The Basics of R

Chirantan Ganguly

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The Basics Of R (Data Camp)

I have tried to incorporate a summary of The Basics of R in this file for future reference and practice.

Little Arithmetics with R

```
3+4
```

```
## [1] 7
```

```
5-5
```

```
## [1] 0
```

```
3*5
```

```
## [1] 15
```

```
(5+5)/2
```

```
## [1] 5
```

```
2^5
```

```
## [1] 32
```

```
28%%6
```

```
## [1] 4
```

Basic Data Types

```
my_numeric<- 42
class(my_numeric)
```

```
## [1] "numeric"
```

```
my_character<-"forty two"
class(my_character)
```

```
## [1] "character"
```

```
my_logical<-is.character(my_character)
my_logical
```

```
## [1] TRUE
```

```
class(my_logical)
```

```
## [1] "logical"
```

Coercion

```
var1<-TRUE
var2<-3
var3<-"15"
var1_char<-as.character((var1))
var1_char
```

```
## [1] "TRUE"
```

```
var2_log<-as.logical((var2))
var2_log
```

```
## [1] TRUE
```

```
var3_num<-as.numeric(var3)
var3_num
```

```
## [1] 15
```

Vectors

```
numeric_vector<-c(1,2.3,4.2,5,10,49,67)
numeric_vector
```

```
## [1]  1.0  2.3  4.2  5.0 10.0 49.0 67.0
```

```
character_vector<-c("Chirantan","Ganguly","Calcutta")
character_vector
```

```
## [1] "Chirantan" "Ganguly"   "Calcutta"
```

```
log_vector<-c(TRUE, FALSE, FALSE, TRUE)
log_vector
```

```
## [1]  TRUE FALSE FALSE  TRUE
```

Accessing Vector Elements

```
numeric_vector[3]
```

```
## [1] 4.2
```

```
character_vector[c(1,3)]
```

```
## [1] "Chirantan" "Calcutta"
```

```
log_vector[c(1:3)]
```

```
## [1]  TRUE FALSE FALSE
```

Selection by Comparison

```
larger_than_ten<-numeric_vector>10
larger_than_ten
```

```
## [1] FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE
```

```
  numeric_vector[larger_than_ten]
```

```
## [1] 49 67
```

Matrices

```
  m<-matrix(1:20, byrow=TRUE, nrow=5, ncol=4)
  m
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    2    3    4
## [2,]    5    6    7    8
## [3,]    9   10   11   12
## [4,]   13   14   15   16
## [5,]   17   18   19   20
```

Factor

Used to fix the number of possible values a vector can take

```
  student_status<-c("student","not student", "not student", "student", "student", "student")
  categorical_student<-factor(student_status)
  categorical_student
```

```
## [1] student     not student not student student     student     student
## Levels: not student student
```

DataFrames

```
mtcars
```

```
##                      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  0  1    4    4
## Mazda RX4 Wag       21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710          22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive      21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout   18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
## Valiant             18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
## Duster 360          14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
## Merc 240D           24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
## Merc 230            22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
## Merc 280            19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
## Merc 280C           17.8   6 167.6 123 3.92 3.440 18.90  1  0    4    4
## Merc 450SE          16.4   8 275.8 180 3.07 4.070 17.40  0  0    3    3
## Merc 450SL          17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
## Merc 450SLC         15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
## Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
## Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
## Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
## Fiat 128            32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
## Honda Civic         30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
## Toyota Corolla      33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
## Toyota Corona       21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
## Dodge Challenger    15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
## AMC Javelin         15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
## Camaro Z28          13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
## Pontiac Firebird    19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
## Fiat X1-9           27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
## Porsche 914-2       26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
## Lotus Europa        30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
## Ford Pantera L      15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
## Ferrari Dino        19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
## Maserati Bora       15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
## Volvo 142E          21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
```

