

1. Tabulate the execution times of each of the individual approaches for computing distance in Python (i.e., run the shared code on your computer, note the times, and tabulate them).

For Loop	0.011 seconds
Apply	0.006 seconds
Vectorized	0.001 seconds

2. Next, replicate the for-loop based approach (the first one) and two different ways to make that version more efficient, in R. Profile these three approaches, and tabulate the results.

For Loop	0.0280 seconds
Apply	0.000859 seconds
Vectorized	0.01698 seconds

3. Based on the computational efficiency of implementations in Python and R, which one would you prefer? Based on a consideration of implementation (i.e., designing and implementing the code), which approach would you prefer? Taking both of these (run time and coding time), which approach would you prefer?

The vectorized approach employed by Python runs with a time duration of 0.001 seconds which surpasses R's apply implementation by 0.000859 seconds thus rendering them comparable in terms of speed. It becomes easier to work with Python syntax through implementation due to NumPy vectorized operations which offer simpler understanding and implementation but R requires learning different apply functions and vectorization methods. I would choose Python because it offers better time efficiency during maintenance and development stages compared to R despite minimal runtime performance variations on this operation scale.

4. Identify and describe one or two other considerations, in addition to these two, in determining which of the two environments – Python or R – is preferable to you.

Two additional key considerations beyond runtime and implementation ease are: 1) ecosystem integration - Python has a broader ecosystem that extends well beyond data

analysis into web development, machine learning, and general-purpose programming, making it more versatile for projects that might need to expand beyond pure data analysis, while R's ecosystem is more specialized and optimized for statistical computing and data visualization, and 2) community support and package maintenance - Python's larger and more diverse developer community often results in better-maintained packages and more comprehensive documentation, though R's statistical packages are often developed by statisticians themselves, potentially providing more statistically rigorous implementations for specialized analytical tasks.