What do we mean when we say we ‘vectorize’ an operation in R? How do you think you can apply vectorized operations in your R code? Your response should be one paragraph in length.

To vectorize an operation in R is to apply mathematical, logical, assignment, and filter operations on vectors or between vectors. Vectorized operations are applied to all elements of a vector, dataframe, or even a matrix based on its position, alleviating the need to loop through and act on each element. This makes writing code more concise, easy to read, and less error prone, particularly if the data sets employed are particularly large.

For example, assignment of consecutive numbers to two different number vectors:

x <- 1:4

y <- 6:9

Allows for arithmetical operations

sum\_xy <- x + y

Behind the scenes what occurs is

x: 1 2 3 4

y: 6 7 8 9

sum\_xy: 7 9 11 13

Thus, the calling vector sum\_xy would produce:

* [1] 7 9 11 13

Simultaneously performing the operations by position in the vectors has ever increasing efficiency with much larger data sets (increased columns and rows).

<https://docs.ycrc.yale.edu/r-novice-gapminder/09-vectorization/>