Inspecting DataFrames

```
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
```

```
tail(mtcars)
```

```
##                mpg cyl  disp  hp drat    wt qsec vs am gear carb
## Porsche 914-2 26.0   4 120.3  91 4.43 2.140 16.7  0  1    5    2
## Lotus Europa  30.4   4  95.1 113 3.77 1.513 16.9  1  1    5    2
## Ford Pantera L 15.8  8 351.0 264 4.22 3.170 14.5  0  1    5    4
## Ferrari Dino  19.7   6 145.0 175 3.62 2.770 15.5  0  1    5    6
## Maserati Bora 15.0   8 301.0 335 3.54 3.570 14.6  0  1    5    8
## Volvo 142E    21.4   4 121.0 109 4.11 2.780 18.6  1  1    4    2
```

```
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 ...
```

```
dim(mtcars)
```

```
## [1] 32 11
```

```
colnames(mtcars)
```

```
##  [1] "mpg"  "cyl"  "disp" "hp"   "drat" "wt"   "qsec" "vs"   "am"   "gear"
## [11] "carb"
```

Contructing Datafame od your own

```
planets <- c("Mercury", "Venus", "Earth", "Mars", "Jupiter", "Saturn", "Uranus", "Neptune")
type <- c("Terrestrial planet", "Terrestrial planet", "Terrestrial planet", "Terrestrial planet", "Gas giant
", "Gas giant", "Gas giant", "Gas giant")
diameter <- c(0.382, 0.949, 1, 0.532, 11.209, 9.449, 4.007, 3.883)  #relative to earth
rotation <- c(58.64, -243.02, 1, 1.03, 0.41, 0.43, -0.72, 0.67)   #relative to earth
rings <- c(FALSE, FALSE, FALSE, FALSE, TRUE, TRUE, TRUE, TRUE)
planet_df<-data.frame(planets, type, diameter, rotation, rings)
planet_df
```

```
##   planets               type diameter rotation rings
## 1 Mercury Terrestrial planet    0.382    58.64 FALSE
## 2   Venus Terrestrial planet    0.949  -243.02 FALSE
## 3   Earth Terrestrial planet    1.000     1.00 FALSE
## 4    Mars Terrestrial planet    0.532     1.03 FALSE
## 5 Jupiter          Gas giant   11.209     0.41  TRUE
## 6  Saturn          Gas giant    9.449     0.43  TRUE
## 7  Uranus          Gas giant    4.007    -0.72  TRUE
## 8 Neptune          Gas giant    3.883     0.67  TRUE
```

Indexing and Selecting Columns from dataframe

```
planet_df[1,c(2,3)]
```

```
##                 type diameter
## 1 Terrestrial planet    0.382
```

```
planet_df$diameter
```

```
## [1]  0.382  0.949  1.000  0.532 11.209  9.449  4.007  3.883
```

Lists

```
my_vector <- 1:10
my_matrix <- matrix(1:9, ncol = 3)
my_df <- mtcars[1:10,]
my_list<-list(my_vector, my_matrix, my_df)
my_list
```

```
## [[1]]
##  [1]  1  2  3  4  5  6  7  8  9 10
##
## [[2]]
##      [,1] [,2] [,3]
## [1,]    1    4    7
## [2,]    2    5    8
## [3,]    3    6    9
##
## [[3]]
##                    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  0  1    4    4
## Mazda RX4 Wag      21.0   6 160.0 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710         22.8   4 108.0  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive     21.4   6 258.0 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout  18.7   8 360.0 175 3.15 3.440 17.02  0  0    3    2
## Valiant            18.1   6 225.0 105 2.76 3.460 20.22  1  0    3    1
## Duster 360         14.3   8 360.0 245 3.21 3.570 15.84  0  0    3    4
## Merc 240D          24.4   4 146.7  62 3.69 3.190 20.00  1  0    4    2
## Merc 230           22.8   4 140.8  95 3.92 3.150 22.90  1  0    4    2
## Merc 280           19.2   6 167.6 123 3.92 3.440 18.30  1  0    4    4
```

Selecting Elements from a List

```
my_list[2]
```

```
## [[1]]
##      [,1] [,2] [,3]
## [1,]    1    4    7
## [2,]    2    5    8
## [3,]    3    6    9
```

```
my_list[[3]][,1]
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2
```