

What is claimed is :

1. A method for graph-based computation, the method including:
accepting specification information for the graph-based computation, the specification information including a plurality of graph elements, and providing a visual representation of the specification information to a user;
determining, on a first computation system, a visual representation of one or more groups of the graph elements based on the accepted specification information, the visual representation including an indication of a spatial extent of a spatial region for at least a first group of the one or more groups, wherein the spatial extent of the spatial region is determined based at least in part on a requirement that the spatial extent envelops one or more graph elements in the first group and a requirement that the spatial extent does not envelop any graph elements out of the first group;
and
providing a visual representation of spatial regions for the one or more groups to the user in conjunction with the visual representation of the specification information.
2. The method of claim 1 wherein determining the visual representation of the one or more groups includes processing the accepted specification information to form the one or more groups.
3. The method of claim 2 further including
causing an execution of graph-based computation on a second computation system to be consistent with the formed one or more groups.
4. The method of claim 3 wherein causing execution of the graph-based to be consistent with the formed groups includes forming an executable representation of the graph-based computation from the specification information and the formed groups.

5. The method of claim 2 further including forming a runtime specification of the graph-based computation according to the formed one or more groups, for controlling an execution of graph-based computation on a second computation system.
6. The method of any of claims 1 through 5 wherein the one or more groups included nested groups of graph elements.
7. The method of any of claims 1 through 5 wherein the specification information for the graph-based computation includes a specification of the plurality of graph elements, the specification of each graph element including a location of a visual representation of the graph element in a visual representation of the graph-based computation.
8. The method of claim 1 wherein determining the visual representation of one or more groups of the graph elements includes:
forming a first characterization of a candidate set of outlines enclosing the spatial regions for the groups; and
determining a second characterization of an adjusted set of outlines enclosing the spatial regions for the groups from the first characterization.
9. The method of claim 8 wherein forming the first characterization includes forming a tessellation of at least a part of the visual representation surrounding the graph elements.
10. The method of claim 9 wherein forming the first characterization includes identifying intersections of boundaries of tiles of the tessellation and the set of outlines.
11. The method of claim 10 wherein determining the second characterization includes adjusting the intersections.

12. The method of claim 11 wherein adjusting the intersections includes constraining the adjusted intersections according to separation requirements between outlines or between outlines and graph elements.

13. The method of claim 11 wherein determining the second characterization further includes smoothing an outline formed by joining the intersections.

14. The method of claim 8 wherein the graph elements form a partially ordered set, and forming the first characterization includes determining a number of outlines separating pairs of graph elements according to the partial ordering.

15. The method of claim 14 wherein forming the first characterization includes determining intersections of lines between visual representations of graph elements and the set of outlines according to the number of outlines separating the graph elements.

16. The method of claim 8 wherein determining the second characterization of a final set of outlines includes reducing a length of each of the candidate set of outlines to form the final set of outlines.

17. The method of claim 16 wherein reducing the length is constrained by separation limits between outlines or between outlines and visual representations of graph elements.

18. The method of claim 8 wherein at least some spatial region for a group of graph elements includes a disconnected spatial region.

19. The method of claim 1 wherein the one or more graph elements in the first group include nodes in a graph that includes nodes interconnected by links.

20. The method of claim 19 wherein each of one or more of the graph elements in the first group represents a computation step within the graph-based computation.

21. The method of claim 1 wherein the spatial extents of the spatial regions for each group include visual representations of at least some of the graph elements in the group corresponding to that spatial region.

22. The method of claim 1 wherein the spatial extent of the spatial region for the first group is specified by an outline enclosing the spatial region for the first group.

23. The method of claim 22 wherein the outline has a non-rectilinear shape that includes a first curved portion shaped to surround visual representations of the one or more graph elements and includes a second curved portion shaped to avoid a visual representation of the at least one graph element out of the first group.

24. Software stored in a non-transitory form on a computer-readable medium, for graph-based computation, the software including instructions for causing a computation system to perform the method of any of claims 1 to 23.

25. A computation system for graph-based computation, the computation system including:

an input device or port configured to accept specification information for the graph-based computation, the specification information including a plurality of graph elements,

an output device or port configured to provide a visual representation of the specification information to a user; and

at least one processor configured to perform the method of any of claims 1 to 23.