

Foundations of R Software

Lecture 26

More Sequences and Other Operations

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Sequences

A sequence is a set of related numbers, events, movements, or items that follow each other in a particular order.

The regular sequences can be generated in R.

Syntax

`seq()`

```
seq(from = 1, to = 1,  
by = ((to - from)/(length.out - 1)),  
length.out = NULL, along.with = NULL, ...)
```

Help for `seq`

Sequences

❑ Continuous sequences with constant unit increment and decrement

> 1:10

[1] 1 2 3 4 5 6 7 8 9 10

> 10:1

[1] 10 9 8 7 6 5 4 3 2 1

> 5:15

[1] 5 6 7 8 9 10 11 12 13 14 15

> 15:5

[1] 15 14 13 12 11 10 9 8 7 6 5

Sequences

❑ Continuous sequences with constant unit increment and decrement

> -1:-10

[1] -1 -2 -3 -4 -5 -6 -7 -8 -9 -10

> -10:-1

[1] -10 -9 -8 -7 -6 -5 -4 -3 -2 -1

> -5:-15

[1] -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15

> -15:-5

[1] -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5

Sequences

R Console

```
> 1:10
[1] 1 2 3 4 5 6 7 8 9 10
> 10:1
[1] 10 9 8 7 6 5 4 3 2 1
> 5:15
[1] 5 6 7 8 9 10 11 12 13 14 15
> 15:5
[1] 15 14 13 12 11 10 9 8 7 6 5
>
> -1:-10
[1] -1 -2 -3 -4 -5 -6 -7 -8 -9 -10
> -10:-1
[1] -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
> -5:-15
[1] -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15
> -15:-5
[1] -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5
> |
```

Sequences

❑ Continuous sequences with constant unit increment and decrement

> 1.23:10

[1] 1.23 2.23 3.23 4.23 5.23 6.23 7.23 8.23 9.23

> 1.23:10.54

[1] 1.23 2.23 3.23 4.23 5.23 6.23 7.23 8.23 9.23
10.23

> 10.54:2.23

[1] 10.54 9.54 8.54 7.54 6.54 5.54 4.54
3.54 2.54

Sequences

□ Continuous sequences with constant unit increment and decrement

> -1.23:-10

[1] -1.23 -2.23 -3.23 -4.23 -5.23 -6.23 -7.23 -
8.23 -9.23

> -5.23:6

[1] -5.23 -4.23 -3.23 -2.23 -1.23 -0.23 0.77
1.77 2.77 3.77 4.77 5.77

Sequences

R Console

```
> 1.23:10
[1] 1.23 2.23 3.23 4.23 5.23 6.23 7.23 8.23 9.23
> 1.23:10.54
[1] 1.23 2.23 3.23 4.23 5.23 6.23 7.23 8.23 9.23 10.23
>
> 10.54:2.23
[1] 10.54 9.54 8.54 7.54 6.54 5.54 4.54 3.54 2.54
>
> -1.23:-10
[1] -1.23 -2.23 -3.23 -4.23 -5.23 -6.23 -7.23 -8.23 -9.23
>
> -5.23:6
[1] -5.23 -4.23 -3.23 -2.23 -1.23 -0.23 0.77 1.77 2.77 3.77 4.77 5.77
> |
```

Sequences

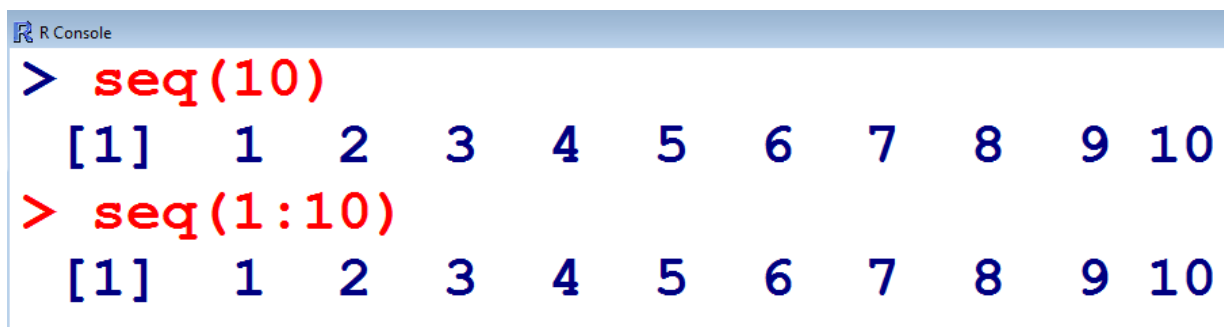
```
> seq(10)
```

```
[1]  1  2  3  4  5  6  7  8  9 10
```

is the same as

```
> seq(1:10)
```

```
[1]  1  2  3  4  5  6  7  8  9 10
```



```
R Console
> seq(10)
[1]  1  2  3  4  5  6  7  8  9 10
> seq(1:10)
[1]  1  2  3  4  5  6  7  8  9 10
```

