Layouts for GD97 Graph-Drawing Competition

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How layouts of graphs were obtained

Graph A

- Automatically obtained layout using `draw/eigenvalues` option in program `Pajek`. Manual editing to reposition vertices in the grid to obtain orthogonal layout in plane (Figure 1).
- Manual editing in 3D to get orthogonal embeddings in space: minimal (Figure 2), symmetric (Figure 3) and cube (Figure 4).

Graph B

- Analyzing graph B using our program `MODEL` we obtained (almost) regular partition in 3 classes. The third class contains only vertex `Harmony Central`. The second class, represented by squares, contains 11 vertices that are connected only to the vertices in the class 1 (represented by circles). Vertices in class 1 are also connected to other vertices in the same class. We first draw all vertices in the class 1 in the center and vertices in class 2 separately – using class shrinking and circular drawing options in `Pajek`. Afterward we manually moved vertices of class 1 connected to only one vertex of class 2 close to this vertex. Finally we manually arranged the remaining vertices of class 1 (Figure 5).
- We transformed given similarities s on arcs to dissimilarities $d = \frac{1}{1+s}$ and applied Ward's hierarchical clustering method to the obtained dissimilarity matrix (Figure 6). We produced a clustering into 12 clusters, shrank the graph using `Pajek`, and draw the obtained skeleton minimizing the number of crossings. Finally we manually arranged the vertices of original graph (Figure 7).

Reference

Batagelj V., Doreian P., Ferligoj A.: *An Optimizational Approach to Regular Equivalence.* Social Networks **14**(1992), 121-135.

Drawings

The complete report in PostScript and all pictures (EPS or GIF) are also available at

