

**sort()** — Reorder rows of matrix

|                                                            |                                                    |                                      |                                |
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## Description

`sort(X, idx)` returns *X* with rows in ascending or descending order of the columns specified by *idx*. For instance, `sort(X, 1)` sorts *X* on its first column; `sort(X, (1,2))` sorts *X* on its first and second columns (meaning rows with equal values in their first column are ordered on their second column). In general, the *i*th sort key is column `abs(idx[i])`. Order is ascending if `idx[i] > 0` and descending otherwise. Ascending and descending are defined in terms of [\[M-5\] abs\(\)](#) (length of elements) for complex.

`_sort(X, idx)` does the same as `sort(X, idx)`, except that *X* is sorted in place.

`jumble(X)` returns *X* with rows in random order. For instance, to shuffle a deck of cards numbered 1 to 52, one could code `jumble(1::52)`. See `rseed()` in [\[M-5\] runiform\(\)](#) for information on setting the random-number seed.

`_jumble(X)` does the same as `jumble(X)`, except that *X* is jumbled in place.

`order(X, idx)` returns the permutation vector—see [\[M-1\] Permutation](#)—that would put *X* in ascending (descending) order of the columns specified by *idx*. A row-permutation vector is a  $1 \times c$  column vector containing the integers 1, 2, ..., *c* in some order. Vectors (1\2\3), (1\3\2), (2\1\3), (2\3\1), (3\1\2), and (3\2\1) are examples. Row-permutation vectors are used to specify the order in which the rows of a matrix *X* are to appear. If *p* is a row-permutation vector, `X[p, .]` returns *X* with its rows in the order of *p*; *p* = (3\2\1) would reverse the rows of *X*. `order(X, idx)` returns the row-permutation vector that would sort *X* and, as a matter of fact, `sort(X, idx)` is implemented as `X[order(X, idx), .]`.

`unorder(n)` returns a  $1 \times n$  permutation vector for placing the rows in random order. Random numbers are calculated by `runiform()`; see `rseed()` in [\[M-5\] runiform\(\)](#) for information on setting the random-number seed. `jumble()` is implemented in terms of `unorder()`: `jumble(X)` is equivalent to `X[unorder(rows(X)), .]`.

`_collate(X, p)` is equivalent to `X = X[p, .]`; it changes the order of the rows of *X*. `_collate()` is used by `_sort()` and `_jumble()` and has the advantage over subscripting in that no extra memory is required when the result is to be assigned back to itself. Consider

$$X = X[*p*, .]$$

There will be an instant after `X[p, .]` has been calculated but before the result has been assigned back to *X* when two copies of *X* exist. `_collate(X, p)` avoids that. `_collate()` is not a substitute for subscripting in all cases; `_collate()` requires *p* be a permutation vector.

## Syntax

```

transmorphic matrix   sort(transmorphic matrix X, real rowvector idx)
void                   _sort(transmorphic matrix X, real rowvector idx)

transmorphic matrix   jumble(transmorphic matrix X)
void                   _jumble(transmorphic matrix X)

real colvector        order(transmorphic matrix X, real rowvector idx)
real colvector        unordered(real scalar n)

void                   _collate(transmorphic matrix X, real colvector p)

```

where

1.  $X$  may not be a pointer matrix.
2.  $p$  must be a permutation column vector, a  $c \times 1$  vector containing the integers 1, 2, ...,  $c$  in some order.

## Remarks and examples

[stata.com](http://stata.com)

If  $X$  is complex, the ordering is defined in terms of [M-5] `abs()` of its elements.

Also see `invorder()` and `revorder()` in [M-5] `invorder()`. Let  $p$  be the permutation vector returned by `order()`:

$$p = \text{order}(X, \dots)$$

Then  $X[p, .]$  are the sorted rows of  $X$ . `revorder()` can be used to reverse sort order:  $X[\text{revorder}(p), .]$  are the rows of  $X$  in the reverse of the order of  $X[p, .]$ . `invorder()` provides the inverse transform: If  $Y = X[p, .]$ , then  $X = Y[\text{invorder}(p), .]$ .

## Conformability

`sort(X, idx), jumble(X):`

```

X:      r1 × c1
idx:    1 × c2, c2 ≤ c1
result: r1 × c1

```

`_sort(X, idx), _jumble(X):`

```

X:      r1 × c1
idx:    1 × c2, c2 ≤ c1
result: void; X row order modified

```

`order(X, idx):`

```

X:      r1 × c1
idx:    1 × c2, c2 ≤ c1
result: r1 × 1

```

unorder( $n$ ):

$n$ :  $1 \times 1$   
*result*:  $n \times 1$

\_collate( $X$ ,  $p$ ):

$X$ :  $r \times c$   
 $p$ :  $r \times 1$   
*result*: *void*;  $X$  row order modified

## Diagnostics

sort( $X$ ,  $idx$ ) aborts with error if any element of abs( $idx$ ) is less than 1 or greater than rows( $X$ ).

\_sort( $X$ ,  $idx$ ) aborts with error if any element of abs( $idx$ ) is less than 1 or greater than rows( $X$ ), or if  $X$  is a view.

\_jumble( $X$ ) aborts with error if  $X$  is a view.

order( $X$ ,  $idx$ ) aborts with error if any element of abs( $idx$ ) is less than 1 or greater than rows( $X$ ).

unorder( $n$ ) aborts with error if  $n < 1$ .

\_collate( $X$ ,  $p$ ) aborts with error if  $p$  is not a permutation vector or if  $X$  is a view.

## Also see

[M-5] [invorder\(\)](#) — Permutation vector manipulation

[M-5] [uniquerows\(\)](#) — Obtain sorted, unique values

[M-5] [ustrcompare\(\)](#) — Compare or sort Unicode strings

[M-4] [Manipulation](#) — Matrix manipulation

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