# SESSION 3: FOUNDATIONAL R PROGRAMMING

Assignment 2

## Table of Contents

# 1. Introduction

This assignment will help you understand the concepts learnt in the session.

# 2. Objective

This assignment will test your skills on Data Structures in R.

# 3. Prerequisites

Not applicable.

# 4. Associated Data Files

Not applicable.

# 5. Problem Statement

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.
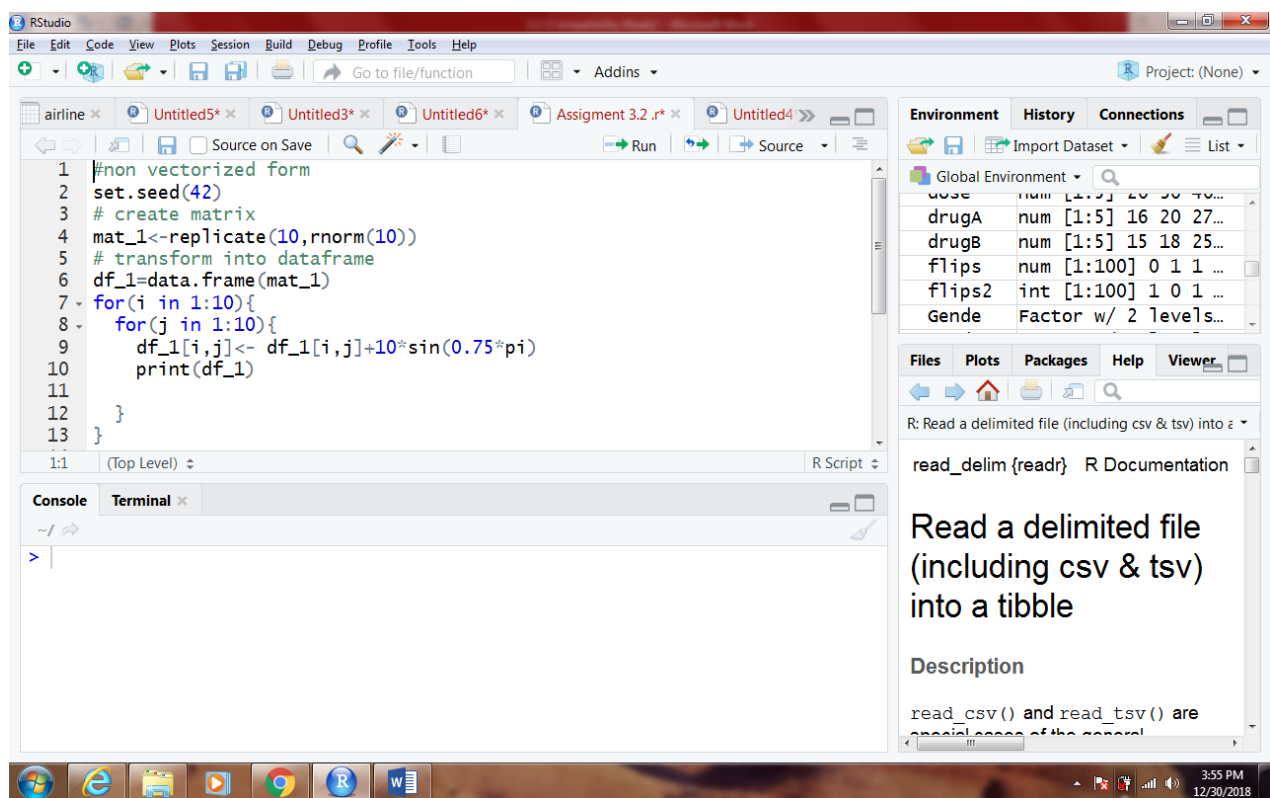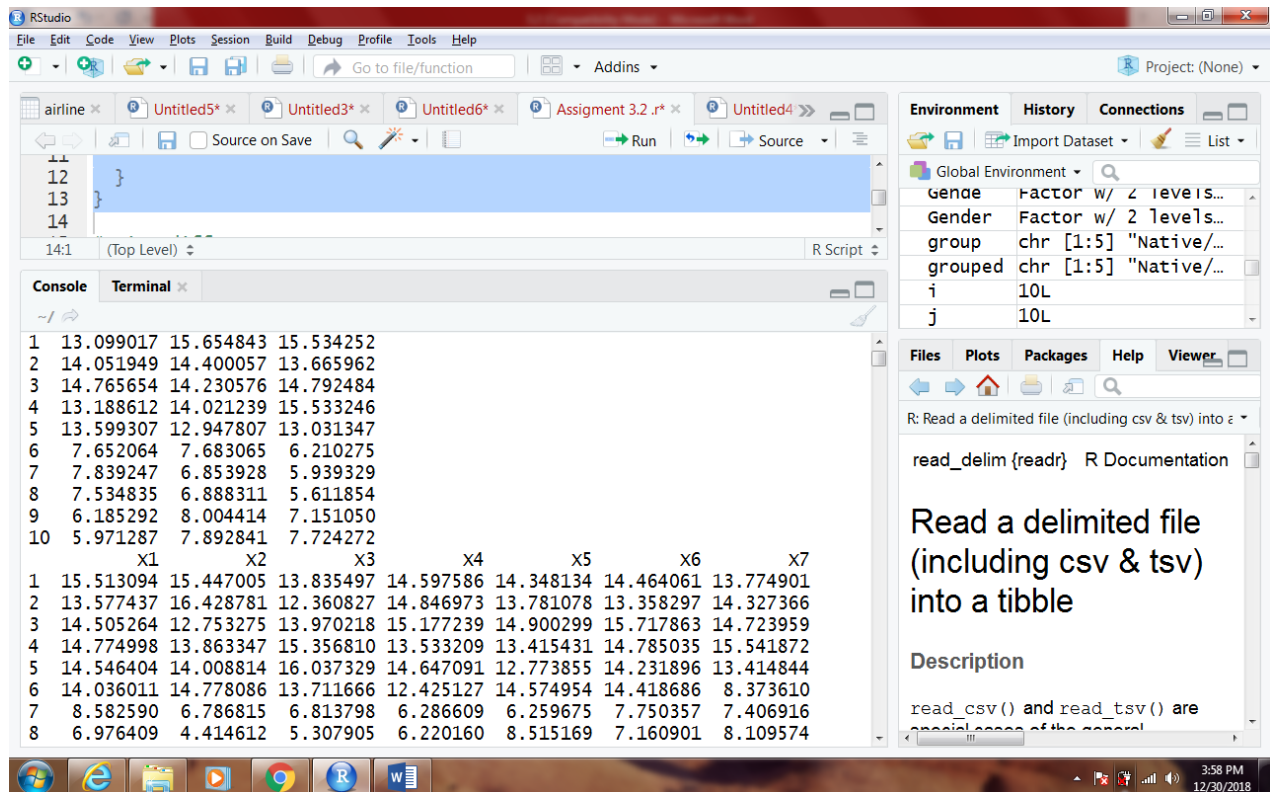
```r
#non vectorized form
set.seed(42)
# create matrix
mat_1<-replicate(10,rnorm(10))
# transform into dataframe
df_1=data.frame(mat_1)
for(i in 1:10){
  for(j in 1:10){
    df_1[i,j]<- df_1[i,j]+10*sin(0.75*pi)
    print(df_1)

  }
}
```

