Course_2_Weekly_Quiz_2

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Question 1: Suppose I define the following function in R

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

What is the result of running?

```
cube(3) # 3^3=27
```

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

Question 2: The following code will produce a warning in R. Why?

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

```
## Warning in if (x > 5) {: the condition has length > 1 and only the first element
## will be used
```

A. There are no elements in ‘x’ that are greater than 5

B. You cannot set ‘x’ to be 0 because ‘x’ is a vector and 0 is a scalar.

C. The syntax of this R expression is incorrect.

D. The expression uses curly braces.

E. ‘x’ is a vector of length 10 and ‘if’ can only test a single logical statement.

- **Answer**: E. ‘x’ is a vector of length 10 and ‘if’ can only test a single logical statement.

Question 3:

```
f <- function(a) {
       g<- function(b) {
              b+c
        }
        c <- 4
        a + g(a)
}
```

If I then run in R

```
f(3)
```

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

- **Answer**: The result is 10.

What we know from the first sight:
g = function (b) = b+c
c = 4
f = function(a) = a + g(a)

when a = 3:
f(3) = 3 + g(3) = 3+(3+4) = 10

Question 4: Consider the following expression:

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

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

What is the value of ‘y’ after evaluating this expression?
- **Answer**: 10

What we know from the first sight:
x = 5 y = NA (when x<3) y = 10 (when x >=3)

Question 5: 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
}
```

- **Answer**: f

Question 7: The R language uses what type of scoping rule for resolving free variables?

A. dynamic scoping

B. lexical scoping

C. compilation scoping

D. global scoping

- **Answer**: B. lexical/static scoping - 定义表达式并能被访问的区间

Question 8: How are free variables in R functions resolved?

A. The values of free variables are searched for in the global environment

B. The values of free variables are searched for in the environment in which the function was defined

C. The values of free variables are searched for in the working directory

D. The values of free variables are searched for in the environment in which the function was called

- **Answer**: B. The values of free variables are searched for in the environment in which the function was defined.

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

A. All objects must be stored in memory

B. All objects can be stored on the disk

C. R objects cannot be larger than 100 MB

D. Functions cannot be nested

- **Answer**: A. All objects must be stored in memory

Question 10: In R, what is the parent frame?

A. It is the package search list

B. It is always the global environment

C. It is the environment in which a function was defined

D. It is the environment in which a function was called

- **Answer**: D. It is the environment in which a function was called.