

Introductory Quiz R/Statistics

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1. Is R an interpreted language or a compiled language?
2. Is R written in C or Fortran?
3. R is a functional language [TRUE | FALSE]
4. Is R a vectorized language?
5. Give an example of another vectorized language?
6. What does this program print?

```
> x <- 3
> fx <- function() {
+   x <- 4
+   return(x)
+ }
> print(fx())
> print(x)
```

7. What does this program print?

```
> fx <- function(x) {
+   x <- x * x
+   return(x)
+ }
> x <- 4
> fx(x)
> x
```

8. What does the program print?

```
> X <- c(1, 2, 3, 4)
> Y <- 1:4
> print(X == Y)
```

9. What does this program print? What probability mass function is this?

```
> F <- function(alpha) {  
+   function(s, f) {  
+     alpha^s * (1 - alpha)^f  
+   }  
+ }  
> print(F(0.5)(2, 2))
```

10. Recycling: The object Z is ?, what about Q and W:

- (a) a 4×1 vector
- (b) a number
- (c) an error
- (d) a 4×3 matrix.

```
> X <- c(1, 2, 3, 4)  
> Y <- c(3, 9, 10)  
> W <- X * X  
> Z <- X * Y  
> Q <- X %*% Y
```

11. Given the normal linear regression model $Y_i = X_i^T \beta + \epsilon_i$, where $\epsilon \sim N(0, \sigma^2)$

- (a) Using least squares what is the estimate for β ?
- (b) How about $\text{var}(\hat{\beta})$ where $\hat{\beta}$ is the estimate of β using linear regression?