R 语言基础：练习(二)

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```
rm(list = ls(all = TRUE))
options(digits = 4)
setwd("E:\\mywork\\study_R\\R_sim_2016\\R_base_exer2\\")
```

1.数组向量矩阵下标练习

Exercise 1

If `x <- c("ww", "ee", "ff", "uu", "kk")`, what will be the output for `x[c(2,3)]`?

a. "ee", "ff"
b. "ee"
c. "ff"

```
x <- c("ww", "ee", "ff", "uu", "kk")
x[c(2, 3)]
## [1] "ee" "ff"
#(Answer: a)
```

Exercise 2

If x <- c("ss", "aa", "ff", "kk", "bb"), what will be the third value in the index vector operation `x[c(2, 4, 4)]`?

a. "uu"
b. NA
c. "kk"

```
x <- c("ss", "aa", "ff", "kk", "bb")
y <- x[c(2, 4, 4)]
y[3]
## [1] "kk"
```

Exercise 3

If `x <- c("pp", "aa", "gg", "kk", "bb")`, what will be the fourth value in the index vector operation `x[-2]`?

a. "aa"
b. "gg"
c. "bb"

```
x <- c("pp", "aa", "gg", "kk", "bb")
y <- x[-2]
y[4]
## [1] "bb"
# (Answer:  c)
```

Exercise 4

Let `a <- c(2, 4, 6, 8)` and `b <- c(TRUE, FALSE, TRUE, FALSE)`, what will be the output for the R expression max(a[b])?

```
a <- c(2, 4, 6, 8)
b <- c(TRUE, FALSE, TRUE, FALSE)
max(a[b])
## [1] 6
#(Answer: 6)
```

Exercise 5

Let `a <- c (3, 4, 7, 8)` and `b <- c(TRUE, TRUE, FALSE, FALSE)`, what will be the output for the R expression `sum(a[b])`?

```
a <- c(3, 4, 7, 8)
b <- c(TRUE, TRUE, FALSE, FALSE)
sum(a[b])
## [1] 7
#(Answer: 7)
```

Exercise 6

Write an R expression that will return the sum value of 10 for the vector `x <- c(2, 1, 4, 2, 1, NA)`

```
x <- c(2, 1, 4, 2, 1, NA)
sum(x, na.rm=TRUE)
## [1] 10
sum(x[-6])  # alternative solution
## [1] 10
```

Exercise 7

If `x <- c(1, 3, 5, 7, NA)` write an r expression that will return the output `1, 3, 5, 7`.

```
x <- c(1, 3, 5, 7, NA)
x[!is.na(x)]
## [1] 1 3 5 7
x[-5]    # alternative solution
## [1] 1 3 5 7
```

Exercise 8

Consider the data frame `s <- data.frame(first= as.factor(c("x", "y", "a", "b", "x", "z")), second=c(2, 4, 6, 8, 10, 12))`. Write an R statement that will return the output 2, 4, 10, by using the variable first as an index vector.

```r
s <- data.frame(first= as.factor(c("x", "y", "a", "b", "x", "z")), seco
nd=c(2, 4, 6, 8, 10, 12))
s$second[(s$first=='x') | (s$first=='y')]
## [1]  2  4 10
s$second[s$first %in% c('x', 'y')]   # alternative solution
```

Exercise 9

What will be the output for the R expression `(c(FALSE, TRUE)) || (c(TRUE, TRUE))`?

```r
(c(FALSE, TRUE)) || (c(TRUE, TRUE))
## [1] TRUE
```

Exercise 10

Write an R expression that will return the positions of 3 and 7 in the vector `x <- c(1, 3, 6, 7, 3, 7, 8, 9, 3, 7, 2)`.

```r
x <- c(1, 3, 6, 7, 3, 7, 8, 9, 3, 7, 2)
which(x %in% c(3, 7))
## [1]  2  4  5  6  9 10
```

2. 因子练习题

Exercise 1

If `x = c(1, 2, 3, 3, 5, 3, 2, 4, NA)`, what are the levels of `factor(x)`?

a. 1, 2, 3, 4, 5
b. NA
c. 1, 2, 3, 4, 5, NA

```r
x = c(1, 2, 3, 3, 5, 3, 2, 4, NA)
levels(factor(x))
## [1] "1" "2" "3" "4" "5"
# (Answer: a)
```

Exercise 2

Let `x <- c(11, 22, 47, 47, 11, 47, 11)`. If an R expression `factor(x, levels=c(11, 22, 47), ordered=TRUE)` is executed, what will be the 4th element in the output?

a. 11
b. 22
c. 47