`http://vlado.fmf.uni-lj.si/vrml/gd.97/gd97.htm`

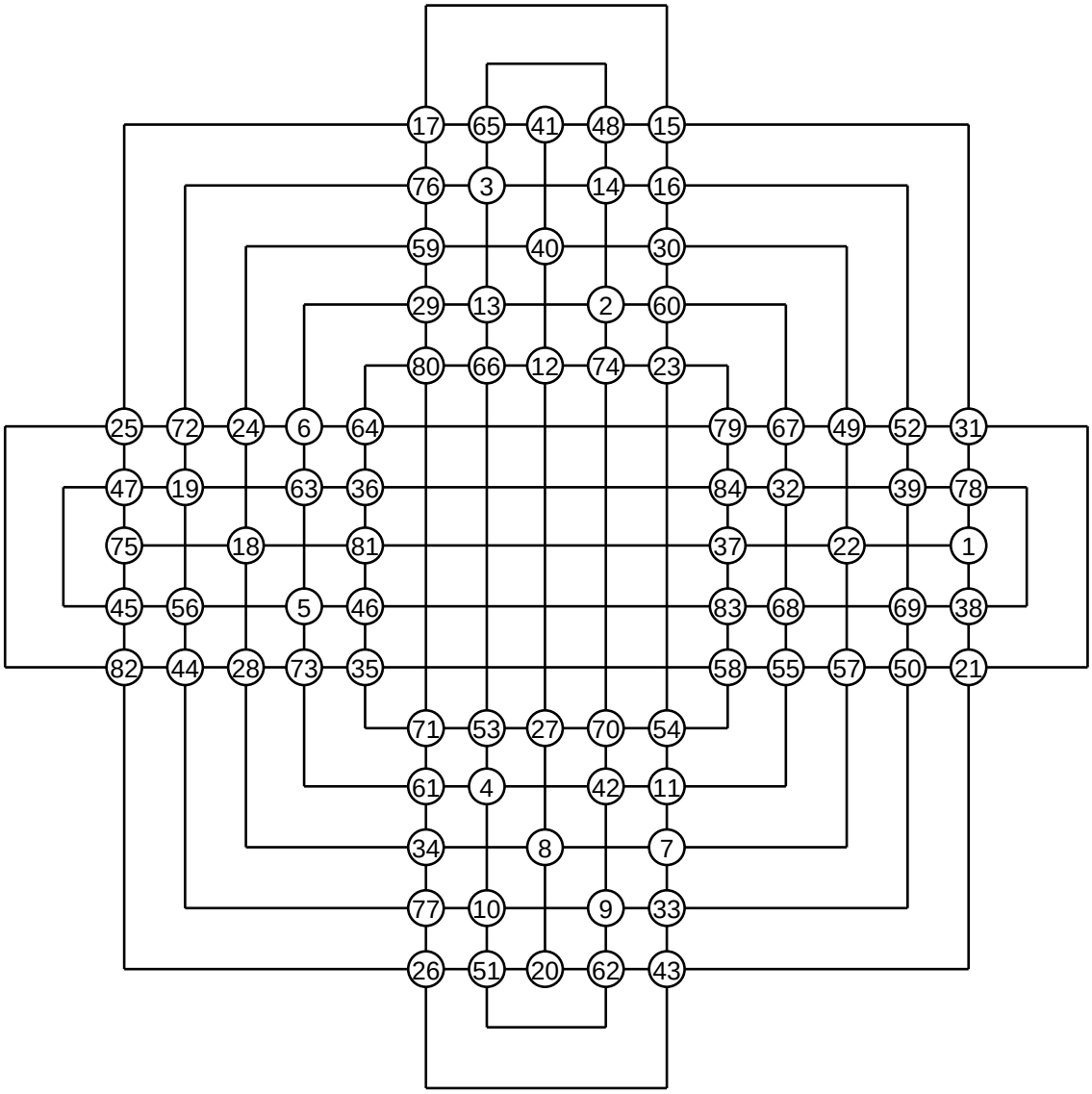

Figure 1: Graph A – orthogonal layout in plane.

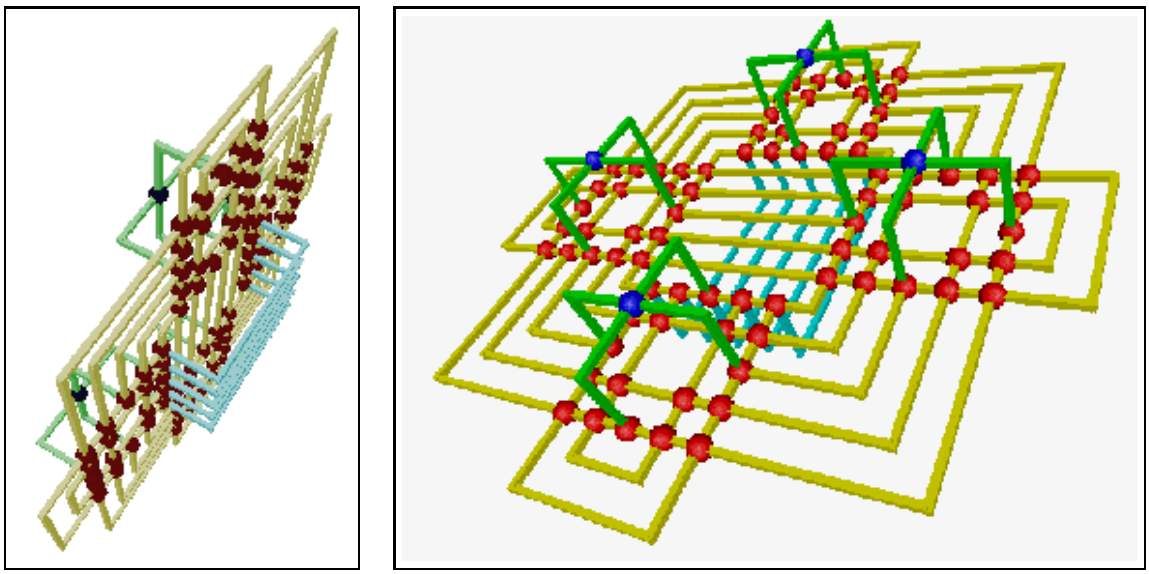

Figure 2: Graph A – 3D minimal. VRML: `http://vlado.fmf.uni-lj.si/vrml/gd.97/amin.wrl`

