1. Create an m x n matrix with replicate(m, rnorm(n)) with m=10 column vectors of n=10 elements each,

constructed with rnorm(n), which creates random normal numbers.

Then we transform it into a dataframe (thus 10 observations of 10 variables) and perform an algebraic

operation on each element using a nested for loop: at each iteration, every element referred by the two

indexes is incremented by a sinusoidal function, compare the vectorized and non-vectorized form of creating

the solution and report the system time differences.

Ans.

m <- replicate(10, rnorm(10), simplify = "matrix") # matrix 10 x 10 with random normal numbers

m

m <- as.data.frame(m) # transforming into data frame

View(m)

library(rbenchmark)

benchmark(

vect = as.vector(m), # vecotrized form

conc = (n <- as.vector(for (i in seq(nrow(m))) {

for (j in seq(ncol(m))) { # nested for

print(2\*sin(m[i, j])) # performing algebraic function on each element

}

}))

)