```r
x <- c(11, 22, 47, 47, 11, 47, 11)
factor(x, levels=c(11, 22, 47), ordered=TRUE)
## [1] 11 22 47 47 11 47 11
```

```
## Levels: 11 < 22 < 47
# (Answer: c)
```

Exercise 3

If `z <- c("p", "a" , "g", "t", "b")`, then which of the following R expressions will replace the third element in z with "b".

a. factor(z[3]) <- "b"
b. levels(z[3]) <- "b"
c. z[3] <- "b"

```
z <- c("p", "a" , "g", "t", "b")
z[3] <- "b"
z
## [1] "p" "a" "b" "t" "b"
# (Answer: c)
```

Exercise 4

If `z <- factor(c("p", "q", "p", "r", "q"))` and levels of z are "p", "q" ,"r", write an R expression that will change the level "p" to "w" so that z is equal to: "w", "q" , "w", "r" , "q".

```
z <- factor(c("p", "q", "p", "r", "q"))
levels(z)[1] <- "w"
z
## [1] w q w r q
## Levels: w q r
```

Exercise 5

If: `s1 <- factor(sample(letters, size=5, replace=TRUE))` and `s2 <- factor(sample(letters, size=5, replace=TRUE))`, write an R expression that will concatenate s1 and s2 in a single factor with 10 elements.

```
set.seed(1234)
s1 <- factor(sample(letters, size=5, replace=TRUE))
s2 <- factor(sample(letters, size=5, replace=TRUE))
factor(c(levels(s1)[s1], levels(s2)[s2]))
##  [1] c q p q w q a g r n
## Levels: a c g n p q r w
```

Exercise 6

Consider the iris data set in R. Write an R expression that will 'cut' the Sepal.Length variable and create the following factor with five levels.

```
(4.3, 5.02] (5.02, 5.74] (5.74, 6.46] (6.46, 7.18] (7.18, 7.9]
32 41 42 24 11
```

```
table(cut(iris$Sepal.Length, 5))
##
##  (4.3,5.02] (5.02,5.74] (5.74,6.46] (6.46,7.18]  (7.18,7.9]
##          32          41          42          24
```

Exercise 7

Consider again the iris data set. Write an R expression that will generate a two-way frequency table with two rows and three colums. The rows should relate to Sepal.length (less than 5: TRUE or FALSE) and columns to Species, with the following output:

```
setosa versicolor virginica
FALSE 30 49 49
TRUE 20 1 1

table(iris$Sepal.Length < 5, factor(iris$Species))
##
##         setosa versicolor virginica
##   FALSE     30         49        49
##   TRUE      20          1         1
```

Exercise 8

Consider the factor `responses <- factor(c("Agree", "Agree", "Strongly Agree", "Disagree", "Agree"))`, with the following output:

```
[1] Agree Agree Strongly Agree Disagree Agree
Levels: Agree Disagree Strongly Agree
```

Later it was found that new a level "Strongly Disagree" exists. Write an R expression that will include "strongly disagree" as new level attribute of the factor and returns the following output:

```
[1] Agree Agree Strongly Agree Disagree Agree
Levels: Strongly Agree Agree Disagree Strongly Disagree

# Exercise 8
responses <- factor(c("Agree", "Agree", "Strongly Agree", "Disagree", "
Agree"))
responses
## [1] Agree          Agree          Strongly Agree Disagree
## [5] Agree
## Levels: Agree Disagree Strongly Agree
factor(responses, levels=c("Strongly Agree", "Agree", "Disagree", "Stro
ngly Disagree"))
## [1] Agree          Agree          Strongly Agree Disagree
## [5] Agree
## Levels: Strongly Agree Agree Disagree St
```

Exercise 9

Let `x <- data.frame(q=c(2, 4, 6), p=c("a", "b", "c"))`. Write an R statement that will replace levels a, b, c with labels `"fertiliser1", "fertliser2", "fertiliser3"`.

```
x <- data.frame(q=c(2, 4, 6), p=c("a", "b", "c"))
x$p <- factor(x$p, levels=c("a", "b", "c"), labels=c("fertiliser1", "fe
rtiliser2", "fertiliser3"))
x
##   q           p
## 1 2 fertiliser1
## 2 4 fertiliser2
## 3 6 fertiliser3
```

Exercise 10

If x <- factor(c("high", "low", "medium", "high", "high", "low", "medium")), write an R expression that will provide unique numeric values for various levels of x with the following output:

levels value 1 high 1 2 low 2 3 medium 3

```
x <- factor(c("high", "low", "medium", "high", "high", "low", "medium
"))
data.frame(levels = unique(x), value = as.numeric(unique(x)))
##   levels value
## 1   high     1
## 2    low     2
## 3 medium     3
```

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