

label

| | | |
|-----------------|-----------------|--------------------------|
| keys: | [from] <number> | source picture |
| | [to] <number> | destination picture |
| Options: | fg | label foreground regions |
| | bg | label background regions |

You use the **label** command to label separate foreground and/or background regions defined in a binary source image. Each labelled region is assigned a unique, integer number counting upwards from 1. The output picture will contain an image in which each pixel is set to the number assigned to the underlying region, or zero, if the underlying region has not been labelled. The **fg** and **bg** options control whether foreground or background regions (or both) are labelled in this way. By default, only foreground regions are labelled.

Examples

```
label
```

This command labels all the foreground regions of the current picture.

```
label 2:1 bg; picture range; type 'Number of objects = ',i2
```

This example labels all the background regions of picture 2:1 and types on the console the number of labelled regions.

```
label 44 to display fg bg
```

This command labels all the connected regions of picture 44 and outputs the final result to the current display picture or partition.

Description

The **label** command has two particular uses:

- It can be used as a quick way to count individual foreground regions.
- It enables you to determine whether there exists a connected path between any two pixels in an image (if they are, they will have the same label).

Semper 6 Command Reference

label

The source picture is treated as a binary image: zero values denote background pixels and non-zero values denote foreground pixels. Background pixels are always treated as being 4-connected, that is, two background pixels are 4-connected only if they are either horizontally or vertically adjacent to each other. Foreground pixels are treated as being 8-connected, that is, two foreground pixels are 8-connected if they are in any way adjacent.

Because of the difference in the way foreground and background pixels are connected, the result of labelling the foreground regions of an image can be quite different from the result of labelling the background regions of the negated version of the same image. For example,

| Source image | label fg |
|---------------------|---------------------|
| 0 0 0 0 0 0 0 0 0 0 | 0 0 0 0 0 0 0 0 0 0 |
| 0 1 1 0 1 1 0 0 0 0 | 0 1 1 0 2 2 0 0 0 0 |
| 0 1 1 0 1 1 0 0 0 0 | 0 1 1 0 2 2 0 0 0 0 |
| 0 0 0 0 0 0 1 0 0 0 | 0 0 0 0 0 0 2 0 0 0 |
| 0 0 0 0 0 0 0 1 0 0 | 0 0 0 0 0 0 0 2 0 0 |
| 0 0 0 0 0 0 0 0 0 0 | 0 0 0 0 0 0 0 0 0 0 |

| negate | label bg |
|---------------------|---------------------|
| 1 1 1 1 1 1 1 1 1 1 | 0 0 0 0 0 0 0 0 0 0 |
| 1 0 0 1 0 0 1 1 1 1 | 0 1 1 0 2 2 0 0 0 0 |
| 1 0 0 1 0 0 1 1 1 1 | 0 1 1 0 2 2 0 0 0 0 |
| 1 1 1 1 1 1 0 1 1 1 | 0 0 0 0 0 0 3 0 0 0 |
| 1 1 1 1 1 1 1 0 1 1 | 0 0 0 0 0 0 0 4 0 0 |
| 1 1 1 1 1 1 1 1 1 1 | 0 0 0 0 0 0 0 0 0 0 |

The **label** command produces the labelled image in two or more passes through the data (two passes except for very detailed images). The results of the first pass are output to an integer form picture with the same dimensions as the source picture. This will be the output picture itself unless the output picture is a display picture, in which case a temporary disc picture is created to hold the results of the first pass.

The range of the final result is stored in the output picture label. This means that the total number of labelled regions can be obtained by means of the **survey** command with no additional processing. The range is limited by the range of 16-bit integers which means that a maximum of 32767 separate regions can be labelled (and therefore counted) in one image.

label

Notes

see also: analyse

Defaults and Ranges

| keys/options | defaults | range |
|--------------|---|----------------------|
| [from] | current picture, held in the variable <i>select</i> | valid picture number |
| [to] | source picture | valid picture number |
| fg/bg | label foreground regions | |