

Week 2 - Quiz 1

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1. Suppose I define the following function in R:

```
cube <- function(x, n) {x^3}
```

What is the result of running

```
cube(3)
```

```
## [1] 27
```

in R after defining this function?

☐ The number 27 is returned

☐ A warning is given with no value returned.

☐ An error is returned because 'n' is not specified in the call to 'cube'

☐ The users is prompted to specify the value of 'n'.

2. The following code will produce a warning in R.

```
x <- 1:10
if(x > 5) {
  x <- 0
}
```

```
## Warning in if (x > 5) {: a condição tem comprimento > 1 e somente o
## primeiro elemento será usado
```

Why?

☐ There are no elements in 'x' that are greater than 5

☐ 'x' is a vector of length 10 and 'if' can only test a single logical statement.

☐ You cannot set 'x' to be 0 because 'x' is a vector and 0 is a scalar.

☐ The expression uses curly braces.

☐ The syntax of this R expression is incorrect.

3. Consider the following function

```
f <- function(x) {
  g <- function(y) {
    y + z
  }
  z <- 4
  x + g(x)
}
```

If I then run in R

```
z <- 10
f(3)
```

```
## [1] 10
```

What value is returned?

[] 4

[] 7

[] 16

[x] 10

4. Consider the following expression. What is the value of ‘y’ after evaluating this expression?

```
x <- 5
y <- if(x < 3) {
  NA
} else {
  10
}
```

[x] 10

[] NA

[] 5

[] 3

5. Consider the following R function. Which symbol in the above function is a free variable?

```
h <- function(x, y = NULL, d = 3L) {
  z <- cbind(x, d)
  if(!is.null(y))
    z <- z + y
  else
    z <- z + f
  g <- x + y / z
  if(d == 3L)
    return(g)
  g <- g + 10
  g
}
```

[x] f

[] z

[] d

[] L

[] g

6. What is an enviroment in R?

- ☐ a list whose elements are all functions
- ☒ a collection of symbol/value pairs
- ☐ an R package that only contains data
- ☐ a special type of function

7. The R language use what type of scoping rule for resolving free variables?

- ☐ global scoping
- ☐ compilation scoping
- ☐ dynamic scoping
- ☒ lexical scoping

8. How are free variables in R functions resolved?

- ☐ The values of free variables are searched for in the environment in which the function was called
- ☒ The values of free variables are searched for in the environment in which the function was defined
- ☐ The values of free variables are searched for in the working directory
- ☐ The values of free variables are searched for in the global environment

9. What is one of the consequences of the scoping rules used in R?

- ☒ All objects must be stored in memory
- ☐ All objects can be stored on the disk
- ☐ Functions cannot be nested
- ☐ R objects cannot be larger than 100 MB

10. In R, what is the parent frame?

- ☐ It is the environment in which a function was defined
- ☐ It is always the global environment
- ☒ It is the environment in which a function was called
- ☐ It is the package search list