skiz

keys:	**[from]**	*<number>*	source picture
	[to]	*<number>*	destination picture
options:	**binary/label**		treat source picture as binary, labelled image
	fg		label foreground regions if binary source image
	bg		label background regions if binary source image
	circle/diamond/square/octagon		use Euclidean, 4-connected, 8-connected or octagonal metric for measuring distances

You use the **skiz** command to generate the *skeleton by zones of influence* or skiz associated with the source image. The skiz is the locus of points which are equidistant from the labelled regions defined by the source image and is the complement to the zones of influence associated with the same source image (see the **zone** command). A binary image is output with 1's for pixels that lie on the skiz and 0's elsewhere. By default, the source picture is treated as a binary image and a temporary, labelled image is obtained from it (see the **label** command for details about the labelling process). If the **label** option is set, the source image is treated as being already labelled. Distances between pixels are measured, by default, using the true Euclidean metric. Faster and possibly acceptable results can be obtained with simpler metrics by specifying one of the options **diamond, square** or **octagon** (see the **dt** command to find out more about distance transforms and metrics).

Examples

```
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```

This command replaces the binary image in the current picture with the skiz associated with the connected foreground regions of the binary image.

```
skiz 1 2 label diamond
```

This command outputs to picture 2 the skiz associated with the labelled regions in picture 1 using the 4-connected, *city block* metric.

Description

If the source picture is treated as a binary image (the default), a temporary, labelled image is obtained from it in exactly the same way as the **label** ccommand. By default, the foreground regions are labelled. You can use the options **fg** and **bg** to control whether foreground and/or background regions are labelled. Note that foreground regions are treated as being 8-connected, while background regions are 4-connected.

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By specifying the **label** option, you can suppress the labelling pass. This allows you to supply source images which have already been labelled, including images generated by any of the classification commands (**box, mindistance** and **likelihood**). Note that differently labelled regions are allowed to touch each other.

The skiz is the locus of points which are equidistant from the labelled regions associated with the source image. Because pixels occupy discrete positions in the image plane, there will only be a few pixels which intersect the skiz exactly. In order to produce a connected representation of the skiz, all pairs of 4-connected pixels which lie on either side of the skiz are also included in the output image. This produces a result which is equally distributed about the true skiz. However, the result will be one to two pixels thick and its level of connectivity will vary.

An entirely 4-connected or 8-connected result can be obtained by using the commands **bmlut** and **bmmap**, but the end result may be biased with respect to the true skiz by up to one pixel.

To obtain an 8-connected skiz, use the following commands:

```
bmlut to <map> if p4 unless c8=1&n8~=1&(~p1&p7),+
                            c8=1&n8~=1&(~p7&p1),+
                            c8=1&n8~=1&(~p3&p5),+
                            c8=1&n8~=1&(~p5&p3)

bmmap <skiz> with <map>
```

where <skiz> contains the results from the skiz command and <map> contains the sequence of look-up tables defining the necessary sequence of 3 by 3 neighbourhood transformations.

To obtain a 4-connected skiz, use the following commands:

```
bmlut to <map> if p4|(~p0&p1&p3)|(p2&p1&p5)|(~p6&p3&p7)|(~p8&p5&p0),+
                  p4&~(c4=1&n4~=1&(~p1&p7)),+
                  p4&~(c4=1&n4~=1&(~p7&p1)),+
                  p4&~(c4=1&n4~=1&(~p3&p5)),+
                  p4&~(c4=1&n4~=1&(~p5&p3))

bmmap <skiz> with <map>
```

The **bmlut** command for the 4-connected case sets up a sequence of 5 neighbourhood transformations. The first transformation is a diagonal fill which makes any 8-connected components of the skiz 4-connected. The remaining transformations specify a 4-connected thinning transformation.

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Distances between pixels are calculated using one of several possible metrics. By default, the exact Euclidean metric is used. A simpler metric requiring less computation, can be selected with one of the options **diamond, square** or **octagon.** For more details about the different metrics and distance transforms, consult the documentation for the **dt** command.

Notes

see also: **zone, dt, label, box, mindistance, likelihood, bmult, bmmap**

Defaults and Ranges

keys/options	defaults	range
[from]	current picture, held in the variable *select*	valid picture number
[to]	source picture	valid picture number
binary/label	treat source picture as a binary image	
fg/bg	label foreground regions	
circle/diamond square/octagon	use the Euclidean metric	