

## RightBrain User Interface

by Hans Andersen

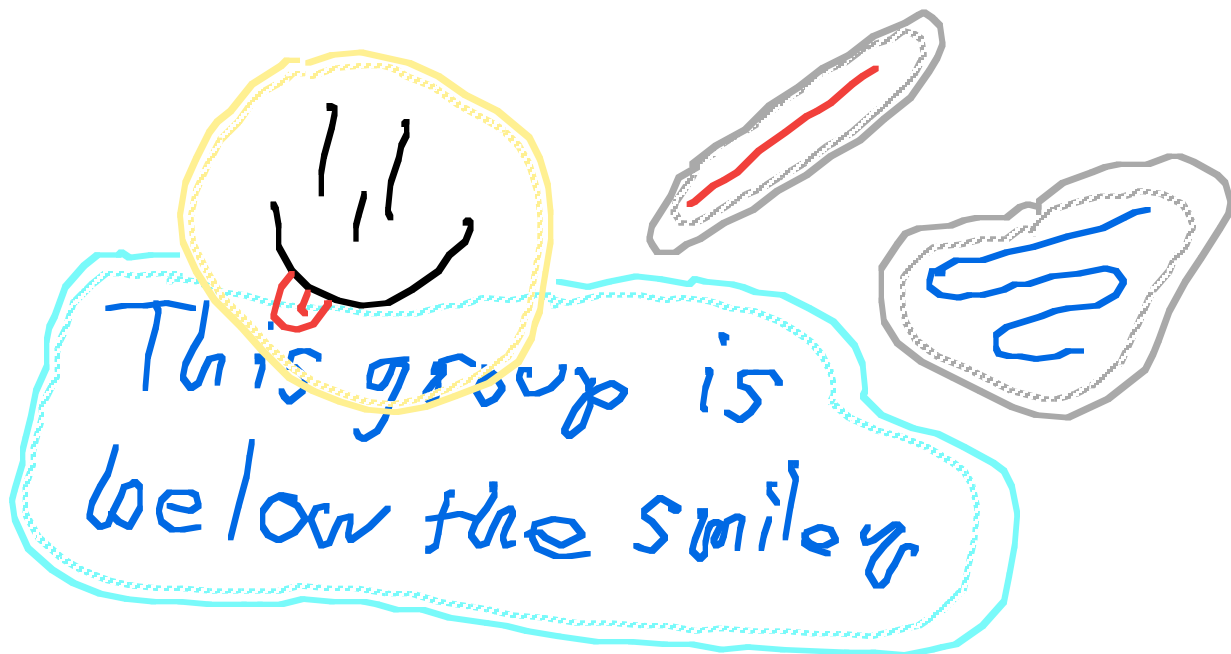
Objects exist on the whiteboard-like surface of RightBrain. Objects are subject to Z-ordering. There are two types of object - strokes and Icons.

Strokes are representations of pen input directly on the screen. Penstrokes should be in solid shades (black, green, red, etc.) Icons are representations of files that are external to RightBrain.

Groups are collections of objects. In a group, the relative positioning and ordering of constituent objects is preserved. Groups are indicated by a colored double-outline surrounding its constituent objects. The double-outline is normally solid on the outside and dashed on the inside, to distinguish the outside from the inside. These outlines should be in pastel shades (highlighter colors) to distinguish between strokes and group boundaries. As a special case, the class of groups called "default groups" uses a light gray as its color.

Every object is a member of precisely one group. This can either be a "normal" group, or a "default" group. When a new stroke is created, if that stroke overlaps the bounds of no non-default groups, then it becomes a member of a "default" group. If the new stroke overlaps the bounds of one or more non-default groups, then it becomes a member of the first such non-default group which it intersects. The bounds of that group "grow" to accommodate the new stroke. When a new icon is created, it is a member of a new non-default group.

Groups are z-ordered. Within a group, its constituent objects are internally z-ordered. Groups can be moved around. When a group is moved, it comes to the front of the z-order. If a group is placed such that it overlaps other groups, this is reflected in the covered group's outline. The portion of an outline that lies within the bounds of another group that is higher in the z-ordering than itself omits its outer solid-outline, only displaying the inner dashed-outline.



