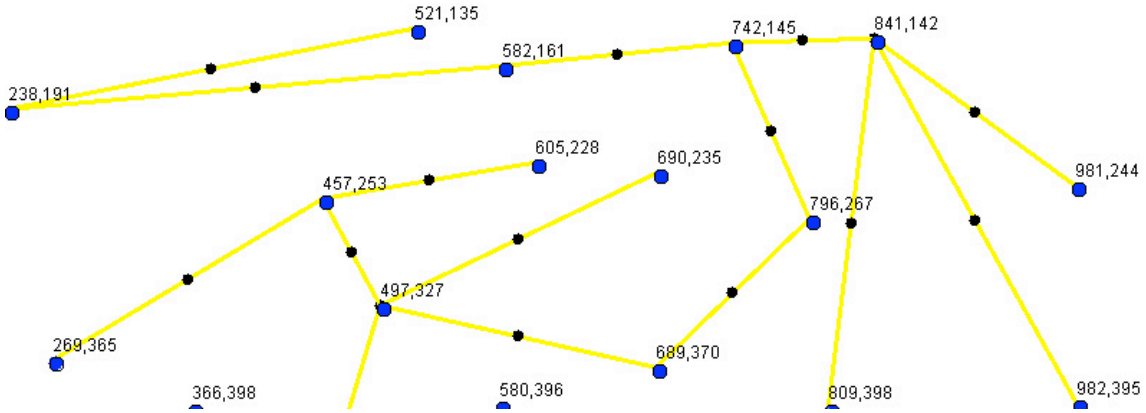
Graph Generator

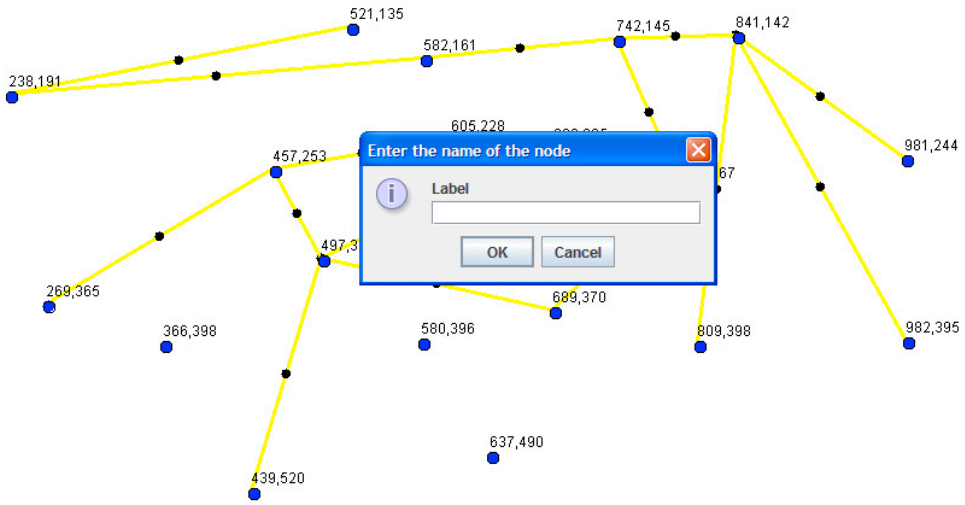
An Overview



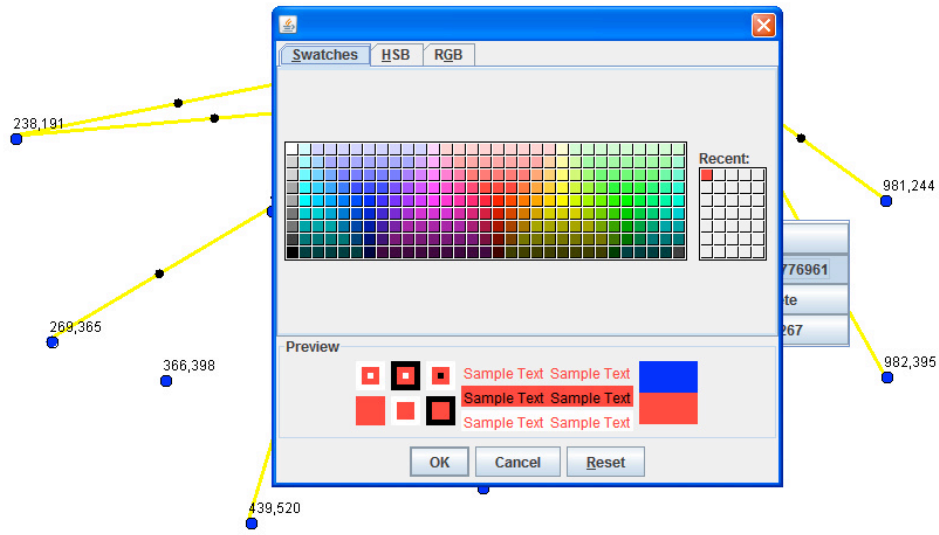
This software performs all the neccessary Graph creation to Graph edition.Graph Generator is optimally designed to view,edit and process large graphs.The options like zoom ,undo,redo,additional data on the current graph and easy editing techniques is the high point of the software.Graph Generator saves the current Graph is formats like txt,jpg,gif and also the most important the graphML format.This universally accepted graph language makes easier for communication with colleagues around the world.The user at his wish can load the file for future use.The software perform graph functions like shortest path calculation ,Depth First Search, Breadth First Search and many more of needed functions.

Properties

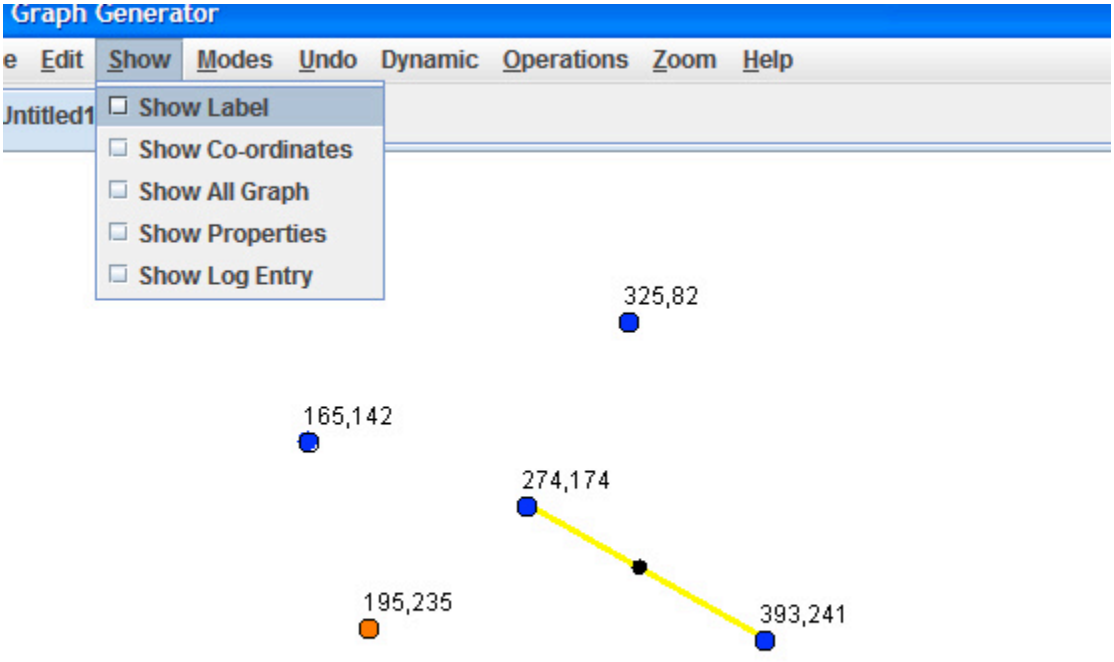
1.Labelling the nodes as per users requirements.



2.Changing the color of edges and nodes



3.Additional Properties



__Used for editing edges

a.Show Label-When selected shows the labels of nodes .

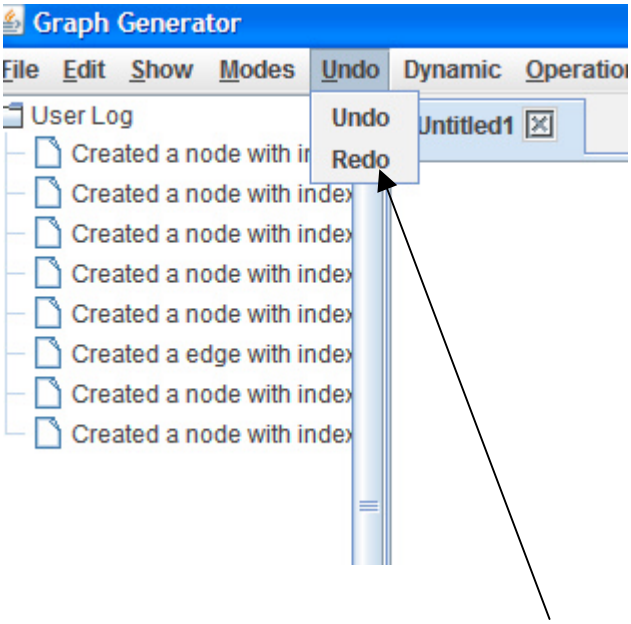
b.Show Coordinates-When selected shows the Coordinates of the Points.

c.Show allGraphs-When selected shows the righthand bar.(mentioned Later)

