

# R Loop Through Data Frame Columns & Rows (4 Examples) | for-, while- & repeat-Loops



I'm Joachim Schork. On this website, I provide statistics tutorials as well as code in Python and R programming.

In this article you'll learn how to **loop over the variables and rows of a data matrix** in [the R programming language](#).

The article will consist of the following contents:

- 1) Example Data
- 2) Example 1: for-Loop Through Columns of Data Frame
- 3) Example 2: for-Loop Over Rows of Data Frame
- 4) Example 3: while-Loop Through Columns of Data Frame
- 5) Example 4: repeat-Loop Through Columns of Data Frame
- 6) Video & Further Resources

Let's dive right in...

## Example Data

As a first step, I'll have to create some data that we can use in the examples later on:

```
data <- data.frame(x1 = 1:5,      # Create example data
                  x2 = 6:10,
                  x3 = 11:15)

data                                # Print example data
#   x1 x2 x3
# 1  1  6 11
# 2  2  7 12
# 3  3  8 13
```

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```
# 4  4  9 14
# 5  5 10 15
```

Have a look at the previous output of the RStudio console. It reveals that our example data has five rows and three columns. All variables are numeric.



Store Results of Loop in List in R (Example) | Save Output of while- & for-Loops

## Example 1: for-Loop Through Columns of Data Frame

In this Example, I'll illustrate how to use a for-loop to loop over the variables of a data frame. First, let's store our data frame in a new data object:

```
data1 <- data # Replicate example data
```



Store Results of Loop in Vector in R (Example) | Save Output of for-Loop in Array

Now, we can use the for-loop statement to loop through our data frame columns using the ncol function as shown below:

```
for(i in 1:ncol(data1)) { # for-loop over columns
  data1[, i] <- data1[, i] + 10
}
```

Let's check how our data frame has changed:

```
data1 # Print updated data
#   x1 x2 x3
# 1 11 16 21
# 2 12 17 22
# 3 13 18 23
# 4 14 19 24
# 5 15 20 25
```

As you can see based on the previous output of the RStudio console, we added +10 to each variable of our data frame.

## Example 2: for-Loop Over Rows of Data Frame

It is also possible to apply for-loops to loop through the rows of a data frame. Example 2 explains how to use the nrow function for this task. First, let's replicate our data:

```
data2 <- data                # Replicate example data
```

Now, we can apply the following R code to loop over our data frame rows:

```
for(i in 1:nrow(data2)) {    # for-loop over rows
  data2[i, ] <- data2[i, ] - 100
}
```

In this example, we have subtracted -100 from each cell of our data matrix:

```
data2                # Print updated data
#   x1  x2  x3
# 1 -99 -94 -89
# 2 -98 -93 -88
# 3 -97 -92 -87
# 4 -96 -91 -86
# 5 -95 -90 -85
```

## Example 3: while-Loop Through Columns of Data Frame

This Example explains how to loop over the columns of a data frame using a while-loop. Again, we are first replicating our data:

```
data3 <- data # Replicate example data
```

Then, we also have to specify a running index that we can increase with each iteration of our while-loop:

```
i <- 1 # Create running index
```

Now, we can start running our while-loop:

```
while(i <=2) { # Start while-loop
  data3[, i] <- data3[, i] + 100
  i <- i + 1
}
```

The result of the previous R syntax looks as follows:

```
data3 # Print updated data
#      x1  x2 x3
# 1 101 106 11
# 2 102 107 12
# 3 103 108 13
# 4 104 109 14
# 5 105 110 15
```

As you can see, we have added +100 to the first two columns of our data. The third column was kept as in the original input data, since the while-loop stopped at the second column.

## Example 4: repeat-Loop Through Columns of Data Frame

Similar to while-loops, we can also use a repeat-loop to loop over the variables of a data frame. Again, we have to replicate our data...

```
data4 <- data # Replicate example da
```

...and we have to specify a running index:

```
i <- 1 # Create running index
```

Now, we can write and run a repeat-loop as shown below:

```
repeat{ # Start repeat-loop

  data4[ , i] <- data4[ , i] + 100
  i <- i + 1

  if(i > 2) {

    break
  }
}
```

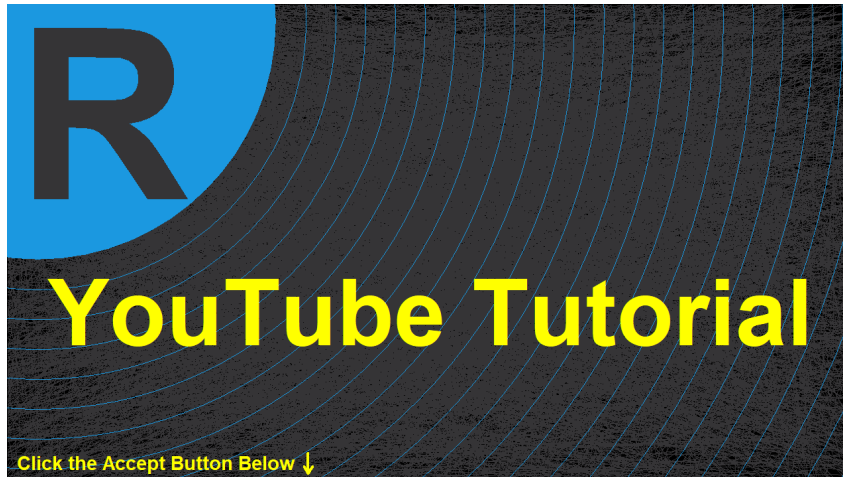
We have specified that our repeat-loop should break after the second iteration and, hence, only the first two variables were changed:

```
data4 # Print updated data
#    x1  x2 x3
# 1 101 106 11
# 2 102 107 12
# 3 103 108 13
# 4 104 109 14
# 5 105 110 15
```

## Video & Further Resources

Do you want to learn more about loops in R? Then you might have a look at the following video of my YouTube channel. I'm showing the examples of this article in the video:

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Furthermore, you may want to read some of the related articles of my website. I have published numerous articles already:

- [for-Loop in R](#)
- [while-Loop in R](#)
- [repeat-Loop in R](#)
- [Loops in R](#)
- [The R Programming Language](#)

Summary: In this R tutorial you learned how to **loop through multiple columns and rows of a data table**. Don't hesitate to tell

me about it in the comments section below, in case you have any additional questions.

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## 26 Comments. [Leave new](#)



**Unnikrishnan C**

January 19, 2021 2:55 pm

That was wonderful.

My data.frame is like this.

```
DATES <- rep(c("2021-01-18","2021-01-19"),each=5)
```

```
STOCKDETAILS <-
```

```
rep(c("MAJESCO","NSE","BUY",120000.00,"DEL","MASTEK","BSE","SELL",150000.00,"DEL"),times=1)
```

I need to get dates only once, and the columns one by one. How to do that?

Thanking you

Reply



**Unnikrishnan C**

January 21, 2021 4:52 am

I have solved the problem myself filtering the dataframe and using an inner for loop and outer for loop. That resolves my problem. though it may not sound the best solution in R

Reply

**Joachim**

January 21, 2021 7:06 am

Hey Unnikrishnan,

Thanks for another comment! Glad to hear that you found a solution for your problem. Indeed, multiple nested for-loops are often not the best/fastest solution, but as long as you don't have problems due to computation time that shouldn't matter too much.

Regards,

Joachim

Reply

**badara ceesay**

March 1, 2022 1:55 pm

how to loop over 5 variable to find there summary statistic

Reply

**Joachim**

March 9, 2022 11:37 am

Hi Badara,

Please excuse the delayed response, I just came back from holidays. Are you still looking for help?

Regards,

Joachim

Reply

**Pedro Maranhão**

March 9, 2022 12:13 pm

Hello, Joachim

I have a doubt, wish that you could help me

I want to do filter (with the tidyverse's function) to each unique value (character) in a column (df\$id\_regiao)

with the result I want to make a data frame to each unique



character

How can I do that with a loop ?

Reply



**Joachim**

March 10, 2022 8:26 am

Hey Pedro,

Could you illustrate what the desired output should look like?

I'm afraid I don't understand what you exactly want to do.

Regards,

Joachim

Reply



**sitaram sahu**

May 26, 2022 10:16 am

Hi,

i've tried the while loop piece of code on the below data frame.

df

var1 var2 var3 var4

1 21 27 23 21

2 23 27 23 21

3 23 28 26 22

4 24 23 26 28

5 15 12 18 19