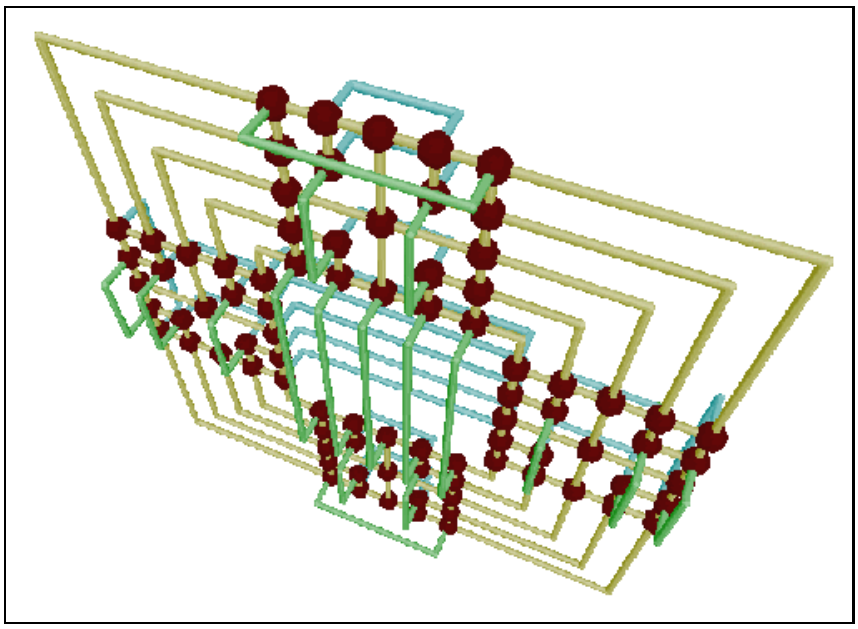

Figure 3: Graph A – 3D symmetric. VRML: `http://vlado.fmf.uni-lj.si/vrml/gd.97/asym.wrl`

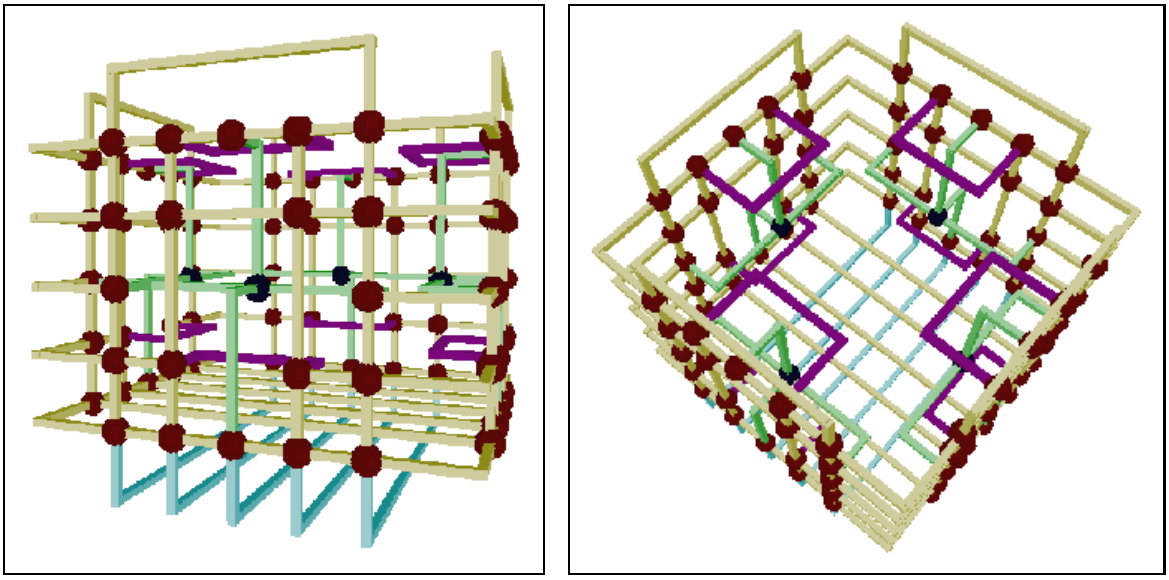

Figure 4: Graph A – 3D cube. VRML: `http://vlado.fmf.uni-lj.si/vrml/gd.97/acube.wrl`