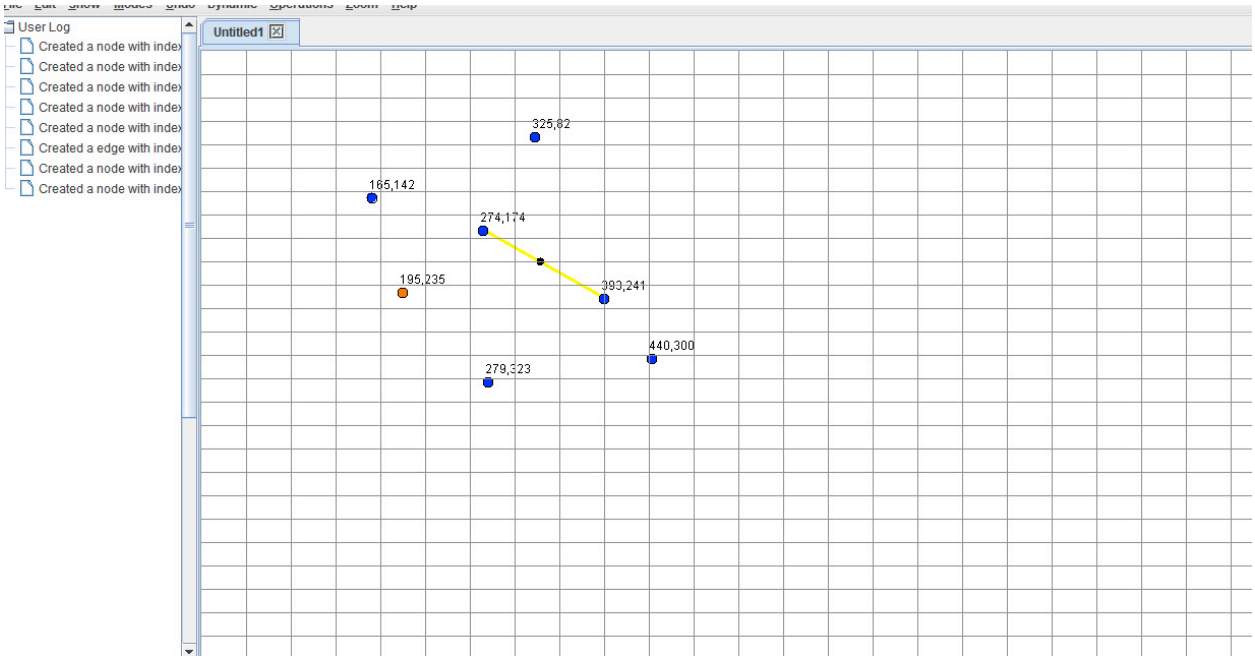
d.Show Properties- When selected shows the bar at the bottom.(mentioned Later)

e.Show LogEntry- When selected shows the lefthand bar.(mentioned Later)

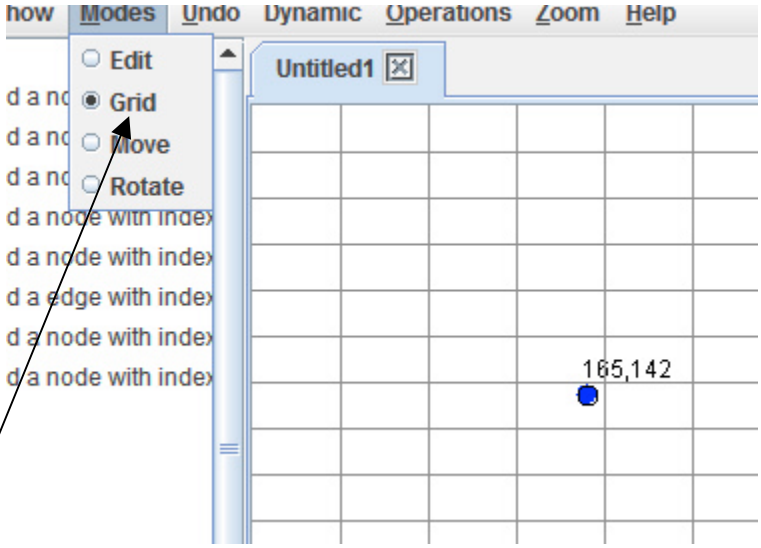
4.**Has the capability to undo and redo-for last 1000 enteries.**



5.User can draw Grids as per his own requirements.



6.Can work in different modes,



a.Edit-Can edit properties of graph in this mode.

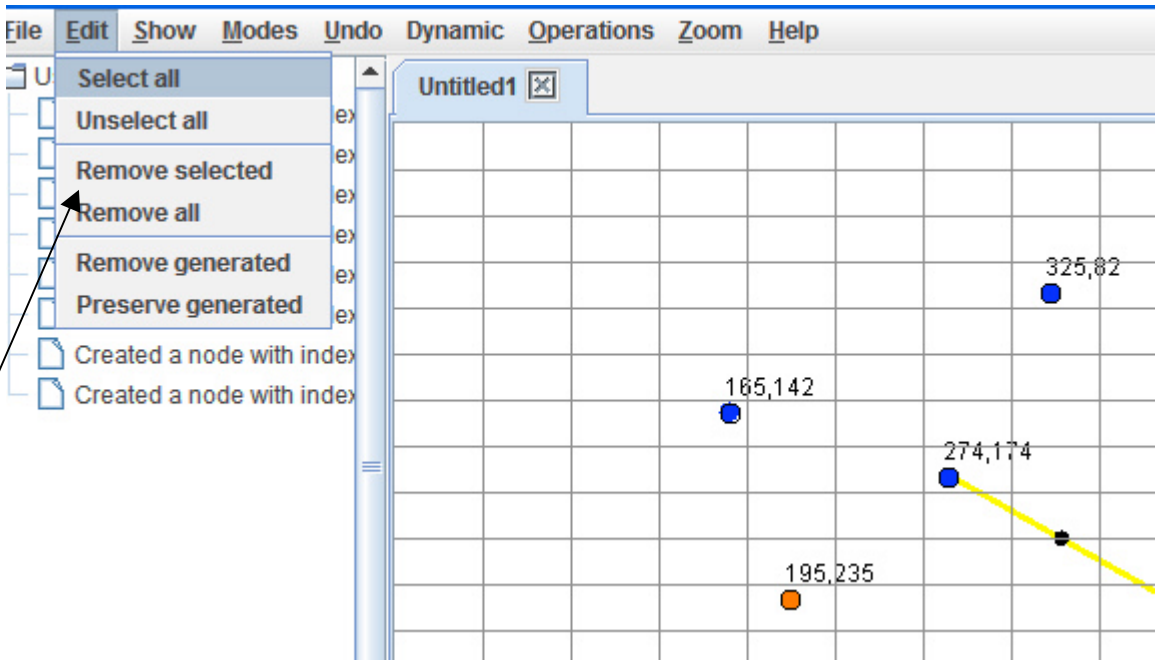
b.Grid-Can draw Grids in this mode.

c.Move-Can move the complete graph(By translation).

User can translate nodes individually also if he wants to.

d.Rotate-Can rotate the graph under specified angle.

7.**Editing Properties**



a.Can Select all nodes and edges for mass changes.

b.Can UnSelect All nodes and edges .

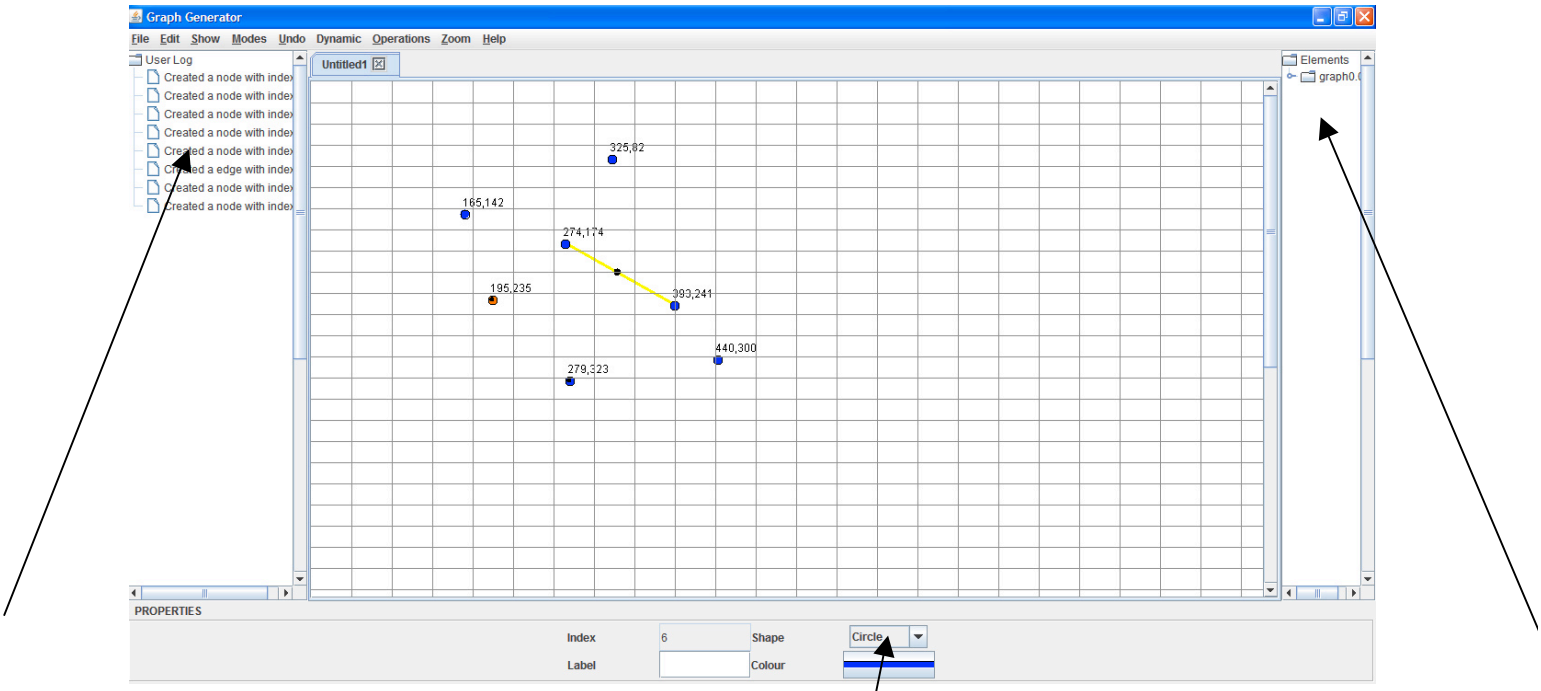
c.Remove Selected can delete nodes which are not required.

d.Remove All the nodes and edges that exist on the graph.

e.Remove Generated-Remove nodes that are generated (Random Generation).

f.Preserve Generated-Delete all nodes an edges except the generated ones.

