Loops

Introduction to R

Question 1

Write a `for()` loop to add, elementwise, the vectors `x` and `y` defined below. Place each sum into the vector `x.plus.y` (which you can initialize using, e.g., `x.plus.y <- rep(NA,4)`, where `NA` means "not available" or missing), then after the `for()` loop, display `x.plus.y`.

```
x <- c(1,2,3,4)
y <- c(-2,2,-3,3)
x.plus.y <- rep(NA,4)
for ( ii in seq_along(x.plus.y) ) {
  x.plus.y[ii] <- x[ii] + y[ii]
}
x.plus.y
```

```
## [1] -1  4  0  7
```

Question 2

Write a `for()` loop to sum the natural logarithms of all elements of the vector `z`, defined below, that are positive. (Use `if` to check for positivity.) Display the result. Show that you can perform the same task without a `for()` loop, by utilizing logical-based vector subsetting and one call to `sum()`.

```
z <- c(-5,1,2,-4,3,4,-3,6)
sum.z.positive <- 0
for ( ii in 1:length(z) ) {
  if ( z[ii] > 0 ) {
    sum.z.positive <- sum.z.positive + log(z[ii])
  }
}
sum.z.positive
```

```
## [1] 4.969813
```

```
sum(log(z[z>0]))
```

```
## [1] 4.969813
```

Question 3

Write a `while()` loop that computes the sum of the first 100 positive integers. (Set the variable `s` equal to zero, then increment its value with each loop.) Then display the result. (It should be 5050.)

```
s <- 0
ii <- 1
while ( ii <= 100 ) {
  s <- s+ii
  ii <- ii+1
}
s
```

```
## [1] 5050
```

Question 4

Repeat Q3, but use a `for()` loop instead.

```
s <- 0
for ( ii in 1:100 ) {
  s <- s + ii
}
s
```

```
## [1] 5050
```

Question 5

Write a `while()` loop that samples one value from a standard normal, then breaks when the value is greater than 4. (The code would be `if ( rnorm(1) > 4 ) break` .) Also include an incrementing variable that increments by one with each loop, and display its value when the loop is broken. (In other words: display how many loops occurred before a sampled value of > 4 was observed.)

```
ii <- 1
while ( ii ) {
  if ( rnorm(1) > 4 ) break
  ii <- ii+1
}
ii
```

```
## [1] 40360
```