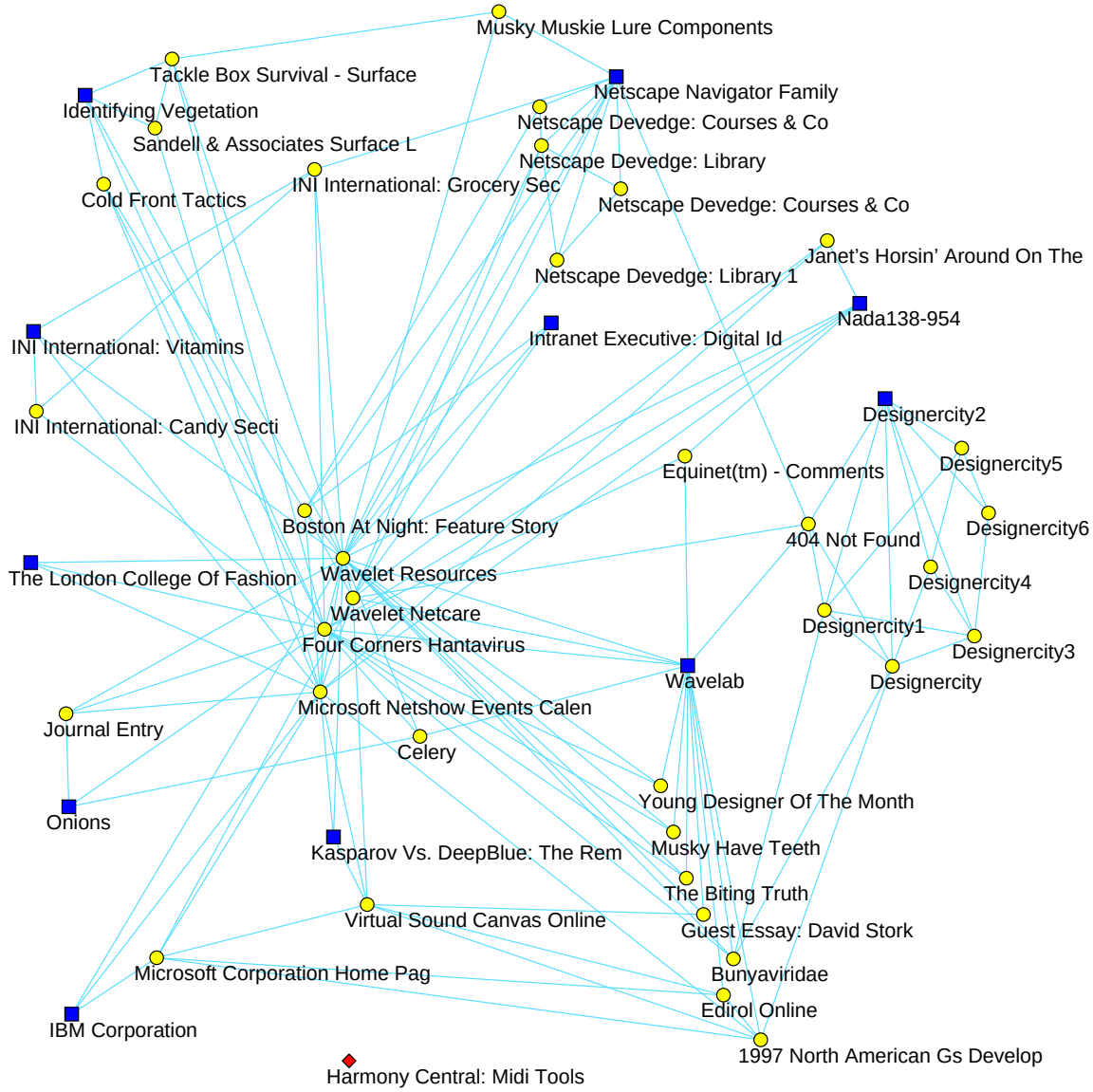

Figure 5: Graph B – regular equivalence.