8.**Different Bars-For easy Edition and complete knowledge of the graph**

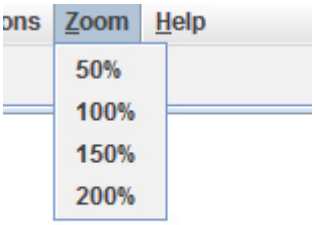


a.Left Hand Bar-UserLog-It stores all the operations that are performed by the user.Undo and Redo will alter the UserLog.Changes can be made from userLog.

b.BottomHand Bar-Properties Bar-Can Edit the properties of nodes and edges once they have been selected.Properties like Index(Fixed),Shape,Label(Name) and RGB color.

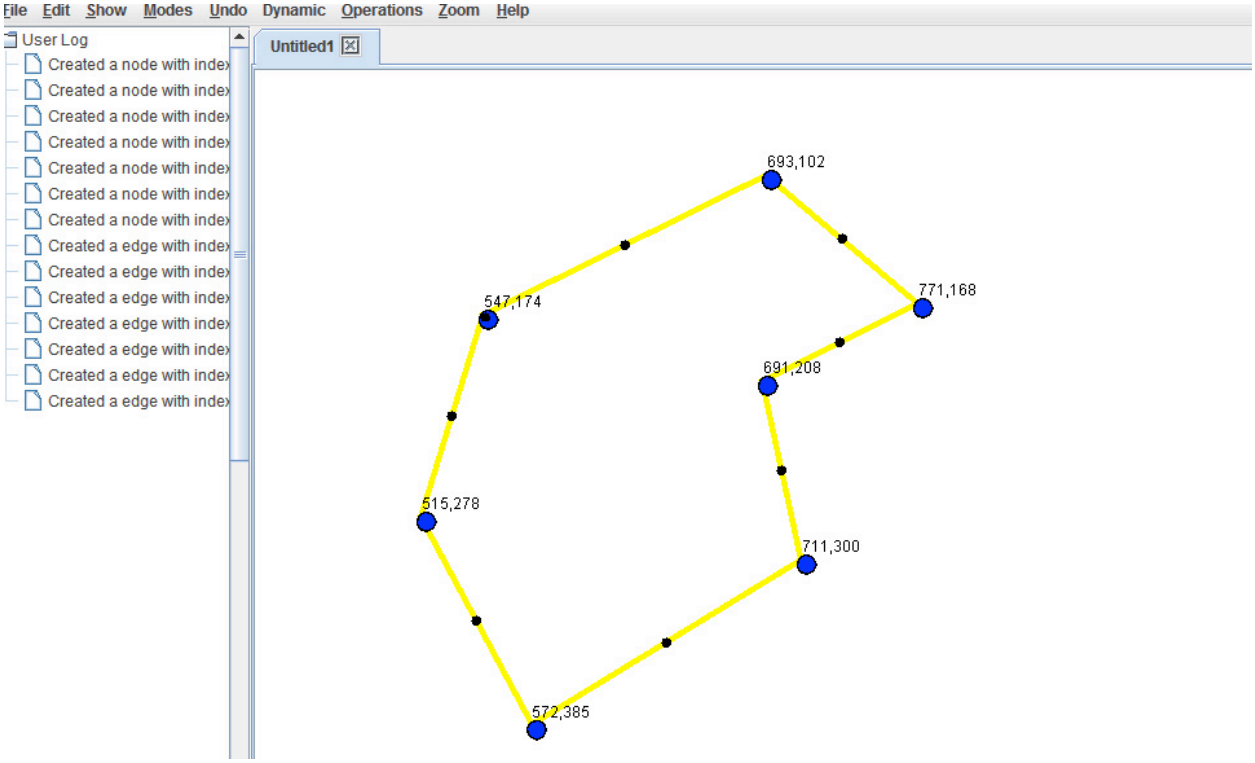
c.The right Hand Bar-Elements-Will Project all the nodes and edges under the particular graph(TREE FORMAT).

9.**Zoom**-Unlike most of the softwares this software can zoom in and zoom out of the graph.Thus

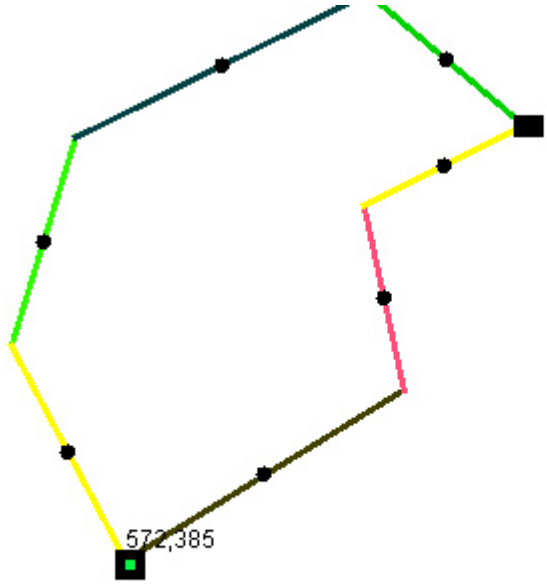


viewing of large and complex graphs can be easier.

After Zooming 150%

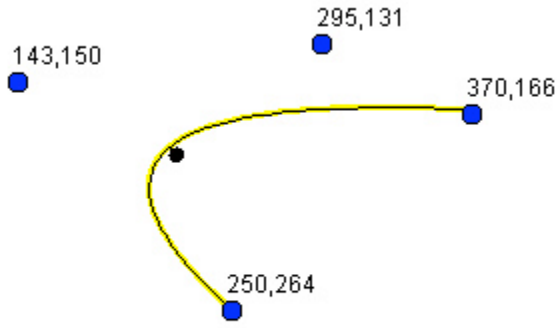


10.**Changing Properties**(Shape,color,coordinates) of node and by just right clicking on the



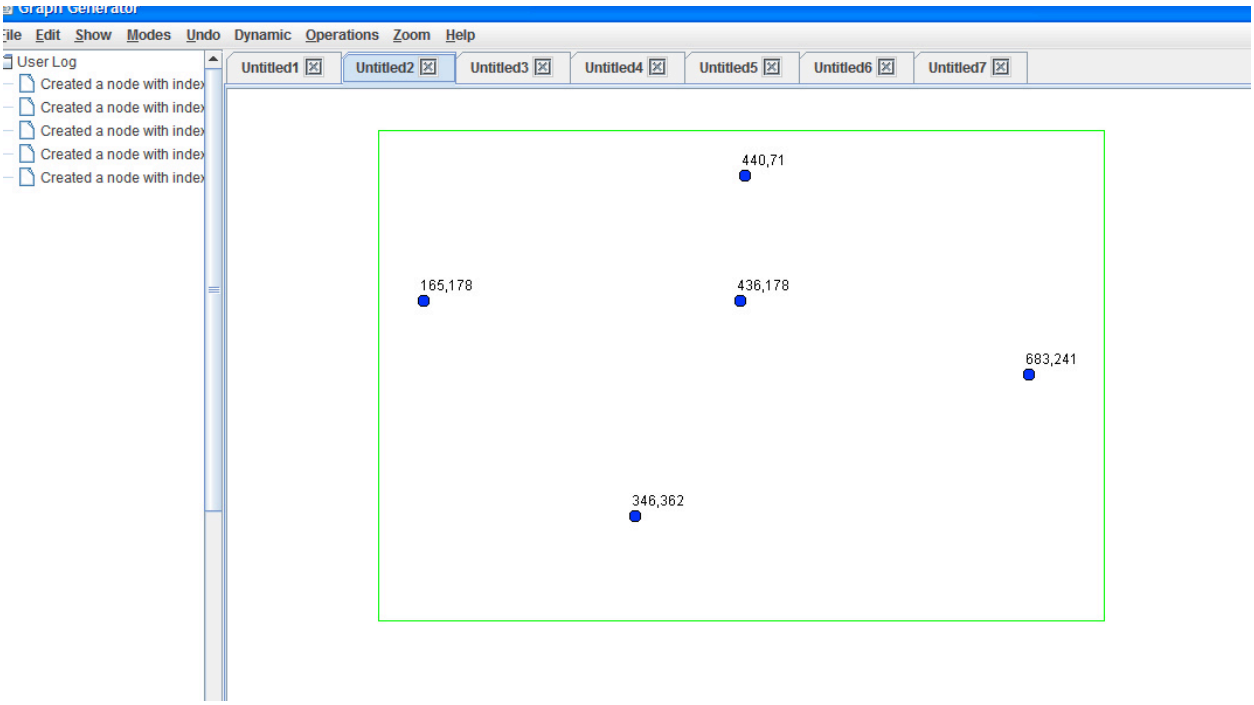
node or center of the edge.

