

Exercises, Chapter 5

Exercise 5.1

Using the *minimum number of keystrokes*, write a single R command that constructs the matrix A given below.

$A =$

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    5    6    7    8    9
## [2,]   12   12   12   12   12
## [3,]   81   64   49   36   25
## [4,]    2    8    4    7    3
```

Exercise 5.2

Write R commands that create a 2 x 4 matrix named x that contains the integers 11, 12, ..., 18 arranged in a column-wise fashion. Then use subscripts that extract the elements that exclude the first row and include the first and fourth columns.

```
##      [,1] [,2] [,3] [,4]
## [1,]   11   13   15   17
## [2,]   12   14   16   18
```

Exercise 5.3

Let A and B be the following 3 x 2 matrices:

$A =$

```
##      [,1] [,2]
## [1,]    1    4
## [2,]    2    5
## [3,]    3    6
```

$B =$

```
##      [,1] [,2]
## [1,]    7   10
## [2,]    8   11
## [3,]    9   12
```

Write R commands to create the matrices A and B using the `matrix` function, then combine A and B to create two new matrices with the `rbind` and `cbind` functions.

Exercise 5.4

A *one-step transition matrix* has elements that are between 0 and 1, row sums that equal 1, and the same number of rows and columns. Write an R command to create the 2 x 2 one-step transition matrix A with elements given by

```
##      [,1] [,2]
## [1,]  0.8  0.2
## [2,]  0.3  0.7
```

Exercise 5.5

Write a single R command that creates a sequence of one 1, two 2s, three 3s, and four 4s, and places them in a 2 x 5 matrix named `b` in a row-wise fashion. This command should use as few keystrokes as possible.

Exercises taken from Chapter 5, “Learning Base R”, by Lawrence M Leemis, ISBN 978-0-9829174-8-0

Exercises, Chapter 6

Exercise 6.1

True or False: A matrix is a special case of an array.

Exercise 6.2

Write an R command that assigns the first 18 positive integers to the 3 x 3 x 2 array named `x` using the default input convention. Next, write an R command that extracts the elements of `x` in a fashion that includes the second and third rows, excludes the second column, and includes the second layer.

Exercise 6.3

The 3 x 4 x 5 array `a` is filled with numeric values. The R command `> b = a[c(1,3),-c(1,4),3:5]` sets `b` to a 2 x 3 x 3 array that includes the first and third rows, excludes the first and fourth columns, and includes the third, fourth, and fifth layers of `a`. Write an R command that accomplishes this same operation using the smallest number of keystrokes.

Exercises taken from Chapter 6, “Learning Base R”, by Lawrence M Leemis, ISBN 978-0-9829174-8-0

Exercises, Chapter 18

Exercise 18.1

Use the `help` function to learn about the `write.table` function. Use the `write.table` function to write the built-in data set `Formaldehyde` (which is a data frame) to an external file named “`file8`”.

Exercise 18.2

Create a file that contains the following two R commands:

```
SmallVector = c(1,2,6)
print(mean(SmallVector))
```

Then enter R and use the `source` function to execute the two commands.

Exercise 18.3

Create a file that contains the data values: 1, 2, and 18. The data values should be separated by *spaces*. Then enter R and read these data values into a vector named `x` with the `scan` function. Print the average of the three values.

Exercise 18.4

Create a file that contains the data values: 1, 2, and 18. The data values should be separated by *commas*. Then enter R and read these data values into a vector named `x` with the `read.csv` (read comma separated values) function. Print the average of the three values.

Exercise 18.5

Enter R and set the object `y` to 4 with the R command `y = 4`. Use the R `dump` function to save `y` to a file (you choose the filename). Use the R `rm` function to remove the object named `y` with the command `rm(y)`. Type `y` to assure that the object no longer exists. Finally, use the `source` function to recover the object named `y` and print its value.

Exercises taken from Chapter 18, “Learning Base R”, by Lawrence M Leemis, ISBN 978-0-9829174-8-0