CLUSE – ward [0.0, 4.80] Sep- 8-1997
Graph B / GD'97

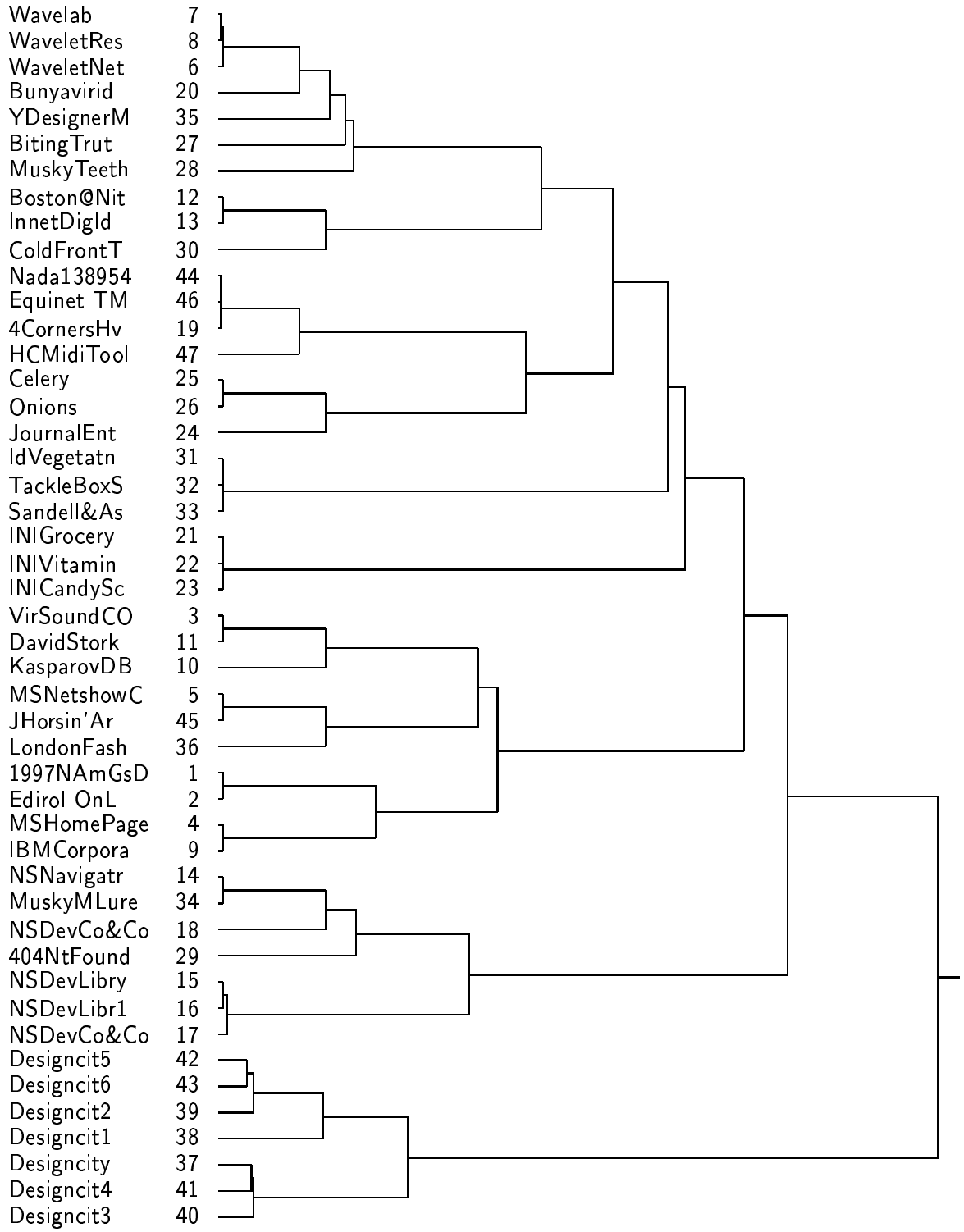

Figure 6: Graph B – Dendrogram for Ward's method.