11.The edges can be represented by **Bezier curves** (by just dragging the center of edge away).

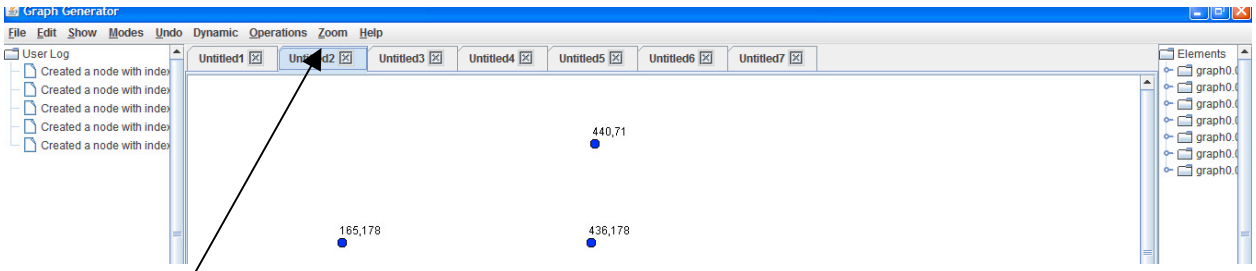


12.**Translation of nodes**-By just dragging the node we can move the node anywhere on the graph.

13.**Selecting all-**By right clicking and creating a rectangle(a window) we can select all the nodes inside the window(Color of the window is green).The length and breadth of the window depend on the user's wish to dragging in the respective x and y axis.

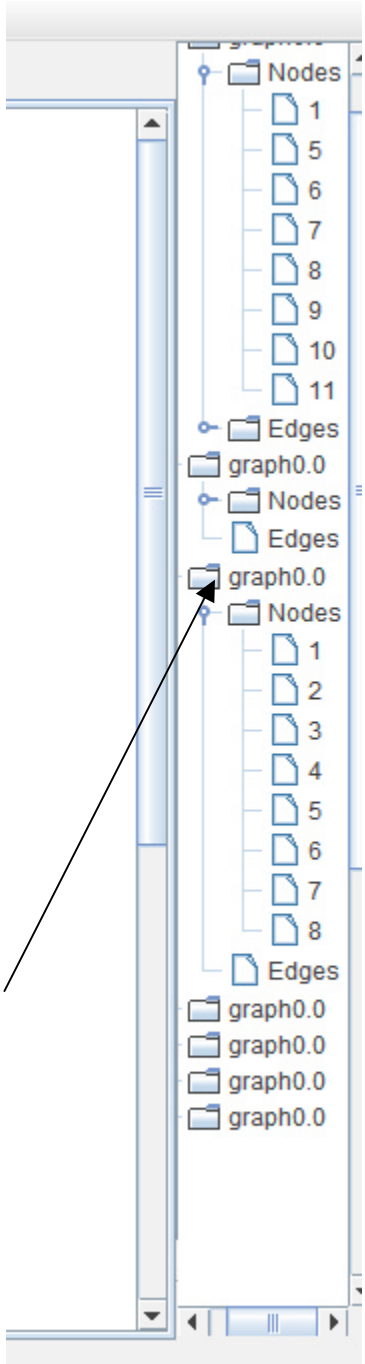


14.**Multiple Graphs(Tabs)** –Opened at once so that the user can work on many projects at one time.

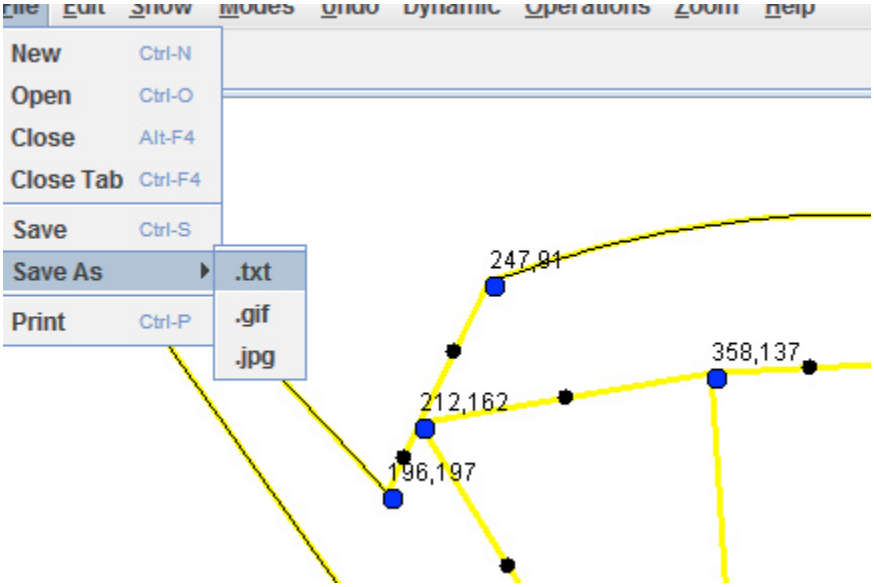


The one that is selected is colored in blue.

15.**Right Hand Bar-Elements-**This Show all the nodes and edges that exist under each particular tab or graph.Selecting a particular graph will show all node and edges with their respective nodes and edges.



16.**Saving a Particular File**-Can be done in .txt ,.gif,.jpg and also in graphML format.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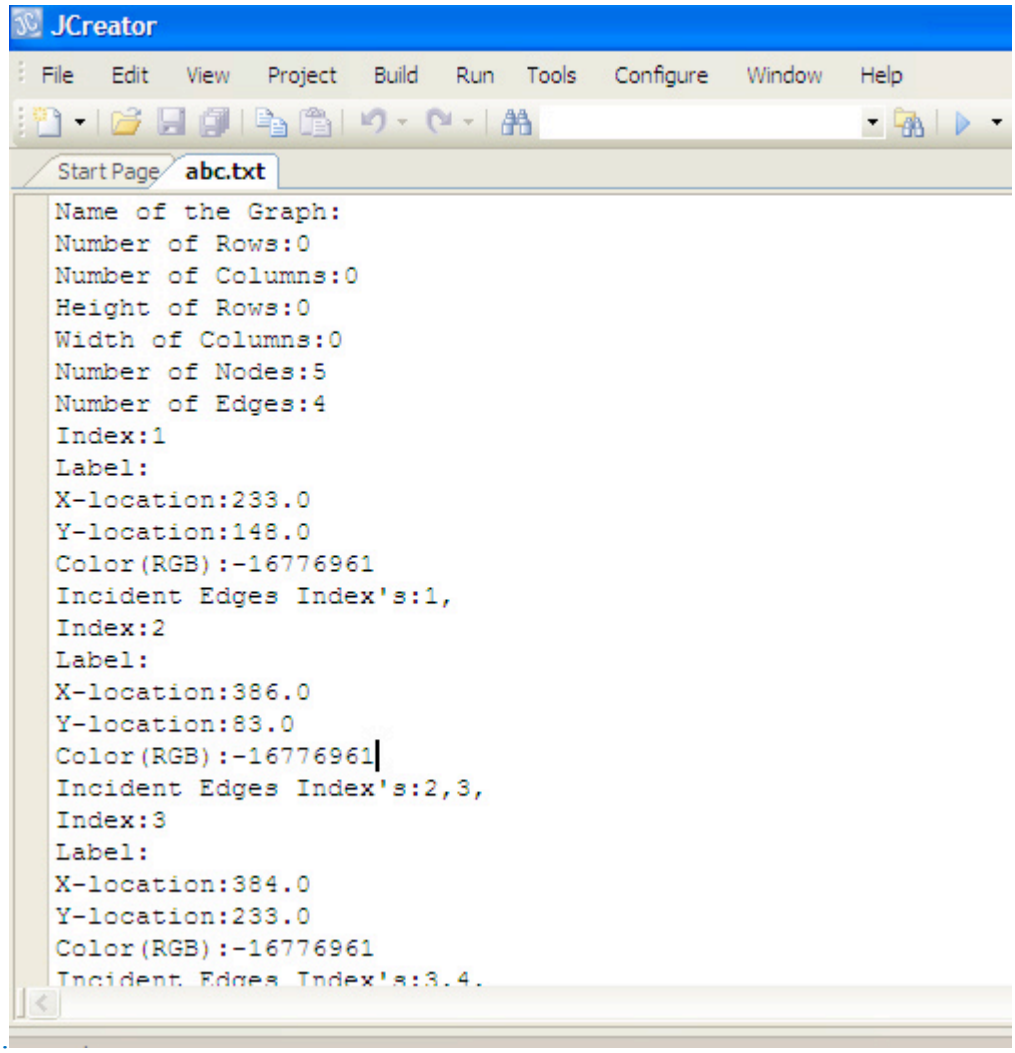
a..txt format-Can be edited in any word editing



