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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", 48.3, "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 =
7x6 table
   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'}  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 =
1x6 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 =
7x6 table
   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
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 = rrmissing(penguins)
```

```
>> penguins = rrmissing(penguins)
```

```
penguins =
```

```
6x6 table
```

Number	species	island	Bill	Gender	year
1	{'Adelie'}	{'Torgersen'}	39.1	{'male'}	2007
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}	2007
3	{'Adelie'}	{'Torgersen'}	48.3	{'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
```

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

```
>>
```

Table: Removing a column

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

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

```
penguins =
```

```
6x5 table
```

Number	species	island	Bill	Gender
1	{'Adelie'}	{'Torgersen'}	39.1	{'male'}
2	{'Adelie'}	{'Torgersen'}	39.5	{'female'}
3	{'Adelie'}	{'Torgersen'}	48.3	{'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 =
```

```
6x3 table
```

species	Gender	year
{'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>