

This project uses ImageJ in combination with plugin ObjectJ to perform integrated grid counting across many images. A grid (Fig 1) is shown as overlay. Of each grid line, the left or right end point can be marked once with a certain category. Max 10 .. 100 categories in 6 colors can be used to mark grid positions. The mouse is used to hover above the desired location, which then can be marked with one or two key strokes. The linked images can be .tif or .jpg format

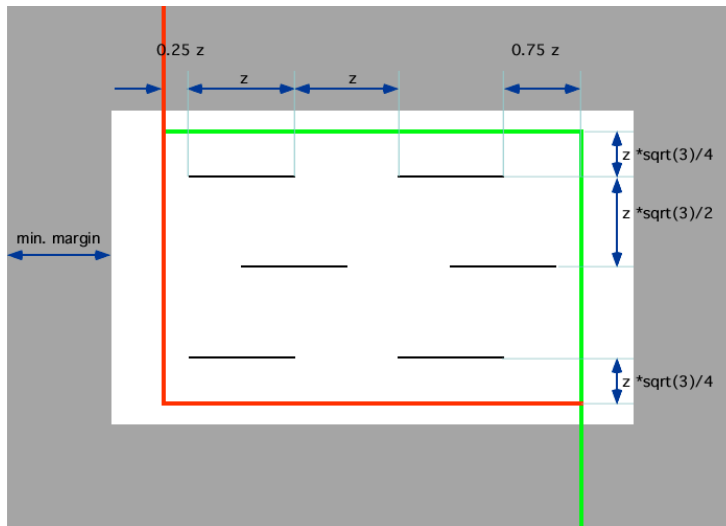


Fig 1: An equilateral triangular grid (black) is used which is synchronized with the frame (red-green). The frame is centered in the image and has the required minimum distance to the image borders; here the margin area is colored gray.

### Labeling

The "Label" feature in ObjectJ is used to show text labels at the grid points. Custom labels are available via single or dual-key shortcuts. Three different modes for fastest possible marking are supported. **Important:** marking points is here not done by clicking with the ObjectJ "Set Marker" tool (which has a colored cursor), it rather is performed with key strokes while the standard crosshair cursor is at the desired position.

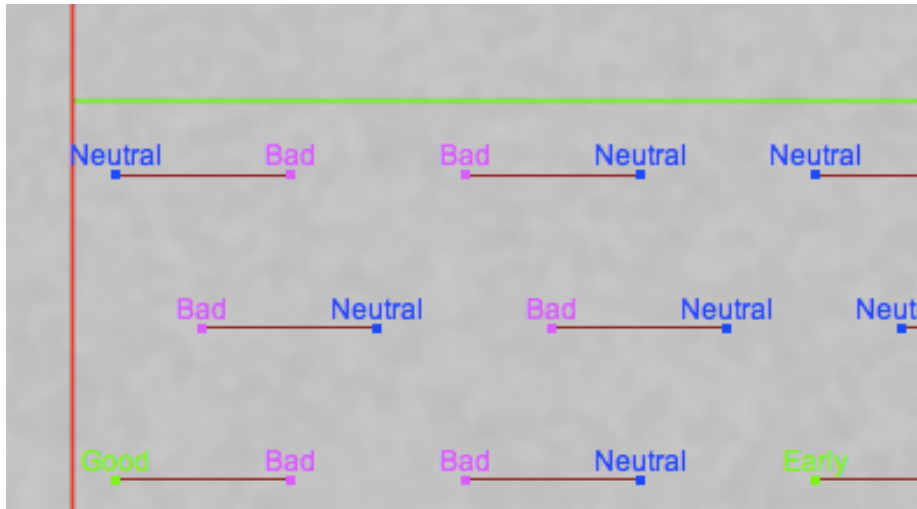


Fig 2: Categories shown as text overlay

### Size and colors of labels

The visibility of the numeric label and font size can be controlled via ObjectJ> Show ObjectJ Tools> Sizes...

To change colors, either choose a different item type in the key table (e.g. 'B' instead 'A'), or change e.g. the color of all items 'A' by going to ObjectJ>Show Project Window, choose panel "Objects", and change "Item Color" in the right-most column

### Panel of Categories

This panel (Fig 7) is an image showing all available categories (with code, label and color) as rows, so the user has a quick overview. If a Joker key is assigned, it is indicated here as 'J'.

### Joker [J] and Repeat [R] Key

If a dual-key category appears to occur more frequently, it can also be marked with a single key, either by pressing 'R' to repeat the most recent category, or by pressing 'J' to use the current Joker category. The joker can be re-defined via menu ObjectJ>Set Joker [I].

### Changing Macro Variables

You can change the key table (see below) and other parameters via ObjectJ>Show Embedded Macros. After the change, click "Install Embedded Macros" and optionally choose ObjectJ>Save Project.