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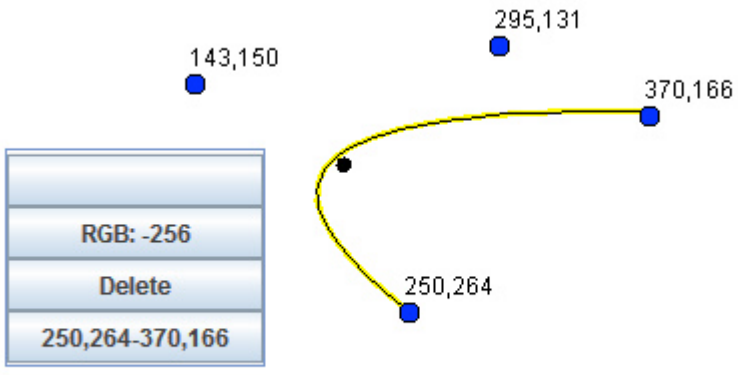
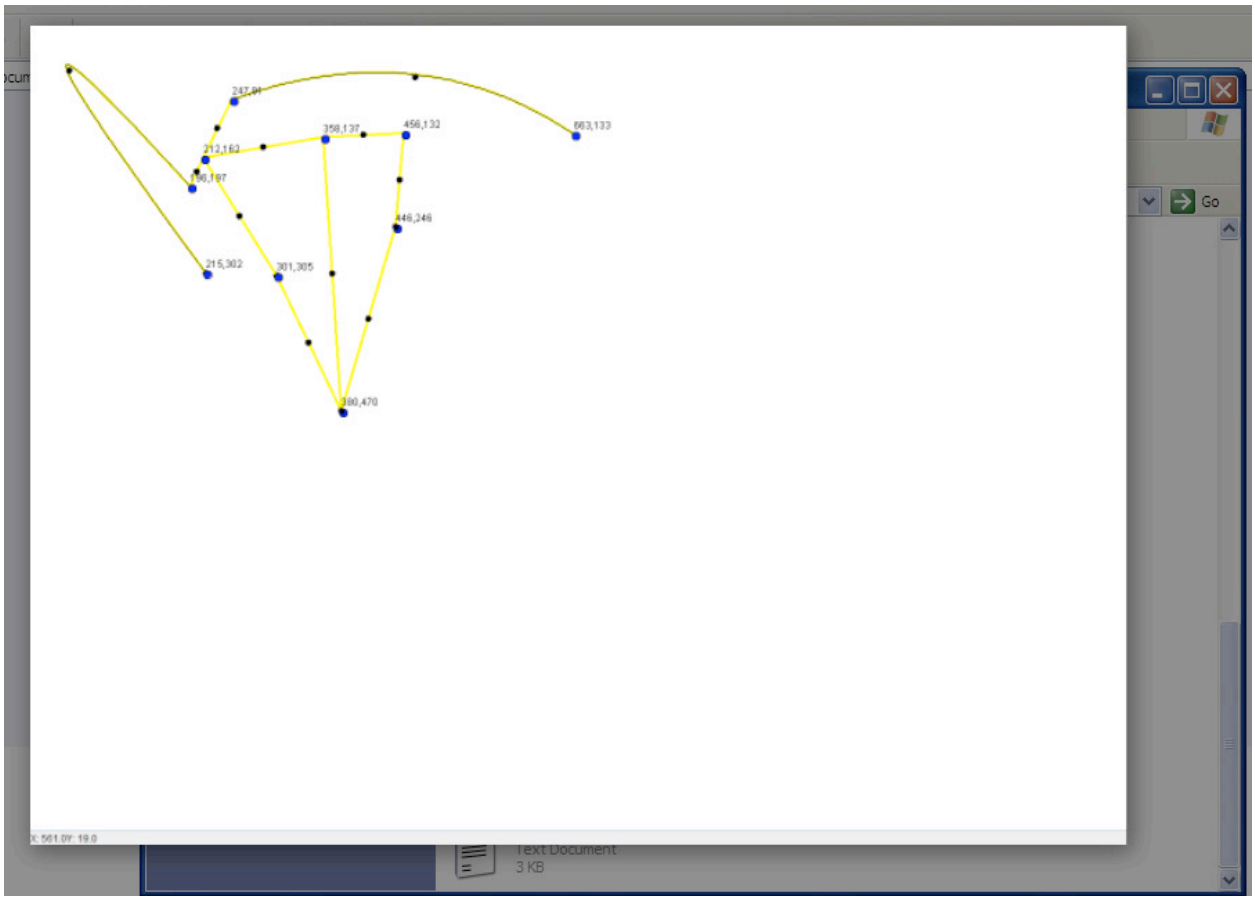


b..gif format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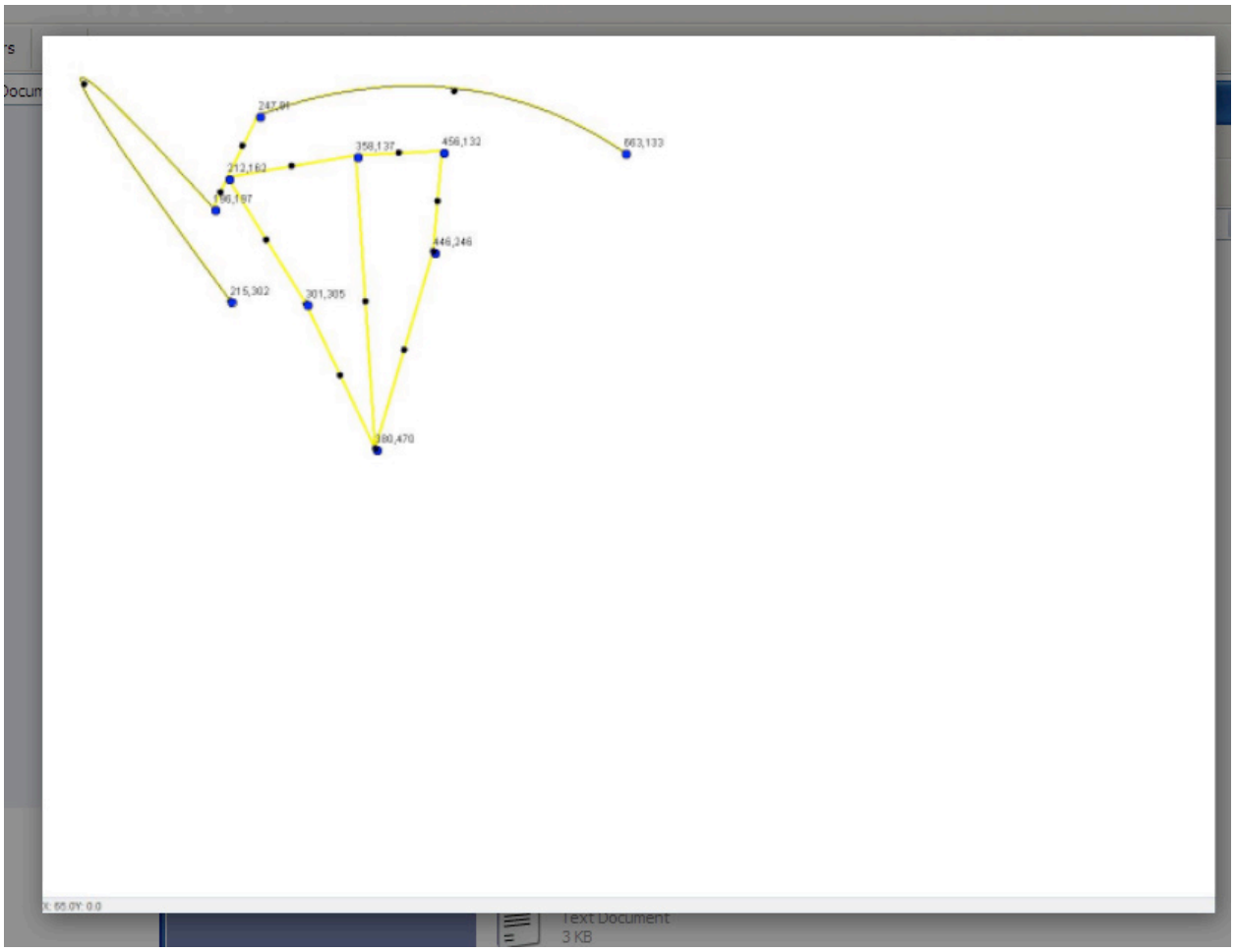
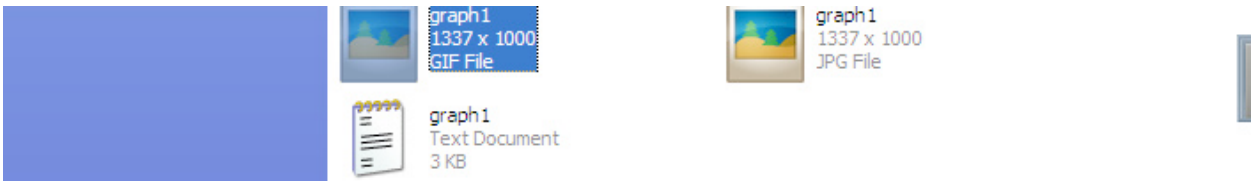
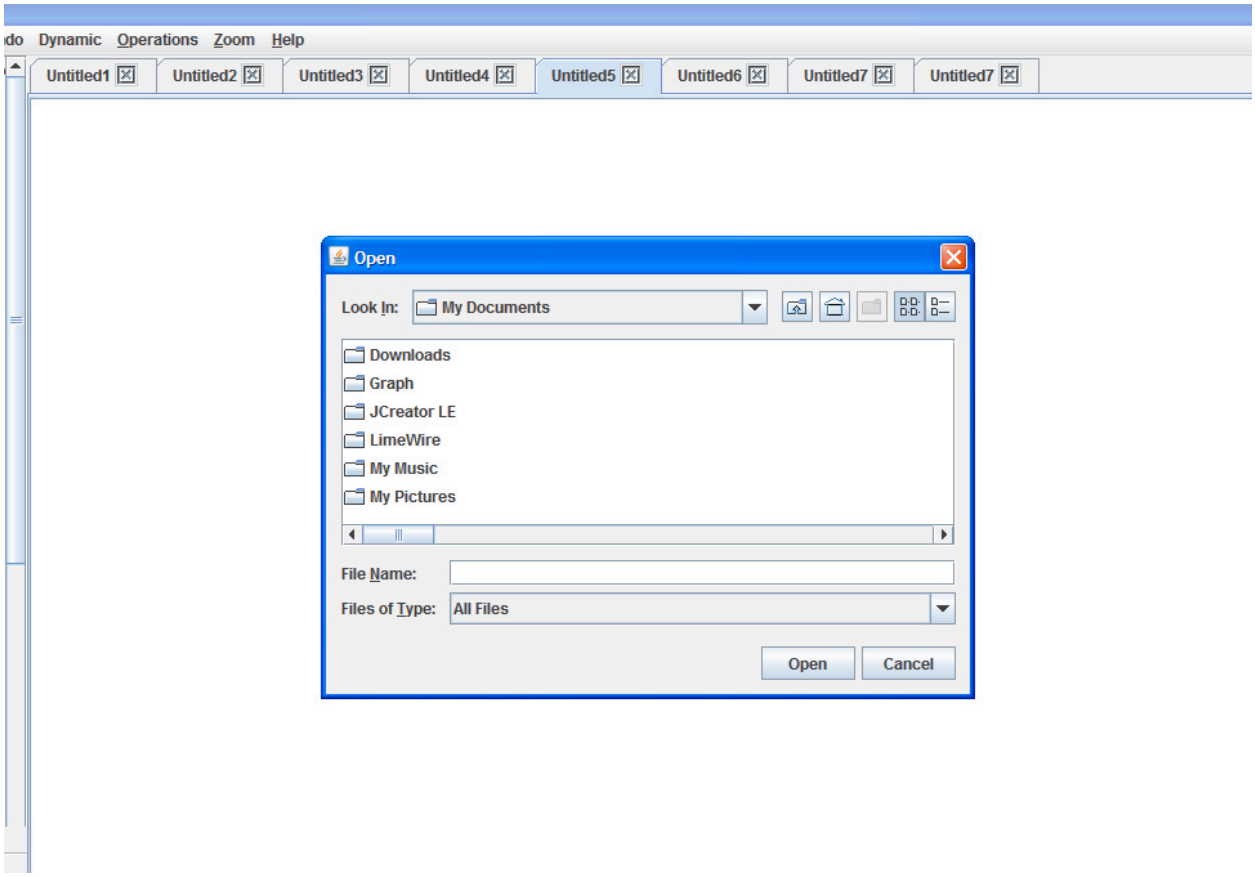


