Assignment1

Sarath. M (DS3)

1.What is the basic difference and similarity between a vector and a matrix?

Ans:

Similarity:

a. Both Vector and Matrix have collection of elements of same Datatype.

Difference:

a. Vector is dimensionless whereas matrix is 2D.

2.What is the basic difference and similarity between a data frame and a matrix?

Ans:

Similarity:

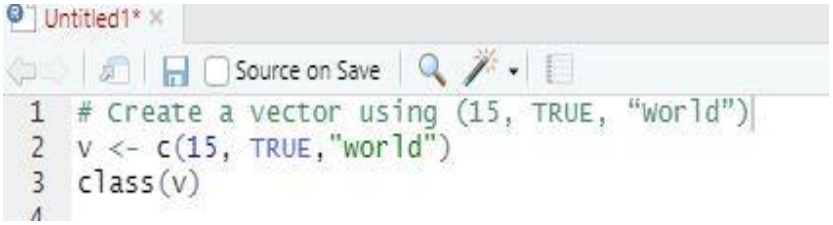
a. Both Data Frame and Matrix are 2D.

Difference:

a. Data Frame is used for different type of variable whereas Matrix is used for same type of variable.
b. Data Frames contains components of equal lengths whereas Matrix contains has integer vector of length 2.

3.Create a vector using (15, TRUE, “World”). What happened to your result?

Ans: Input:

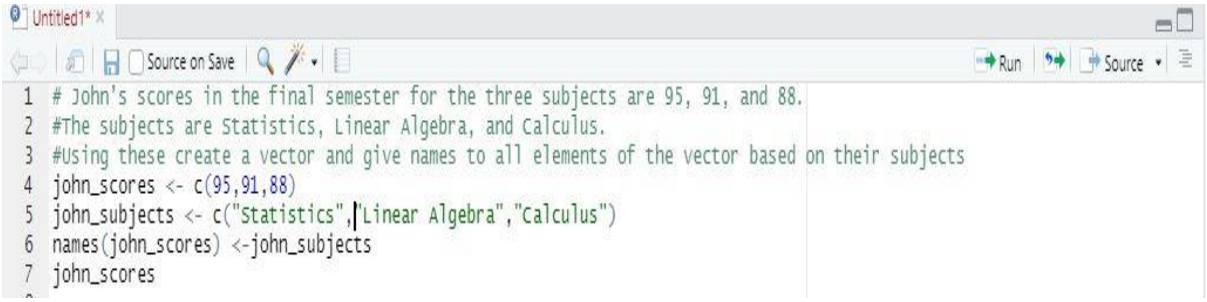


Output:

As the data for vector is not of same data type it is automatically considered whole of vector as character.

4. John’s scores in the final semester for the three subjects are 95, 91, and 88. The subjects are Statistics, Linear Algebra, and Calculus. Using these create a vector and give names to all elements of the vector based on their subjects.

Ans: Input:



Output:

```
> john_scores <- c(95,91,88)
> john_subjects <- c("Statistics","Linear Algebra","Calculus")
> names(john_scores) <-john_subjects
> john_scores
    Statistics Linear Algebra       Calculus
            95             91             88
```

5. Please check the types (character or numeric) of the vector you created.

Ans:

```
> class(john_scores)
[1] "numeric"
> class(john_subjects)
[1] "character"
>
```

6. You have three students in your class (choose any name you want). You must create a matrix using their score in the above mentioned subjects (question 4) Student 1 (95, 91, and 88), Student 2(96, 94, and 97), Student 3(88, 98, and 85). Create a matrix and label column and row names.

Ans:input:

```
sarath_marks <- c(95,91,88)
karthik_marks <- c(96,94,97)
surya_marks <- c(88,98,95)
#box office
student_names <- c("sarath","karthik","surya")
subject_names <- c("Statistics","Linear Algebra","Calculus")
 # constructing matrix
student_marks <- cbind(sarath_marks,karthik_marks,surya_marks)

final_mar <- matrix(student_marks,nrow=3,byrow=TRUE,
                    dimnames=list(c(student_names),c(subject_names)))
final_mar
```

Output:

```
> final_mar
       Statistics Linear Algebra Calculus
sarath         95             91       88
karthik        96             94       97
surya          88             98       95
>
```

7. Convert the created matrix into a data frame

   Ans: input

```
final_mar_frame=data.frame(final_mar)
final_mar_frame
class(final_mar_frame)
```

   Output:

```
> final_mar_frame=data.frame(final_mar)
> final_mar_frame
       Statistics Linear.Algebra Calculus
sarath         95             91       88
karthik        96             94       97
surya          88             98       95
> class(final_mar_frame)
[1] "data.frame"
```

8. Create three vectors using five countries (your choice) from the following website. The first vector should be country names, the second vector should be the total number of cases, and the third vector should contain the total number of deaths. Create a data frame using these vectors.

   https://www.worldometers.info/coronavirus/

Ans:Input:

```
country_names <-c("USA","Brazil","India","Russia","France")
Total_Cases <- c(30704292 , 12227179,11787534,4483471,4378446)
Total_Deaths<- c(558422,301087,160726,96219,93180)
covid_details=data.frame(country_names , Total_Cases,Total_Deaths)
covid_details
class(covid_details)
```

Output:

```
> country_names <-c("USA","Brazil","India","Russia","France")
> Total_Cases <- c(30704292 , 12227179,11787534,4483471,4378446)
> Total_Deaths<- c(558422,301087,160726,96219,93180)
> covid_details=data.frame(country_names , Total_Cases,Total_Deaths)
> covid_details
  country_names Total_Cases Total_Deaths
1           USA    30704292       558422
2        Brazil    12227179       301087
3         India    11787534       160726
4        Russia     4483471        96219
5        France     4378446        93180
> class(covid_details)
[1] "data.frame"
>
```

9. Please read the mtcars data set from R. It is an built-in data set. Please check the structure of the data set. If required, please convert the data into their appropriate data types (character, logical, factor, etc). Save your results as a new data frame using a new name.