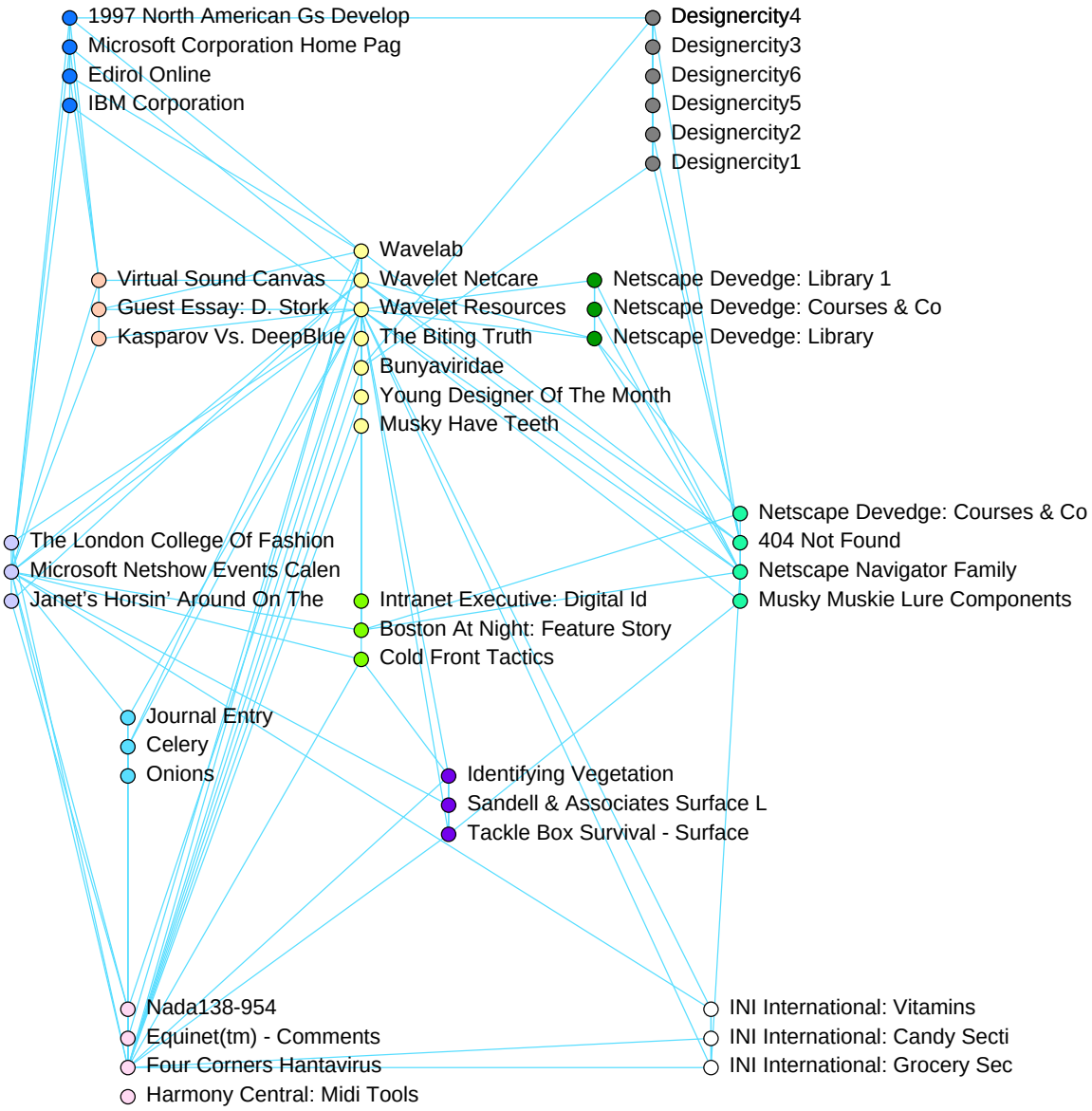

Figure 7: Graph B – Ward's clustering.