17. **Opening A saved file-**

The File On The Disk

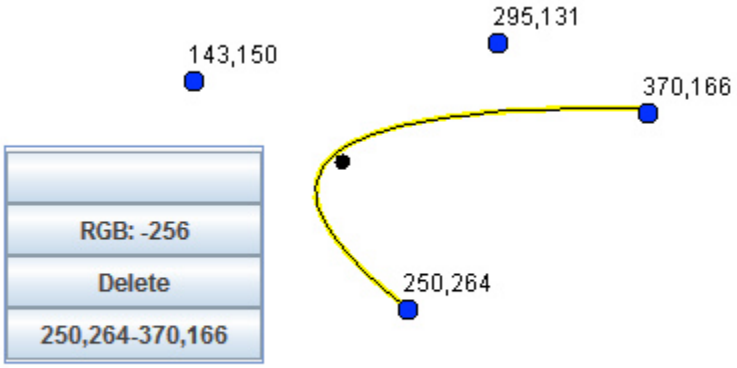




18. Can generate a complete graph from unknown locations of node and edges(**From graphML format**).

19.Random Node Creation is done by specifying the number of nodes or edges that are required. GraphGenerator automatically generates those nodes and edges on the graph randomly.

Working



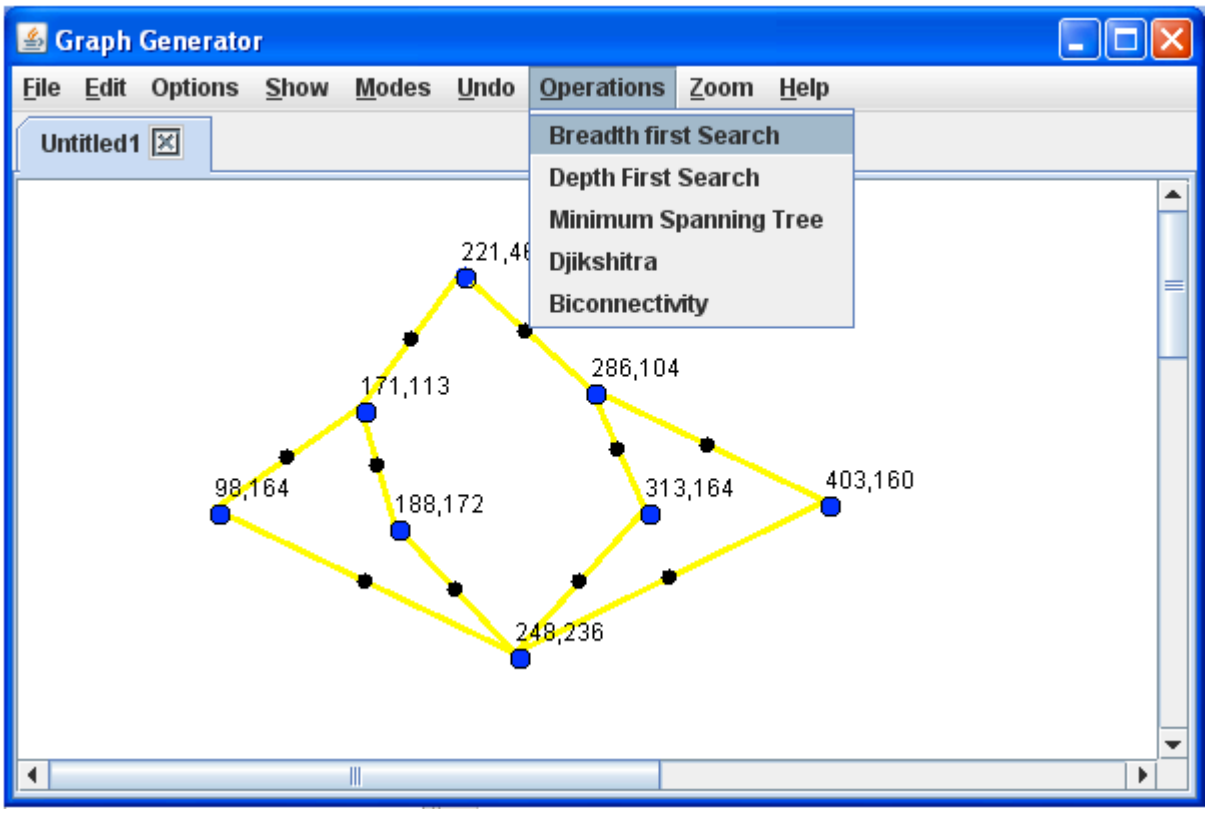
The user can create nodes by just clicking on the graph.The node is created at that particular coordinate.By dragging a line from one node to another created node, a edge is created.

The line shows the edge being created.Each node is stored with its coordinate,shape,RGB color and other properties for identification.Similar is the case for an edge.Once a new node or edge is created the sceen is repainted .The Graph is an object and multiple graphs are stored as different objects.The format that the graph is stored is unique.It stores all coordinates ,color,shape(coded) and incident edges.A accustomed user can change the properties just from the txt file. All data is mentioned for a novice to edit but a few things must be kept in mind.

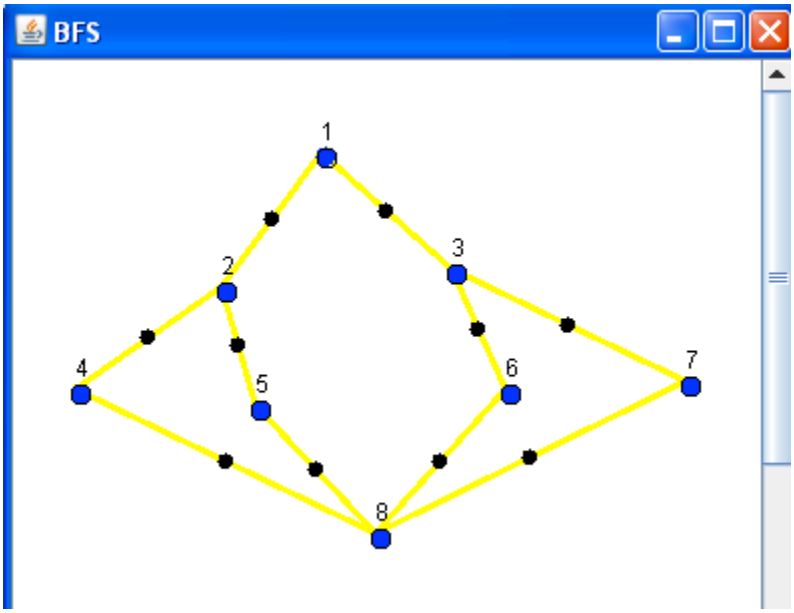
Operations:

1. Breadth First Search

Graph traversal using breadth first search technique. The required option is present in the menu bar option named Operations. On clicking 'Breadth First Search' from this menu a Dialog Box appears asking for the index of the desired starting node.

