**Problem statement :**

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.

**Solution:**

m <- replicate(10, rnorm(10), simplify = "matrix")

m

m <- as.data.frame(m)

View(m)

install.packages("rbenchmark")

library(rbenchmark)

benchmark(

vect = as.vector(m),

conc = (n <- as.vector(

for (i in seq(nrow(m))) {

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

print(2\*(m[i,j]))

}

}))

)