Sequences

Sequences with a predefined variable and constant increment

> x=2

> seq(1, x, x/10)

[1] 1.0 1.2 1.4 1.6 1.8 2.0

```
R Console
> x=2
> seq(1, x, x/10)
[1] 1.0 1.2 1.4 1.6 1.8 2.0
>
> x=50
> seq(0, x, x/10)
[1] 0 5 10 15 20 25 30 35 40 45 50
> |
```

> x=50

> seq(0, x, x/10)

[1] 0 5 10 15 20 25 30 35 40 45 50

Sequences

Outcome of sequences can be stored.

```
x = seq(1, 50, 1/2)
```

x

```
[1] 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0
[18] 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5
[35] 18.0 18.5 19.0 19.5 20.0 20.5 21.0 21.5 22.0 22.5 23.0 23.5 24.0 24.5 25.0 25.5 26.0
[52] 26.5 27.0 27.5 28.0 28.5 29.0 29.5 30.0 30.5 31.0 31.5 32.0 32.5 33.0 33.5 34.0 34.5
[69] 35.0 35.5 36.0 36.5 37.0 37.5 38.0 38.5 39.0 39.5 40.0 40.5 41.0 41.5 42.0 42.5 43.0
[86] 43.5 44.0 44.5 45.0 45.5 46.0 46.5 47.0 47.5 48.0 48.5 49.0 49.5 50.0
```

```
y=2*x
```

y

```
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
[22] 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
[43] 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
[64] 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
[85] 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
```

Sequences

Outcome of sequences can be stored.

```
R Console
> x = seq(1, 50, 1/2)
> x
 [1]  1.0  1.5  2.0  2.5  3.0  3.5  4.0  4.5  5.0  5.5  6.0  6.5  7.0  7.5  8.0  8.5  9.0
[18]  9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5
[35] 18.0 18.5 19.0 19.5 20.0 20.5 21.0 21.5 22.0 22.5 23.0 23.5 24.0 24.5 25.0 25.5 26.0
[52] 26.5 27.0 27.5 28.0 28.5 29.0 29.5 30.0 30.5 31.0 31.5 32.0 32.5 33.0 33.5 34.0 34.5
[69] 35.0 35.5 36.0 36.5 37.0 37.5 38.0 38.5 39.0 39.5 40.0 40.5 41.0 41.5 42.0 42.5 43.0
[86] 43.5 44.0 44.5 45.0 45.5 46.0 46.5 47.0 47.5 48.0 48.5 49.0 49.5 50.0
>
> y=2*x
> y
 [1]  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22
[22] 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
[43] 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
[64] 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85
[85] 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
> |
```

Sequences: Index vector

❑ Assignment of an index-vector

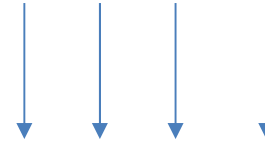
```
x = c(9,8,7,6)
```

```
ind = seq(along=x)
```

```
ind
```

```
[1] 1 2 3 4
```

9, 8, 7, 6



1 2 3 4

Accessing a value in the vector through index vector

❑ Accessing an element of an index-vector

```
> x[ ind[2] ]
```

```
[1] 8
```

```
R Console
> x = c(9,8,7,6)
> ind = seq(along=x)
> ind
[1] 1 2 3 4
>
> x[ ind[2] ]
[1] 8
> |
```

Sequences

Generating sequences of dates

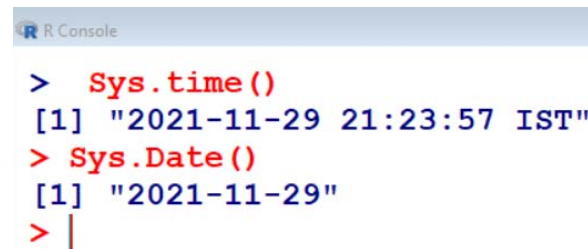
Generating current time and date

`Sys.time()` command provides the current time and date from the computer system.

```
> Sys.time()  
[1] "2021-11-29 21:23:57 IST"
```

`Sys.Date()` command provides the current date from the computer system.

```
> Sys.Date()  
[1] "2021-11-29"
```

A screenshot of an R console window showing the execution of two commands. The first command is > Sys.time(), which returns [1] "2021-11-29 21:23:57 IST". The second command is > Sys.Date(), which returns [1] "2021-11-29". The prompt > is followed by a vertical bar |.

```
R Console  
> Sys.time()  
[1] "2021-11-29 21:23:57 IST"  
> Sys.Date()  
[1] "2021-11-29"  
> |
```