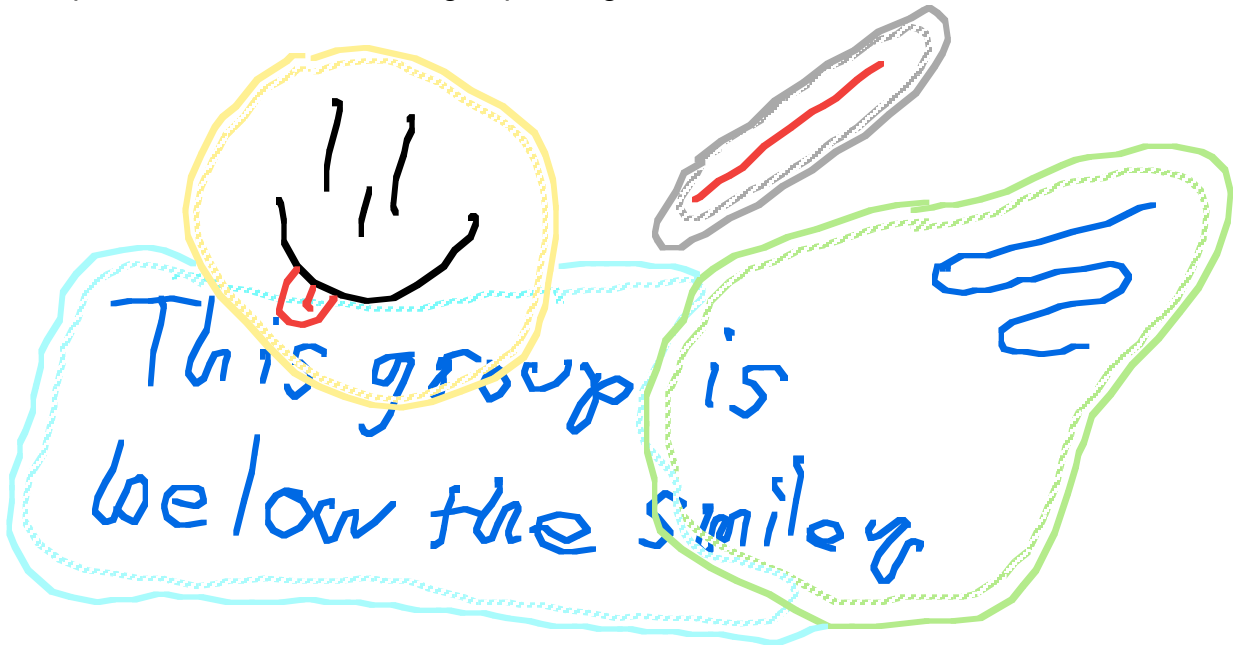
The above picture shows four groups. The two groups in the upper-right are default groups

consisting of only one stroke apiece. The remaining two groups consist of multiple strokes. The yellow-outlined group is above the blue-outlined group in the z-ordering, so a portion of the blue group's solid outline is omitted, and the yellow group's outline is "on top" of some of the blue group's content.

New groups can be formed with a flow-menu interaction culminating in a sweeping gesture that indicates the area to be grouped. When the action is completed, all objects enclosed or intersected by the path of the gesture become assigned to a new group, losing any former group associations.