### KeyTable

The embedded macro set contains a keyTable, that relates codes (such as '4' or '66') to item types and labels. Below, five labels (Good, Bad, Neutral, Early, Late) are defined, some of which (e.g. Good and Early) share the same item type and thus color. The user is free to choose single and dual key combinations as long as

no ambiguity conflicts are reported. The second key of a 'dual key' must be pressed within 1.5 sec.

Example for a KeyTable:

```
keyTable = " ";
keyTable += "#1, A, Good ";
keyTable += "#2, B, Bad ";
keyTable += "#3, C, Neutral ";
keyTable += "#66, A, Early ";
keyTable += "#67, B, Late ";
```

In the example above, pressing key '1' will set a point of type 'A' (green in the example project) and show up as label "Good", where 'A' is one of the item types shown in ObjectJ>Show ObjectJ Tools or ObjectJ>Show Project Window/Objects.

## Panel of Categories

This panel (Fig 7) is a cheat sheet showing all available categories (with code, label and color) as rows, so the user has a quick overview of all codes and their labels. The 'joker category' is highlighted with letter 'J'.

## Background Color

Label strings on the images can be drawn with or without background.

Examples:

```
backgroundColor="none", //No background
backgroundColor="yellow", //yellow background
backgroundColor="#8000ff00", //semi-transparent green
```

## Three modes for marking

(i) "Focus mode", indicated by a magenta 'focus' circle, is intended for sequential marking of grid points

(ii) "Swatter" mode, indicated by a light green brush area, is used to define an irregular area and assign all its free grid points with the same marker type.

(iii) "Random Access Mode" (Focus and Swatter = off): the user positions the cursor above a free grid point and marks it via single or double digit.

## Menu Commands:

### Initialize Grid [F3]

This is necessary before marking a different window.

### Key 0..9

Evaluates key strokes. These menu commands must be invoked by key shortcuts, not via menu.

### Key R

Repeat, = mark point with most recent category. This menu command must be invoked by key shortcut, not via menu.

### Key J

Marks cursor position with Joker category. This menu command must be invoked by key shortcut, not via menu. Choose "Object]>Show Panel [I]" to show the current Joker.

### Focus [F]

Type 'F' to set the magenta 'focus' circle to the next free position, starting from the cursor position. Type 'F' again to leave the "Focus Mode". The focus circle shows which grid point is marked next, and after marking, the focus circle jumps to the next free grid position.

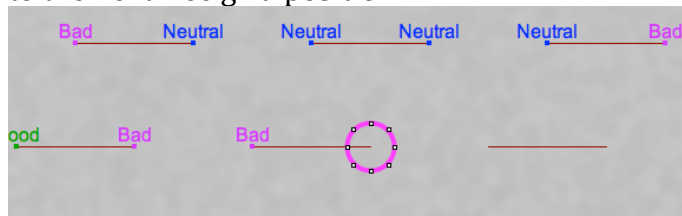


Fig. 3: Focus mode

### Start/Stop Swatter [S]

Shows or hides the circular brush area (Fig 4). Click inside the brush area and drag towards outside to extend, or click outside drag towards inside to trim. All non-occupied grid points inside the swatter area can be annotated or with a single or dual-key stroke, or killed with key 'K'.

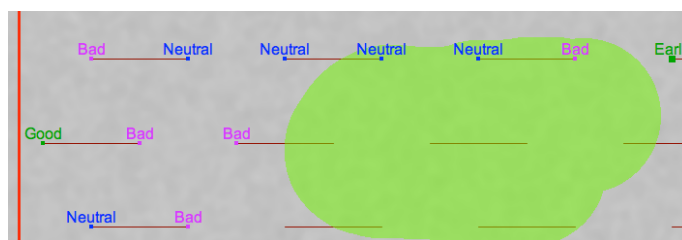


Fig. 4: Swatter mode

### Swatter All/ None [A]

Highlights (or unhighlights) the entire frame as swatter area (Fig 5) . This can be used to mark all unmarked grid locations with a certain category. Be careful as currently there is no Undo (but you can precede the operation with Object]>Save Project).

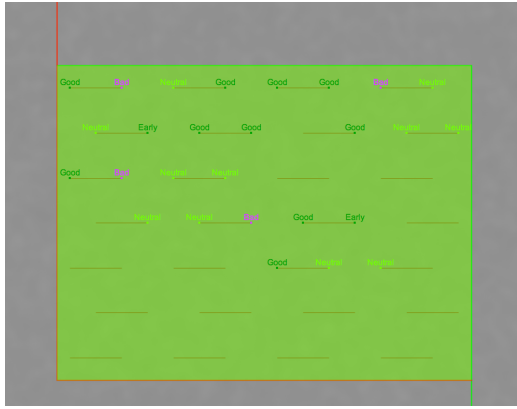


Fig. 5: Swatter All

### Kill [K]

If swatter is on, kills all markers in the swatter area. Otherwise, kills the marker that is close to the cursor. **Note:** please don't use the **ObjectJ pistol tool**, you would have to choose **ObjectJ>Initialize Grid** before the grid point can be marked again.