Ans:

Input:

```
head(mtcars)
str(mtcars)
mtcars_new <- within(mtcars ,{
                  vs <- factor(vs,labels=c("v","s"))
                  am <- factor(am,labels=c("automatic","manual"))
                   cyl<- ordered(cyl)
                   gear<- ordered(gear)
                   carb<- ordered(carb)
})

mtcars_new
str(mtcars_new)
```

Output:

```
> head(mtcars)
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

```
> str(mtcars)
'data.frame':   32 obs. of  11 variables:
 $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
 $ cyl : num  6 6 4 6 8 6 8 4 4 6 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp  : num  110 110 93 110 175 105 245 62 95 123 ...
 $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
 $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num  16.5 17 18.6 19.4 17 ...
 $ vs  : num  0 0 1 1 0 1 0 1 1 1 ...
 $ am  : num  1 1 1 0 0 0 0 0 0 0 ...
 $ gear: num  4 4 4 3 3 3 3 4 4 4 ...
 $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
> mtcars_new <- within(mtcars ,{
+                    vs <- factor(vs,labels=c("v","s"))
+                    am <- factor(am,labels=c("automatic","manual"))
+                     cyl<- ordered(cyl)
+                     gear<- ordered(gear)
+                     carb<- ordered(carb)
+ })
> mtcars_new
                   mpg cyl  disp  hp drat    wt  qsec vs        am gear carb
Mazda RX4         21.0   6 160.0 110 3.90 2.620 16.46  v    manual    4    4
Mazda RX4 Wag     21.0   6 160.0 110 3.90 2.875 17.02  v    manual    4    4
Datsun 710        22.8   4 108.0  93 3.85 2.320 18.61  s    manual    4    1
Hornet 4 Drive    21.4   6 258.0 110 3.08 3.215 19.44  s automatic    3    1
Hornet Sportabout 18.7   8 360.0 175 3.15 3.440 17.02  v automatic    3    2
Valiant           18.1   6 225.0 105 2.76 3.460 20.22  s automatic    3    1
Duster 360        14.3   8 360.0 245 3.21 3.570 15.84  v automatic    3    4
Merc 240D         24.4   4 146.7  62 3.69 3.190 20.00  s automatic    4    2
Merc 230          22.8   4 140.8  95 3.92 3.150 22.90  s automatic    4    2
Merc 280          19.2   6 167.6 123 3.92 3.440 18.30  s automatic    4    4
Merc 280C         17.8   6 167.6 123 3.92 3.440 18.90  s automatic    4    4
Merc 450SE        16.4   8 275.8 180 3.07 4.070 17.40  v automatic    3    3
Merc 450SL        17.3   8 275.8 180 3.07 3.730 17.60  v automatic    3    3
Merc 450SLC       15.2   8 275.8 180 3.07 3.780 18.00  v automatic    3    3
Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  v automatic    3    4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  v automatic    3    4
Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  v automatic    3    4
Fiat 128          32.4   4  78.7  66 4.08 2.200 19.47  s    manual    4    1
Honda Civic       30.4   4  75.7  52 4.93 1.615 18.52  s    manual    4    2
Toyota Corolla    33.9   4  71.1  65 4.22 1.835 19.90  s    manual    4    1
Toyota Corona     21.5   4 120.1  97 3.70 2.465 20.01  s automatic    3    1
Dodge Challenger  15.5   8 318.0 150 2.76 3.520 16.87  v automatic    3    2
AMC Javelin       15.2   8 304.0 150 3.15 3.435 17.30  v automatic    3    2
Camaro Z28        13.3   8 350.0 245 3.73 3.840 15.41  v automatic    3    4
Pontiac Firebird  19.2   8 400.0 175 3.08 3.845 17.05  v automatic    3    2
Fiat X1-9         27.3   4  79.0  66 4.08 1.935 18.90  s    manual    4    1
Porsche 914-2     26.0   4 120.3  91 4.43 2.140 16.70  v    manual    5    2
Lotus Europa      30.4   4  95.1 113 3.77 1.513 16.90  s    manual    5    2
Ford Pantera L    15.8   8 351.0 264 4.22 3.170 14.50  v    manual    5    4
Ferrari Dino      19.7   6 145.0 175 3.62 2.770 15.50  v    manual    5    6
Maserati Bora     15.0   8 301.0 335 3.54 3.570 14.60  v    manual    5    8
Volvo 142E        21.4   4 121.0 109 4.11 2.780 18.60  s    manual    4    2
```

```
> str(mtcars_new)
'data.frame':   32 obs. of  11 variables:
 $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
 $ cyl : Ord.factor w/ 3 levels "4"<"6"<"8": 2 2 1 2 3 2 3 1 1 2 ...
 $ disp: num  160 160 108 258 360 ...
 $ hp  : num  110 110 93 110 175 105 245 62 95 123 ...
 $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
 $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num  16.5 17 18.6 19.4 17 ...
 $ vs  : Factor w/ 2 levels "v","s": 1 1 2 2 1 2 1 2 2 2 ...
 $ am  : Factor w/ 2 levels "automatic","manual": 2 2 2 1 1 1 1 1 1 1 ...
 $ gear: Ord.factor w/ 3 levels "3"<"4"<"5": 2 2 2 1 1 1 1 2 2 2 ...
 $ carb: Ord.factor w/ 6 levels "1"<"2"<"3"<"4"<..: 4 4 1 1 2 1 4 2 2 4 ...
```