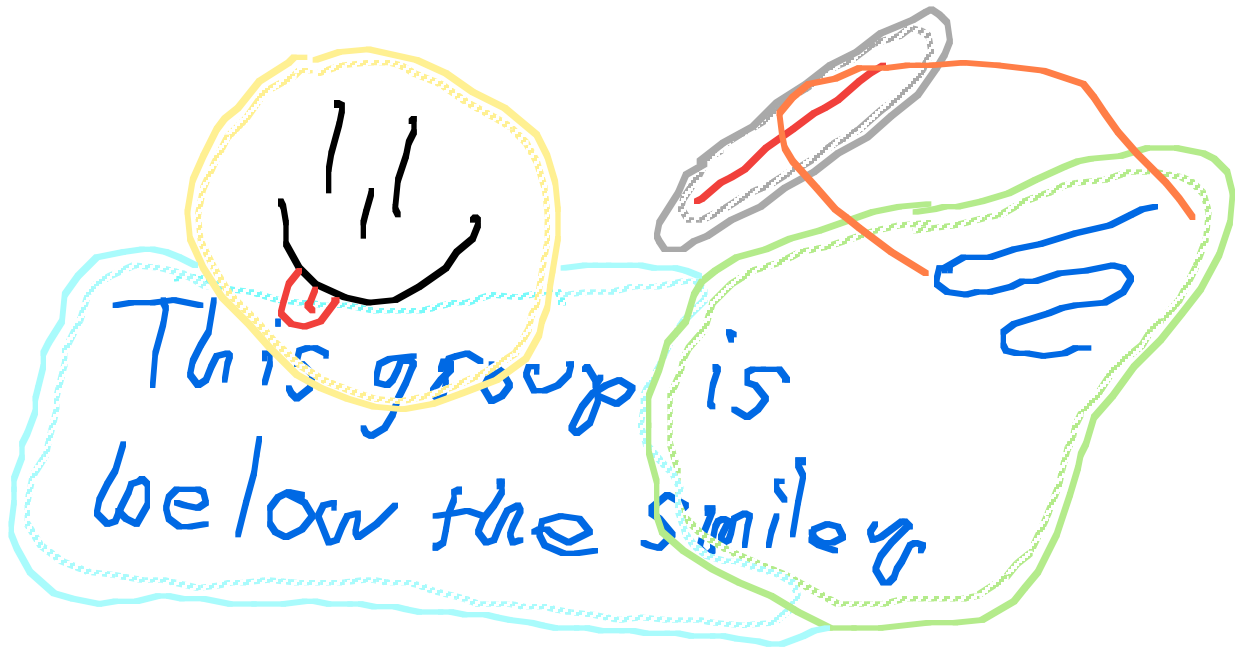


In the above picture, the orange circle is the path of the gesture associated with a "Form Group" action. The result is the group arrangement shown below:

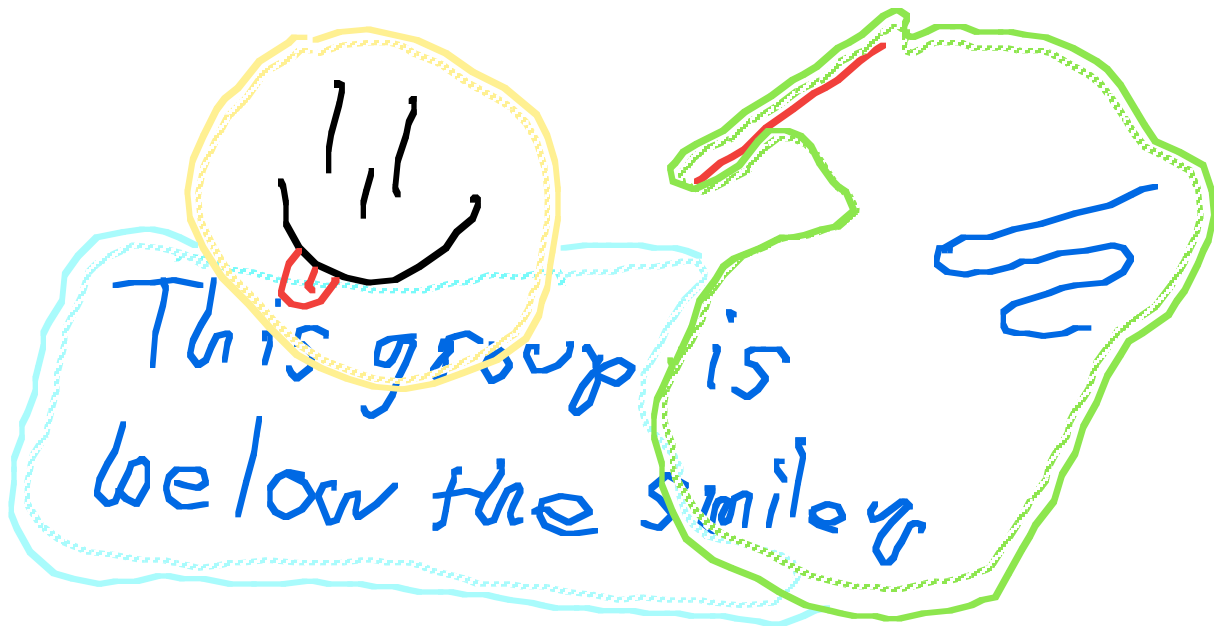


The new group, which was arbitrarily assigned a light-green color, has bounds encompassing the entire region of the gesture plus the bounds of all those strokes enclosed or intersected by that area. The new group is highest in the z-order, so it is “on top” of the blue-bordered group.