### Kill Duplicates and Unnamed Points

Cleans up the data set in case grid points are assigned twice, or unnamed markers accidentally set with the ObjectJ marker tool.

### Show Panel [P]

Shows the Panel of Categories. Locate the cursor upon a category and press 'J' to define the Joker (Fig7).

### Show Frequency Table

Shows both a bar graph with relative frequencies, and a table with absolute and relative frequencies (Fig 6). Older tables are closed.

### Undo Marking

Removes the most recently marked point(s)

### Select None [Shift-Command-A]

Can be used to remove both the Focus circle and the Swatter area (ImageJ>Edit>Selection>Select None)

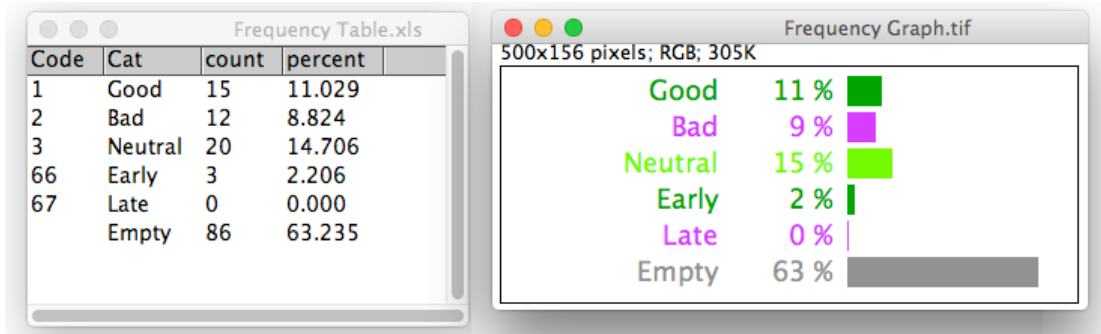


Fig 6: Frequency Graph and Frequency table

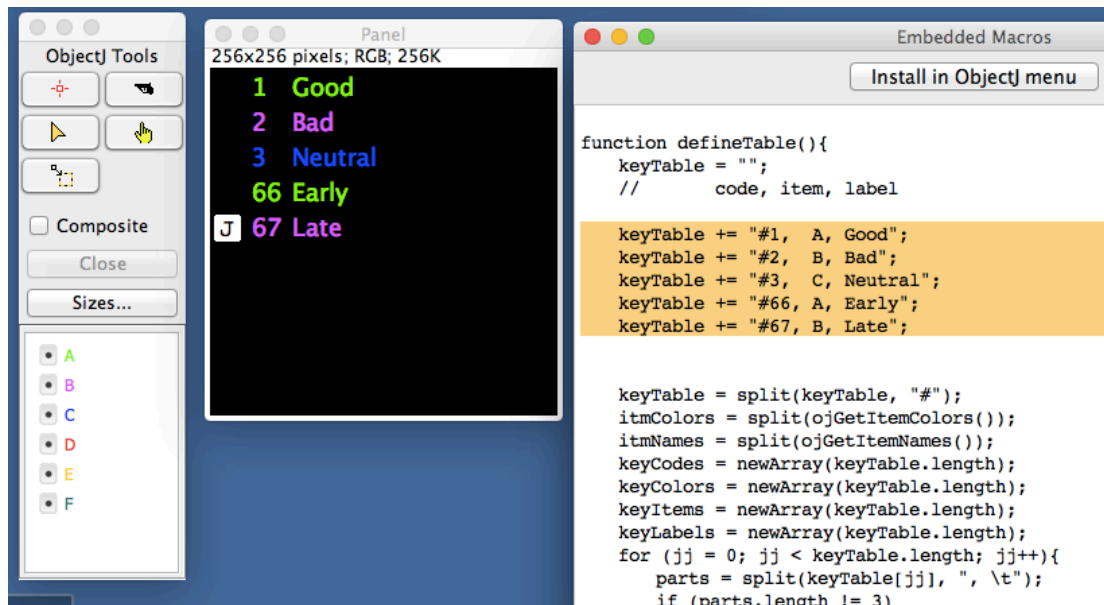


Fig 7: Possible categories are defined in ObjectJ>show Embedded Macros (right) and can be displayed in the panel with the corresponding colors via ObjectJ>Show Panel. For example "Good" is shown in green because it uses the green item type "A". This color can be changed in ObjectJ>Show Project Window: in the "Objects" panel, double-click the corresponding color field.