Exam 1 review

Q17 (exam review)

if a player sees same color on other two hats, guess color they don't see ; else they pass

e.g.

P1	P2	P3
red	blue	blue

P1: guess red

P2: pass

P3: pass

Process

1. 3 players; randomly assign a colored hat to each player

2. Each player guesses their color
   - if they see two of the same color, guess opposite
   - else, pass

3. Check if the player(s) who guessed were correct
   if all guesses are correct, they collectively win

4. Repeat many times!

Code ideas

```
hats <- sample(c("red", "blue"), 3,
               replace = T)
```

for loop over this for each player

```
# first player
if (hats[2] == hats[3]){
  guess[1] <- ifelse(hats[2]=="red",
                     "blue",
                     "red")
} else {
  guess[1] <- "pass"
}
```

```
guess[guess != "pass"] ==
    hats[guess != "pass"]
```

← for loop (around whole process)

Put it all together:

```
hats:  c("red", "blue", "red")
hats[-1]:  c("ble", "red")
hats[-1][1] : "blue"        hats[-1][2]:
                              "red"
```

```
nsim <- 1000
results <- rep(NA, nsim)
for (i in 1:nsim){
      # create hats
      hats <- sample (c("red","blue"), 3, replace=T)
      guess <- rep(NA, 3)
      # loop over players
      for (j in 1:3) {
            if( hats[-j][1] == hats[-j][2]) {
                  guess[j] <- ifelse (hats[-j][1] == "red", "ble", "red")
            } else {
                  guess[j] <- "pass"

            }
      }
      # check if all guessed colors are correct (#Ts == length of vector)
    results[i] <- sum(guess[guess != "pass"] == hats[guess != "pass"]) ==
                    length (guess[guess != "pass"])
}

mean(results) # proportion of times players won the game
```

Q15

requirements: · x[[1]] eturn function mean

```
x <- list(mean,

x[[1]](c(1,2,3))    =>    mean(c(1,2,3))
↳ 2                        ↳ 2
```

```
if (....) {
   ....
}else{
   .....
}
```

← not vectorized   generally vectorized → ifelse(...,....,....)

QS :

```
output <- rep(1, 10)
for (i in 2:10){
    output[i] <- i + output[i+1]
}
output[5]
```

$\overbrace{1 \quad 1 \quad 1 \cdots\cdots 1}^{\text{length } 10}$

i=2 : $\text{output}[2] \leftarrow \underbrace{2 + \underbrace{\text{output}[3]}_{1}}_{3}$

output :

1 3 1 1 1

i = 3 : $\text{output}[3] \leftarrow \underbrace{3 + \underbrace{\text{output}[4]}_{1}}_{4}$

1 3 4 1 1

⋮

i = 5 : $\text{output}[5] \leftarrow \underbrace{5 + \underbrace{\text{output}[6]}_{1}}_{6}$

1 3 4 5 $\boxed{6}$ 1 ...