R screen

```
# time difference
system.time(
  for(i in 1:10){
    for(j in 1:10){
      df_1[i,j]<- df_1[i,j]+10*sin(0.75*pi)
    }
  }
)
```

R – studio

File  Edit  Code  View  Plots  Session  Build  Debug  Profile  Tools  Help

Addins ▾

Project: (None) ▾

airline ×  | Untitled5* × | Untitled3* × | Untitled6* × | Assigment 3.2 .r* × | Untitled4 ▸▸

Source on Save  | Run  | Source ▾

```
10       print(df_1)
11
12     }
13   }
14
15   # time difference
16   system.time(
17     for(i in 1:10){
18       for(j in 1:10){
19         df_1[i,j]<- df_1[i,j]+10*sin(0.75*pi)
20       }
21     }
22   )
23
```

23:1  (Top Level) ▾                                                R Script ▾

Console  Terminal ×

~/ ⇱

```
+     for(j in 1:10){
+       df_1[i,j]<- df_1[i,j]+10*sin(0.75*pi)
+     }
+   }
+ )
   user  system elapsed
   0.05    0.00    0.04
> |
```

Environment  History  Connections

Import Dataset ▾  | List ▾

Global Environment ▾

Gende    Factor w/ 2 levels…
Gender   Factor w/ 2 levels…
group    chr [1:5] "Native/…
grouped  chr [1:5] "Native/…
i        10L
j        10L

Files  Plots  Packages  Help  Viewer

R: Read a delimited file (including csv & tsv) into a ▾

read_delim {readr}   R Documentation

# Read a delimited file (including csv & tsv) into a tibble

## Description

read_csv() and read_tsv() are

3:58 PM
12/30/2018

Data Analytics

## 6.  Expected Format

1.  R file should be submitted where applicable.
2.  R file should be in PDF or in .r format
3.  Proper screenshots of the outputs should be submitted as well
4.  The r codes, if submitted in any other format, will be subjected to deduction in marks

Note: Your solution will not be entertained if it is any other format, e.g., .zip, .doc, .rtf etc.

## 7. Approximate Time to Complete Task

30 mins.