

Planar map editor

Perhaps the best way to get acquainted with the peeling exploration of planar maps is to try some examples and to observe the effects of the various peeling operations. Unfortunately, as the reader may have noticed, even with relatively small maps performing a gluing operation (G_{k_1, k_2}) by hand already becomes tedious and error-prone. Luckily there is an automated solution in the form of a *planar map editor* which can be accessed in the browser at:

<http://www.nbi.dk/~budd/planarmap/examples/editor.html>

To perform a peeling exploration, say, of a finite planar map of perimeter 8 with the root face on the outside:

- Select a corner of the displayed edge (which is the starting configuration) and press «8» to produce a face of degree 8.
- For convenience you can mark a root edge by selecting a corner and pressing «M».
- If you like you can give the hole (the bounded face) a different color by selecting it, opening up the *SELECTION* menu, and choosing a color where it says *Fill*.
- To perform an operation C_k with, say, $k = 2$ to explore a face of degree $2k = 4$: choose a peel edge by selecting a corner of the hole, then press «4».
- To perform a gluing operation G_{k_1, k_2} : select two corners of the hole (hold «shift» to do so), then press «G».

Of course, one may also treat the outer face as the hole, which is particularly convenient when exploring an infinite planar map, and the operations C_k and G_{k_1, k_2} work similarly. The only thing one should keep in mind is that the gluing operation depends on the order in which the two corners are selected: gluing is always done clockwise, in the sense that the active edges that sit clockwise in between the first and second corner become part of the “finite” hole.

Exercise Try to recreate the following planar maps by a peeling exploration, i.e. by only using the digit keys and «G» (and «Ctrl-Z» to undo). For (a), (b) and (c), start with a hole of degree 8 as described above. For (d), (e) and (f), start with a single edge, the root edge, and view the outer face as a hole of degree 2. To increase the challenge let a colleague be your peel algorithm \mathcal{A} , i.e. someone telling you which edge should be peeled next.