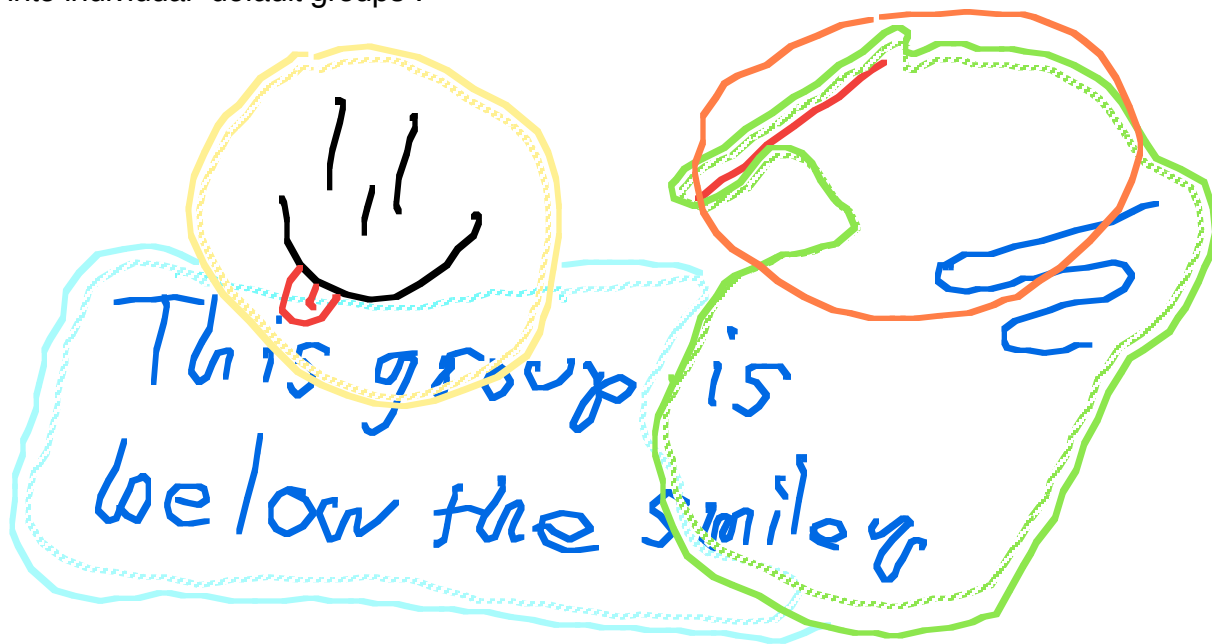
Groups can have more content appended to them with a flow-menu action initiated on an existing group and encompassing the area to be appended. When the action is completed, all objects enclosed or intersected by the path of the gesture become assigned to a new group, losing any former group associations.



In the above picture, the orange line is the path of the gesture associated with an “Append to Group” action that was initiated on the green-bordered group. The result is the group arrangement shown below:



Groups can also be decomposed into their constituent parts through a flow-menu action similar to the action that forms new groups. An area is indicated by a gesture, and all the objects enclosed by or intersecting with the gesture are removed from the group and put into individual “default groups”.



In the above picture, the orange line is the path of the gesture associated with a “Decompose Area” action. The result is the group arrangement shown below:



## Icons

For purposes of grouping, interaction with strokes, etc., icons behave like “Large Rectangular Strokes”. An icon looks like a piece of information enclosed by a rectangular

boundary. This could look like a tiny image like an icon on a Windows desktop, or it could look like a large image like a map or photograph, or it could look like the text of a single url, or it could look like the text of a single sentence from a work by James Joyce. No matter what it looks like, it has a definite rectangular boundary. It is the rectangular boundary that matters for purposes of intersection w/group or gesture boundaries.

Two special actions are available when a FlowMenu is invoked within the boundaries of an icon. The image can be detached from its current group membership and moved elsewhere. It can also be “invoked”, causing its original document to be opened in LeftBrain.

## **Actions**

The default interaction with RightBrain is to draw new strokes. All other operations are accomplished via the Flowmenu.

### **Flowmenu-triggered Interactions that can be done on groups:**

- move
- scale (grow/shrink via a “circular action” on the flowmenu)
- dock (more on that later)
- change outline color (from several preset choices)
- delete group
- append area (as described above)
- duplicate group

### **Flowmenu-triggered Interactions that can be done on icons:**

- detach/move (dissociates the indicated icon from its current group, and allows you to “extract” an icon from the rest of its group)
- invoke (tell LeftBrain to call up the icon’s source document in a relevant editing application)

### **Flowmenu-triggered Interactions that can be done anywhere:**

- change pen color (from several preset choices)
- define new group (as described above)
- decompose area (as described above)
- undo/redo (via a “circular action” on the flowmenu)
- print
- conclude session (this is perhaps the only action that should cause a modal alert box!)