CSC 120 (R Section) — Quiz #1 — 2016-01-29

No books, notes, or calculators are allowed. You have 30 minutes to write this quiz.

**Question 1**: [24 Marks] On the six blank lines below, write what R will output at that point if the commands shown are typed into the R console window. Note that the ”>” shown at the beginnings of lines is the R command prompt, not something typed.

```r
> 7+3*10
> a <- 5
> b <- a+1
> a <- 2
> a*b

> x <- c(4,3,9)
> x[1]+x[a]

> x*a

> y <- x
> x[2] <- 10
> x+y

> s <- "pineapple"
> substring(s,4,4)=="e"
```

**Question 2**: [26 Marks] Consider a function called `mystery` defined as follows:

```r
mystery <- function (a) {
    x <- a
    if (a[4]==0)
        x[1] <- 0
    else
        x[1] <- 1
}
```

Below are two calls of this function. Write in the blank lines after them what R will output as a result of these calls.

```r
> mystery (c(3,2,7,0,2))

> mystery (c(7,3,1,4))
```
Question 3: [25 Marks] Write down a definition for a function called limit that takes as arguments a number \( x \) and a positive number \( \text{lim} \), and returns as its value the argument \( x \) if its absolute value is less than \( \text{lim} \), and otherwise returns \( \text{lim} \) if \( x \) is positive and \(-\text{lim}\) if \( x \) is negative. You must use only R features that have been covered in lectures and labs; in particular, you must not use R’s \texttt{min} or \texttt{max} functions. You may use the \texttt{abs} function if you wish.

Examples: \( \text{limit(-3,7)} \) is \(-3\), \( \text{limit(-9,7)} \) is \(-7\), \( \text{limit(12,7)} \) is \(7\).

Question 4: [25 Marks] Write down a definition for a function called positive_sum that takes two arguments, called \( \text{vec1} \) and \( \text{vec2} \), which you should assume are numeric vectors of the same length (which is at least one). The function should return as its value a numeric vector the same length as its arguments, in which each element is the sum of the corresponding elements of \( \text{vec1} \) and \( \text{vec2} \), except that if this sum is negative, the value for that element should be \(-1\). You should use only those R features that we have covered so far in the course.

Here is the output from an example call of this function:

```r
> positive_sum (c(3,-18,2,-2,5), c(2,13,4,-3,-2))
[1] 5 -1 6 -1 3
```