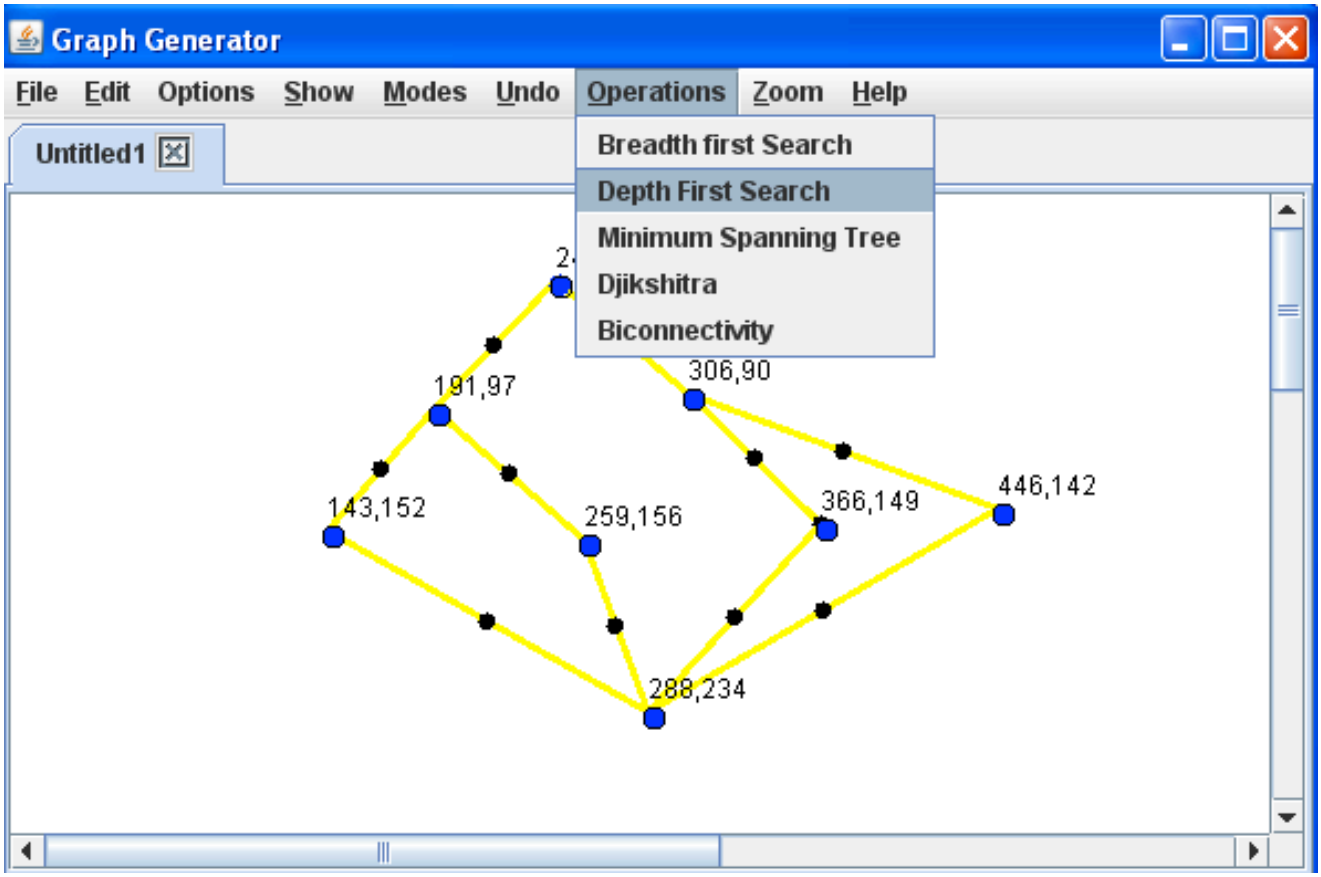


The result is displayed in a separate frame with the nodes numbered according to the order in which they have been traversed.

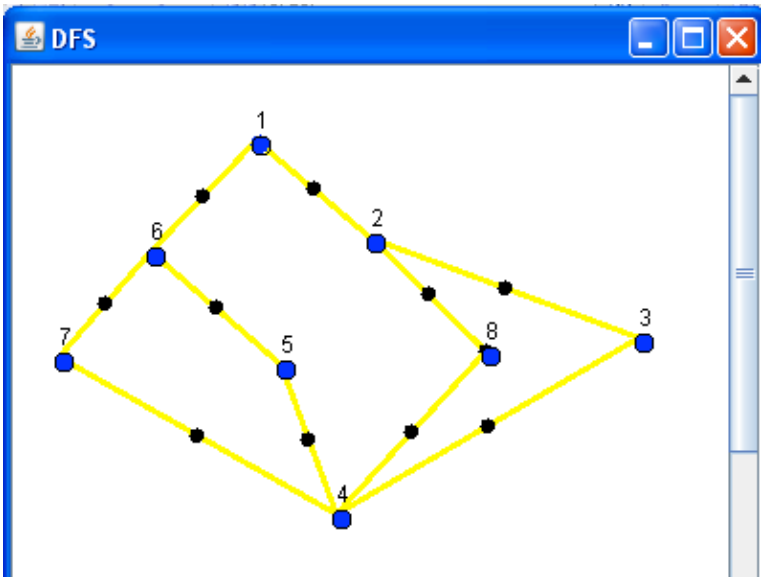


2. Depth First Search

Graph traversal using depth first search technique. The required option is present in the menu bar option named Operations. On clicking 'Depth First Search' from this menu a Dialog Box appears asking for the index of the desired starting node.

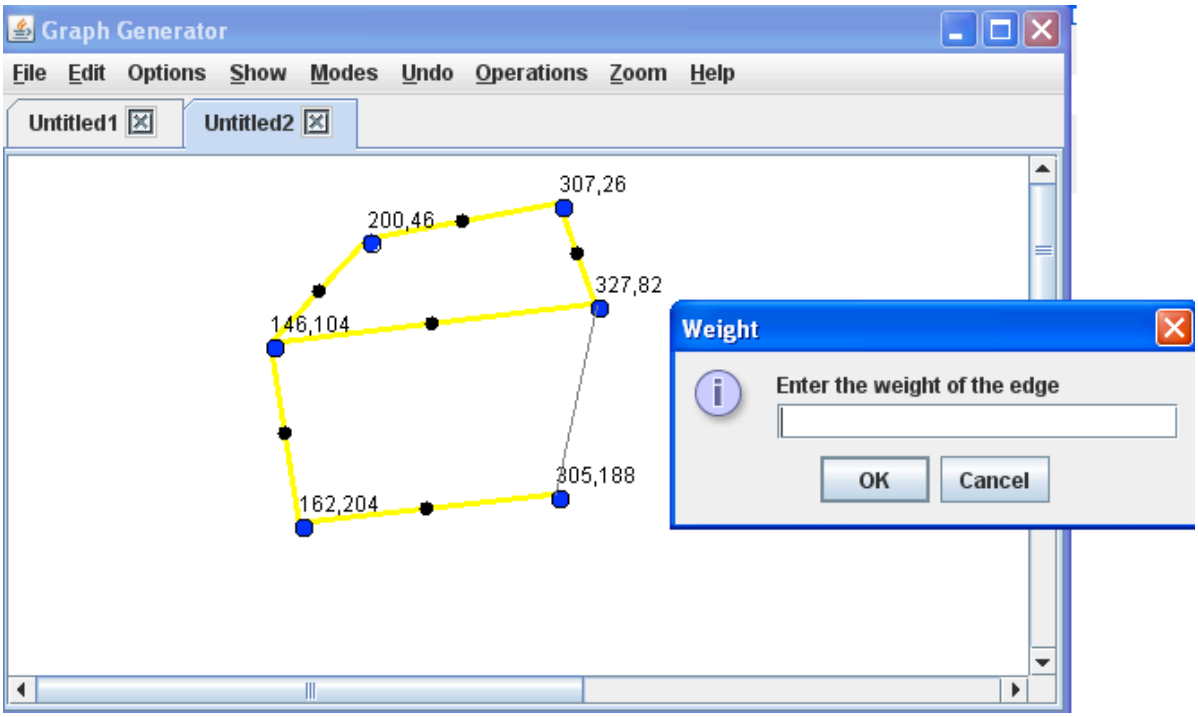


The result is displayed in a separate frame with the nodes numbered according to the order in which they have been traversed.