```
code : i repeat {
```

```
+ df[,i ] <- df[,i] + 100
```

```
+ i 2)
```

```
+ { break}
```

```
+ }
```

and I the below.

df

var1 var2 var3 var4

1 121 127 23 121

2 123 127 23 121

3 123 128 26 122

4 124 123 26 128

5 115 112 18 119

seems like it didnt work on 2nd column only. would you care to provide a reason.

thanks in advance

Reply



**Joachim**

June 6, 2022 4:29 pm

Hey Sitaram,

I just came back from vacation. Do you still need help with this question?

Regards,  
Joachim

Reply



**Narges**

May 26, 2022 3:32 pm

Dear Joachim

I need help in making a list from many data.frame (data.frame1 to data.frame25) and need to make a list of them using for loop.

I would be happy if you help me.

Reply



**Joachim**

June 6, 2022 4:31 pm

Hey Narges,

I'm sorry for the late response, I just came back from vacation. Do you still need help with your question?

Regards,  
Joachim

Reply



**Wang**

July 4, 2022 10:46 am

Hi Joachim,

Thank you for the wonderful explanations on looping. I have a sample dataset shown below fruits taken by students in a week. I have similar data with 1000 observations and 10 different columns. I want to club my data as a total of:

1. Apple
2. Banana
3. Orange
4. Apple + banana
5. Apple + Orange
6. banana+ Orange
7. Apple + banana+ Orange

Could you kindly show me how to do it? Thank you

student\_id Apple Banana orange

1 0 1 0

2 1 1 1

3 1 0 1

4 1 0 0

5 0 0 0

6 1 1 0

7 0 1 1

8 0 1 0

Reply



**Wang**

July 4, 2022 10:48 am

The data got distorted:

id Apple Banana orange

1). 0 1 0

2). 1 1 1

3 ). 1 0 1

4 ). 1 0 0

5 ). 0 0 0

6 ). 1 1 0

7 ). 0 1 1

8 ). 0 1 0

Reply



**Joachim**

July 8, 2022 6:58 pm

Hey Wang,

Thanks for the kind comment. Please see my response to your question in the for-loop tutorial:

<https://statisticsglobe.com/for-loop-in-r>

Regards,

Joachim

Reply



**NR**

July 6, 2022 4:18 am

Hi Joachim,

How do i do loop for every 2×2 matrix and get the inverse value of it?

Reply



**Joachim**

July 8, 2022 7:02 pm

Hey,

Could you please explain the structure of your input data and the desired output in some more detail?

Regards,

Joachim

Reply



**Oriana**

July 14, 2022 10:52 pm

Hi Joachim,

I'm wondering if you can help me a problem?

I'm trying to iterate through a data frame using a for loop and identify negative values and multiply them by -10. I keep running into issues with the if condition I'm using to identify negative values. This is the code I'm using and the error that keeps occurring.

```
df <- data.frame(x = letters[1:5], y = c(-4,-2,0,2,4), z = c(3,4,-5,6,-8))
```

```
for(i in 2:ncol(df)){  
  if(i < 0){  
    new_val <- df[,i]*-10  
    df[, i] <- new_val-df[,i]  
  }  
}
```

Error msg: 'Error in if(df[,i] 1'

Any help on how to fix this or an alternative method would be greatly appreciated.

Thanks,

Oriana

Reply



**Joachim**

July 17, 2022 7:39 am

Hey Oriana,

I have just executed your code, and it worked without displaying any error messages.

Are you certain that this is precisely the code you had problems with?

Regards,  
Joachim

Reply

**Jack**

January 14, 2023 6:55 am

I have almost the same code as Oriana (comment above).  
My code runs without error, but it doesn't change my data frame column/s at all.  
I need to take all negative values make them positive and multiply by 100 i.e. multiply by -100.

```
for(i in 2:ncol(df)) {  
  if(i < 0) {  
    df$y <- df$y*-100  
  }  
}
```

Any help would be greatly appreciated. Thank you

Reply

**Cansu (Statistics Globe)**

January 16, 2023 10:48 am

Hello Jack,

Your case is a bit different than given in the tutorial. Try the following code out.

```
df <- data.frame(x = letters[1:5], y = c(-4, -2,  
df  
  
for(i in 2:ncol(df)){  
  for(j in 1:nrow(df)){  
  
    if(df[j,i] < 0) {  
      df[ j, i] <- df[ j, i]*-100  
    }  
    else {  
      df[ j, i] <- df[ j, i]  
    }  
  }  
}  
  
df
```

Let me know if you have any further questions.

Regards,  
Cansu

Reply



**Jack**

January 17, 2023 8:24 am

You are a saint!

I managed to do it but I had three separate for loop codes. Not nice and neat like yours.

Thank you so much for your help

Reply



**Cansu (Statistics Globe)**

January 17, 2023 9:12 am

Hello Jack,

Thank you for your sweet words. I am glad that I could help 😊

Regards,  
Cansu



**HLA**

September 29, 2022 3:51 am

Hi, Joachim.

Is there a way to for-loop columns in a data frame with formulas.

Here's an example:

Data

Case Age Term Start Date

1 34 2 2018

2 21 3 2020

3 43 5 2015

Then, the additional columns should be

Case — Y2015 Y2016 Y2017 Y2018 Y2019 Y2020

1 0 0 0 34 35 36

2 0 0 0 0 0 21

3 43 44 45 46 47 0

Thank you!

– bulet

Reply



**Joachim**

September 30, 2022 5:46 pm

Hey,

I'm uncertain if I get your question correctly. Are you looking for something like [this](#)?

Regards,

Joachim

Reply



**Hamad Omar**

October 27, 2022 6:08 pm

great exercises. I got a lot of benefits from Youtube videos as well website. Thank you so much.

Just wondering how do iterate through columns by data.

e.g. if I have 1:N columns and want to iterate through columns using a specific date

Reply



**Joachim**

November 14, 2022 12:44 pm

Hi Hamad,

Thank you so much for the kind words, glad you find my tutorials helpful!



I'm sorry for the delayed reply. I was on a long vacation, so unfortunately I wasn't able to get back to you earlier. Do you still need help with your syntax?

Regards,  
Joachim

Reply

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