chull

keys:	[from]	<number>	source picture
	[to]	<number>	output picture

Use the **chull** command to generate the convex hull for the regions defined in the binary source image. If you imagine an elastic band stretched around all foreground regions in the source picture, the convex hull is the area enclosed by the elastic band. The convex hull therefore includes in its boundary all the extreme points of the source regions, and it has no concavities. You can detect the presence of concavities in binary objects by looking at the difference between the objects and their convex hulls. If there is no difference between an object and its convex hull, the object must be convex. **Chull** also returns the convex perimeter and area in the variables *p* and *a*.

Examples

```
chull; type 'convex perimeter and area: ',p,a'
```

This example replaces the current picture with its convex hull and types the perimeter and area of the convex hull.

```
chull 1 2; calculate :2 & ~:1
```

This example calculates the convex deficiency of regions in picture 1 and puts the result in picture 2.

Description

The source picture is treated as a binary image: zero values denote background pixels and non-zero values denote foreground pixels. The output picture will contain the convex hull of the foreground regions. Note that the source image may contain any number of separate foreground regions. **Chull** always produces a single convex hull which includes all the foreground regions in the source picture.

Chull returns the perimeter and area of the convex hull in Semper variables *p* and *a*. The perimeter and area correspond exactly to the values which the **analyse** command would return for the convex hull.

The range of the final result is stored in the output picture label.

Notes

variables set:	*p*	(perimeter of convex hull)
	a	(area of convex hull)
see also:	**analyse**	

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Defaults and Ranges

keys/options	defaults	range
[from]	current picture, held in the variable *select*	valid picture number
[to]	source picture	valid picture number