**Assignment 2.3**

**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.

**Ans**:

**Creating a 10 by 10 matrix :**

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

matx

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

View(matx)

install.packages("rbenchmark")

library(rbenchmark)

benchmark(

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

  conc = (n <- as.vector(

    for (i in seq(nrow(matx))) {

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

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

      }

    }))

)