winnings
+ list(wins = wins,totals = total, avgs = avg)
+ #output will be a list containing these three vectors,
whose names are
+ # on the left-hand side of the equals sign.
+ }
>
```

When running this program, it's very important that you assign the output to a vector:

```
output <- roulette(100)
```

To refer to the output, use the $ sign:

```
> names(output)
[1] "wins"   "totals" "avgs"
> output$wins[1:10]
 [1] -1  1  1  1 -1 -1 -1 -1 -1 -1
> output$totals[1:10]
 [1] -1  0  1  2  1  0 -1 -2 -3 -4
> output$avgs[1:10]
 [1] -1.0000000  0.0000000  0.3333333  0.5000000  0.2000000
0.0000000
 [7] -0.1428571 -0.2500000 -0.3333333 -0.4000000
```

What if you make a mistake while typing in the function? If so, you pretty much have to start all over again. But there's an easier way.

You can type your function into another file, using any word processor. Save the file as "ascii" (or "text only"). Put the file in R's "working directory." (I recommend you change the working directory to your "documents" folder, or some other easy to access folder, by selecting "Change Working Directory" under the "Tools" menu.)

Suppose that we created a file named "foo.txt" that consisted of the function above. To compile the program, from within R type
source("foo.txt")
and you will either compile the file or get error messages. You can then edit the file to make corrections, and then "source" it when you are ready.