

The “Required functionality” list starts you at 80%. Each element that is missing will deduct 2 points from the final score.

The “Recommended features” list features are each worth +2 points to the score.

The “Additional bonus features” list features are each worth +2 points to the final score as well.

Required functionality (to guarantee an 80% score) for “Graph Theorist’s Sketchpad” apps:

1. Graphical display of vertices and edges
2. Input of vertices and edges
3. Able to reposition vertices while maintaining adjacencies
4. Deletion of vertices and edges
5. Parallel edges
6. Loops
7. Ability to color or label vertices

Recommended features:

1. Information about numbers of vertices and edges
2. Information about degrees of vertices
3. Display of directed arcs (for directed graphs)
4. Information about components
5. Show which edges are bridges
6. Show whether a graph is bipartite

Additional bonus features:

1. Adjacency matrix and/or Laplacian matrix info
2. Eigenvalues, eigenvectors for #1
3. Quick Cartesian product constructions (e.g. $G \times K_2$ for any G)
4. Heuristics for minimal colorings/Chromatic numbers
5. Chromatic polynomial computation (at least for small graphs)
6. Algorithms for “pretty” drawings of graphs (cycles that automatically look like cycles; grids that look like grids; etc.)
7. Implementing well-known algorithms (Dijkstra, Ford-Fulkerson, spanning tree constructions, etc.)
8. Any other bells or whistles of your personal interest