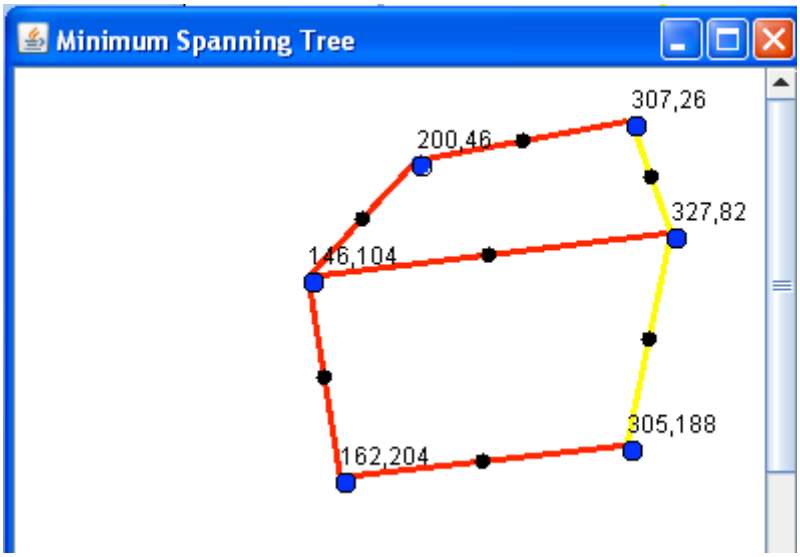


3. Minimum Spanning Tree

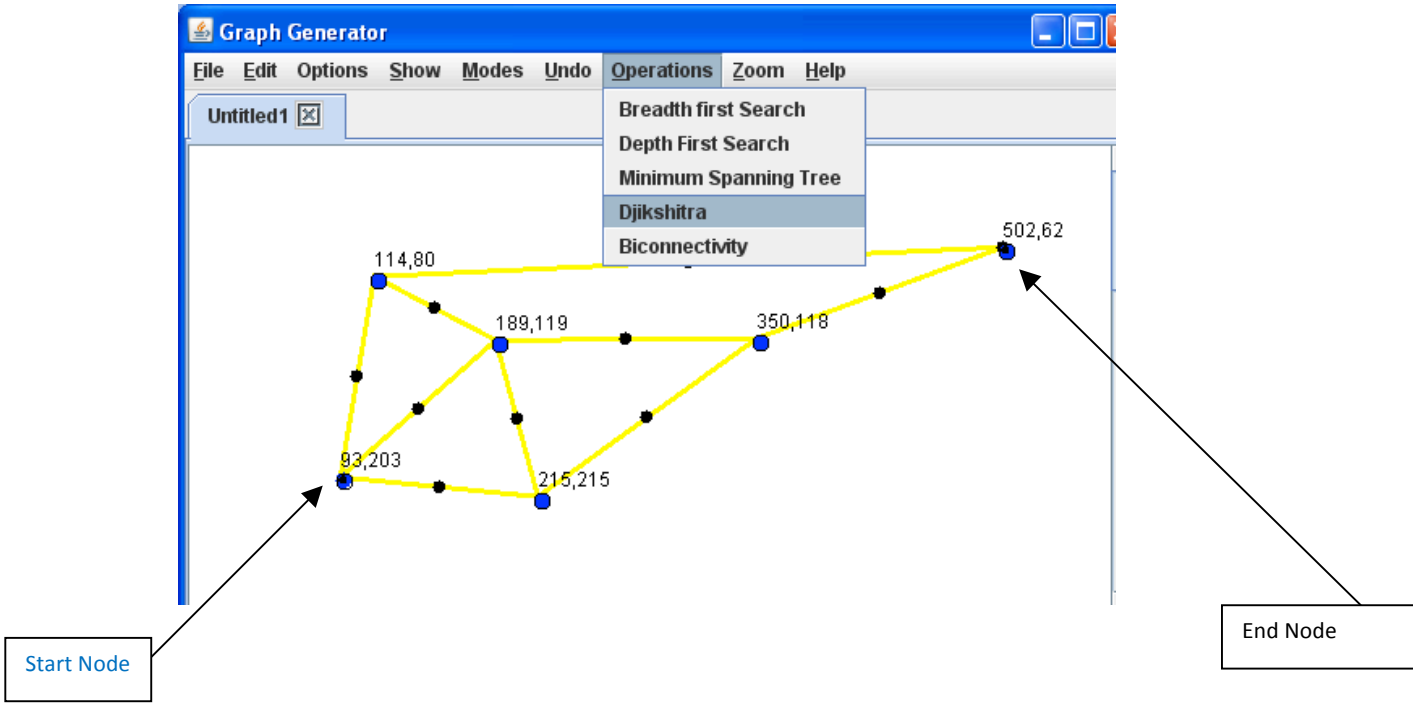
Minimum Spanning Tree is a spanning tree of least cost. The cost of a weighted undirected graph is the sum of the costs or weights of the individual edges of the graph. The graph must be weighted or else a minimum spanning tree cannot be obtained. To make a weighted graph the appropriate option must be chosen from the 'Options' menu. Whenever an edge is made a dialog box appears asking for the weight of that edge. Also all nodes of the graph must be connected i.e. each node must have at least one edge.



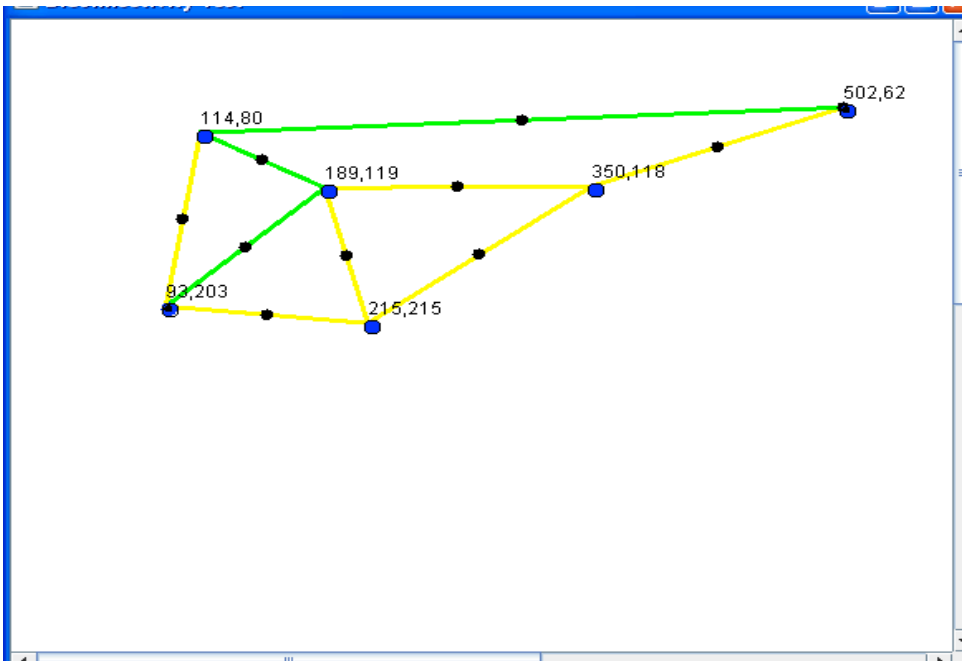
On clicking on 'Minimum Spanning Tree' option from the Operations menu a new frame appears showing the minimum spanning tree of the present graph. The edges which are present in the minimum spanning tree are depicted by the color RED and the ones which are left out by YELLOW.



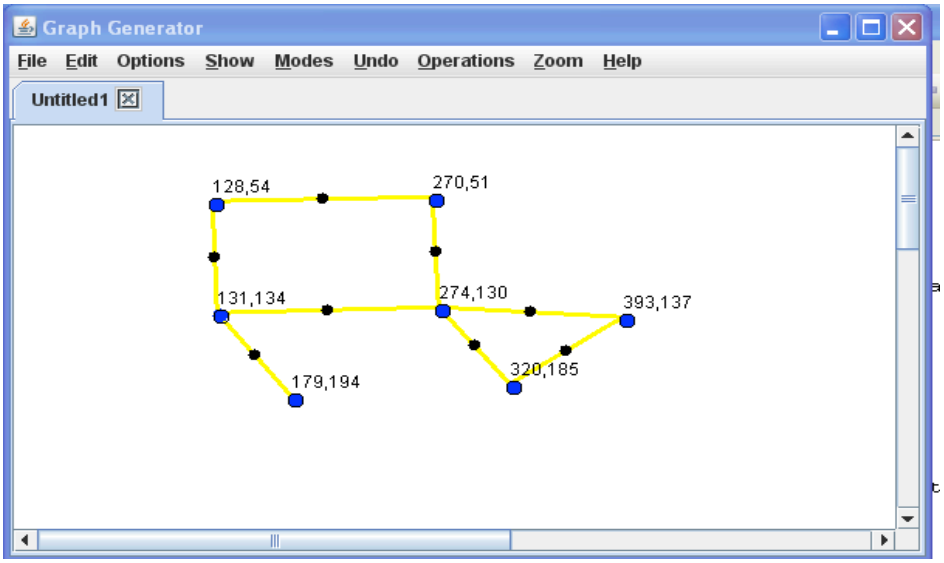
4) Djiksta's Algorithm



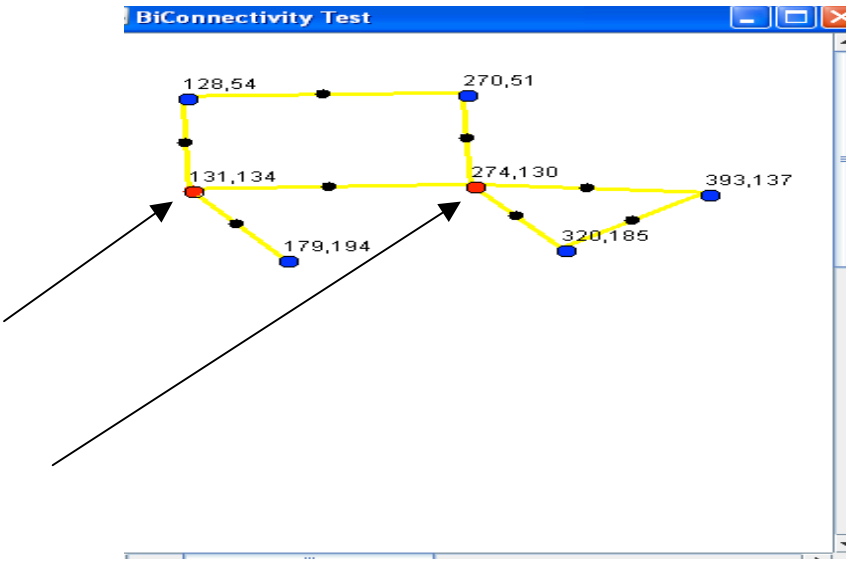
Djiksta's path is calculated from the starting to the ending node of the graph and the output is shown in a new pop up window where the edges have been coloured green.



5)**Biconnectivity Test**



Biconnectivity test can be applied to the above graph. All the articulate points are found in this operation and are marked red.



Conclusion

The first phase of the creation of Graph Generator has been completed that is to say that the foundation of GraphGenerator has been laid for further development of further useful applications like

1.Attack Graph Generation

2.Modification of GraphViz graphs through user interaction in GraphGenerator.

3.Online version of GraphGenerator .

Other applications could be also created as per user requirement.

Therfore there is a lot to look forward to!!!