CSC 120 (R Section), Spring 2015 — Quiz #2 Answers

No books, notes, or calculators are allowed. You have 25 minutes to write this quiz.

Question 1: [30 marks] Consider a function called `whathappens` defined as follows:

```
> whathappens <- function (abc, xyz) {
+     Q <- abc + pqr
+     1000*Q + xyz
+ }
```

(The `>` and `+` characters at the beginning of the lines above (and below) are the prompts printed by R, not part of the function.)

After `whathappens` is defined as above, the lines below are typed into the R console, one after the other. In each of the three blank areas below, write what R will print after the line above is typed in, taking into account what will have happened earlier.

```
> pqr <- 5
> xyz <- 6
> Q <- 13
> whathappens (2, 8)

  ANSWER: 7008

> Q

  ANSWER: 13

> xyz

  ANSWER: 6

> abc <- 12
> whathappens (4, 3)

  ANSWER: 9003
```

Question 2: [20 marks] Write down what R will print after the lines below are typed into the R console. (Careful, it's a bit tricky — keep track of what `x` will be!)

```
> x <- rep(2,3)
> while (length(x) < 7) x <- c(x,x+1)
> x

  ANSWER: 2 2 2 3 3 3 3 3 3 4 4 4
```

Question 3: [25 marks] Consider a function called `whatcalc` defined as follows:

```
> whatcalc <- function (stuff) {
+     a <- 0
+     for (i in 1:length(stuff)) {
+         v <- stuff[[i]]
+         p <- v[1] * v[2]
+         a <- a + p
+     }
+     a
+ }
```

Write down the value returned by this function that is printed after the line below is typed to the R console. Also say what values are assigned to the variable `p` during this call of the function.

```
> whatcalc (list (c(3,2), 10:20, rep(2,5)))
```

ANSWER: p is set to 6, 110, 4. The value returned is 120.

Question 4: [25 marks] Write down the definition of a function called `ones_in_corners` that will take as its only argument a positive integer `n`, and return as its value a matrix with `n` rows and `n` columns whose elements are zeros except for the four corners of the matrix, which are ones. (The corner elements are in the first row, first column, the first row, last column, the last row, first column, and the last row, last column).

ANSWER:

```
ones_in_corners <- function (n) {
   M <- matrix(0,nrow=n,ncol=n)
   M[1,1] <- 1
   M[1,n] <- 1
   M[n,1] <- 1
   M[n,n] <- 1
   M
}
```