

Patrice Koehl

Tables in MATLAB

Organizing data

Tables

Table is a data type suitable for **column-oriented data** that is often stored as columns in a text file or in a spreadsheet.

Tables consist of **rows and column-oriented variables**.

Each **variable** in a table can have **a different data type** and **a different size** with the **one restriction** that each **variable must have the same number of rows**.

Tables

Text file *'simple.csv'* containing the information:

Format: "Column Separated Values (CSV): standard text-based format for spreadsheet, used for example by Microsoft Excel

```
"rowid","species","island","bill_length_mm","sex","year"  
"1","Adelie","Torgersen",39.1,"male",2007  
"2","Adelie","Torgersen",39.5,"female",2007  
"3","Adelie","Torgersen",40.3,"female",2007  
"4","Adelie","Torgersen",NA,NA,2007  
"5","Adelie","Torgersen",36.7,"female",2007  
"6","Adelie","Torgersen",39.3,"male",2007  
"7","Adelie","Torgersen",38.9,"female",2007
```

Header (name of the variables)

Rows of value; each row contains values for all variables.

Those values may be of different types:

- ❖ Numbers
- ❖ Category
- ❖ Text

Reading a table in Matlab

```
>> penguins = readtable('simple.csv')
```

```
>> penguins=readtable("simple.csv")
```

```
penguins =
```

```
7×6 table
```

<u>rowid</u>	<u>species</u>	<u>island</u>	<u>bill_length_mm</u>	<u>sex</u>	<u>year</u>
1	{'Adelie'}	{'Torgersen'}	39.1	{'male' }	2007
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}	2007
3	{'Adelie'}	{'Torgersen'}	40.3	{'female'}	2007
4	{'Adelie'}	{'Torgersen'}	NaN	{'NA' }	2007
5	{'Adelie'}	{'Torgersen'}	36.7	{'female'}	2007
6	{'Adelie'}	{'Torgersen'}	39.3	{'male' }	2007
7	{'Adelie'}	{'Torgersen'}	38.9	{'female'}	2007

```
>>
```

Table: variable names (column headers)

```
>> penguins.Property.VariableNames
```

```
>> penguins.Properties.VariableNames
```

```
ans =
```

```
1×6 cell array
```

```
    {'rowid'}    {'species'}    {'island'}    {'bill_length_mm'}    {'sex'}    {'year'}
```

```
>>
```

Table: Change variable names

```
>> penguins = renamevars(penguins, ["sex", "rowid", "bill_length_mm"], ...  
  ["Gender", "Number", "Bill"])
```

```
>> penguins = renamevars(penguins, ["sex", "rowid", "bill_length_mm"], ...  
  ["Gender", "Number", "Bill"])
```

penguins =

7×6 [table](#)

<u>Number</u>	<u>species</u>	<u>island</u>	<u>Bill</u>	<u>Gender</u>	<u>year</u>
1	{'Adelie'}	{'Torgersen'}	39.1	{'male' }	2007
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}	2007
3	{'Adelie'}	{'Torgersen'}	40.3	{'female'}	2007
4	{'Adelie'}	{'Torgersen'}	NaN	{'NA' }	2007
5	{'Adelie'}	{'Torgersen'}	36.7	{'female'}	2007
6	{'Adelie'}	{'Torgersen'}	39.3	{'male' }	2007
7	{'Adelie'}	{'Torgersen'}	38.9	{'female'}	2007

>>

Table: Removing missing values

```
>> penguins = rmmissing(penguins)
```

```
>> penguins=rmmissing(penguins)
```

```
penguins =
```

```
6x6 table
```

<u>Number</u>	<u>species</u>	<u>island</u>	<u>Bill</u>	<u>Gender</u>	<u>year</u>
1	{'Adelie'}	{'Torgersen'}	39.1	{'male' }	2007
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}	2007
3	{'Adelie'}	{'Torgersen'}	40.3	{'female'}	2007
5	{'Adelie'}	{'Torgersen'}	36.7	{'female'}	2007
6	{'Adelie'}	{'Torgersen'}	39.3	{'male' }	2007
7	{'Adelie'}	{'Torgersen'}	38.9	{'female'}	2007

```
>>
```

Table: Select rows based on condition

```
>> var = penguins.Properties.VariableNames;  
>> male=penguins(penguins.Gender=="male",var)
```

```
male =
```

```
2x6 table
```

<u>Number</u>	<u>species</u>	<u>island</u>	<u>Bill</u>	<u>Gender</u>	<u>year</u>
1	{'Adelie'}	{'Torgersen'}	39.1	{'male'}	2007
6	{'Adelie'}	{'Torgersen'}	39.3	{'male'}	2007

```
>>
```


Table: Removing a column

```
>> penguins.year=[]
```

```
>> penguins.year=[]
```

```
penguins =
```

```
6×5 table
```

<u>Number</u>	<u>species</u>	<u>island</u>	<u>Bill</u>	<u>Gender</u>
1	{'Adelie'}	{'Torgersen'}	39.1	{'male' }
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}
3	{'Adelie'}	{'Torgersen'}	40.3	{'female'}
5	{'Adelie'}	{'Torgersen'}	36.7	{'female'}
6	{'Adelie'}	{'Torgersen'}	39.3	{'male' }
7	{'Adelie'}	{'Torgersen'}	38.9	{'female'}

```
>>
```

Table: Select columns based on names

```
>> penguin2=penguins(:,{'species' 'Gender' 'year'})
```

```
>> newvars = {'species' 'Gender' 'year'};  
>> penguin2=penguins(:,newvars)
```

```
>> penguin2=penguins(:,{'species' 'Gender' 'year'})
```

```
penguin2 =
```

```
6×3 table
```

<u>species</u>	<u>Gender</u>	<u>year</u>
{'Adelie'}	{'male' }	2007
{'Adelie'}	{'female'}	2007
{'Adelie'}	{'female'}	2007
{'Adelie'}	{'female'}	2007
{'Adelie'}	{'male' }	2007
{'Adelie'}	{'female'}	2007

```
>>
```

Table: Extracting values from selected columns

Number	species	island	Bill	Gender	year
1	{'Adelie'}	{'Torgersen'}	39.1	{'male' }	2007
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}	2007
3	{'Adelie'}	{'Torgersen'}	40.3	{'female'}	2007
5	{'Adelie'}	{'Torgersen'}	36.7	{'female'}	2007
6	{'Adelie'}	{'Torgersen'}	39.3	{'male' }	2007
7	{'Adelie'}	{'Torgersen'}	38.9	{'female'}	2007

```
>> values = [ penguins.Bill penguins.year]
```

```
values =
```

```
1.0e+03 *
```

```
0.0391 2.0070  
0.0395 2.0070  
0.0403 2.0070  
0.0367 2.0070  
0.0393 2.0070  
0.0389 2.0070
```

Additional Information

Complete tutorial on tables in Matlab:

<https://www.mathworks.com/help/matlab/tables.html>