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#####
####      CHECKING HATS EXERCISE SOLUTION      ####
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```
# Suppose that men in the old days wore only two
# types of hats, black and grey, and that hats of
# a particular type are indistinguishable. Assume
# 20 men with hats visit the restaurant and half
# of the men are wearing each type of hat. The
# hats are randomly mixed, and we are interested
# in the number of men who leave the restaurant
# with the correct hat.
```

```
# 1) Modify the function scramble.hats() to compute
# the number of correct matches in this setting.
# (The only change is the definition of the vector
# hats; if one represents a black hat and a grey hat
# using a 1 and 2, respectively, then hats consist
# of ten 1's and ten 2's.
```

```
scramble.hats2 = function(){
  hats = c(rep(1, 10), rep(2, 10))
  mixed.hats = sample(hats)
  sum(hats == mixed.hats)
}
```

```
# 2) Using the function replicate(), repeat this
# simulation for 1000 trials. Store the number of
# matches for the 1000 experiments in the vector
# matches.
```

```
matches = replicate(1000, scramble.hats2())
```

```
# 3) From the simulated values, approximate the
# probability that 10 or more men receive the
# correct hats. Also, find the expected number
# of correct matches. Then, plot a histogram of
# the non-parametric distribution of correct
# matches.
```

```
mean(matches >= 10)
# [1] 0.683 on this simulation, it may vary
```

```
mean(matches)
# [1] 10.004 on this simulation, it may vary
```

```
hist(matches) # see plot in pdf
```

Histogram of matches

