Programing Assignment-I

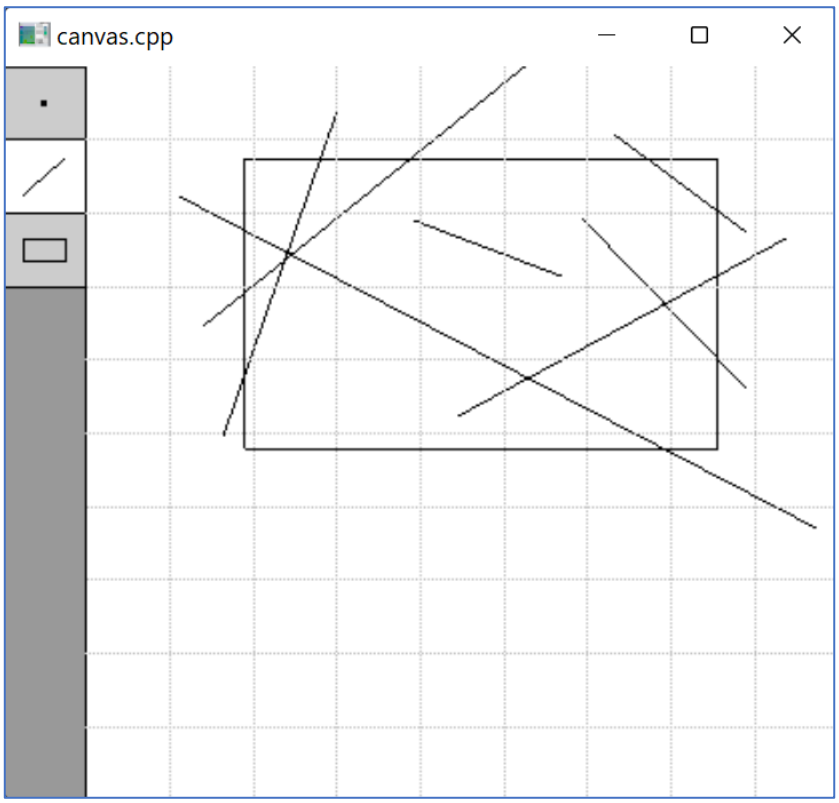
(Due on Tuesday 20th Feb 2024, Midnight)

This is an individual assignment. Students are expected to solve only one assignment as per the last digit of their roll#. Those with last odd digit will solve programming problem-I and those with even digit will solve programming problem-II.

Understand the code canvas.cpp given under the folder ExperimenterSource\Chapter3 from the book by Sumant Guha. Define the clipping window using mouse clicks routines of the windowing system and draw the window on the canvas using OpenGL API.

Problem-I

You have been asked to implement a Sutherland-Cohen Line Clipping algorithm discussed in the class. The user should be able to choose from a menu a line to draw. The program should allow the user to input set of line segments interactively by pointing a mouse to a location on a canvas and selecting the two end-point of a line segment by clicking the mouse button. Having displayed all the line segments on the canvas, the user can then select a rectangular window from the menu by selecting two diagonally opposite corners. At this point, the canvas will be rendered somewhat as depicted in the figure below. On selecting the button from the menu by clicking on mouse, the program should clip all the line that lie inside the clipping window. The result should be displayed in the graphical window. You are free to use canvas.cpp code given in the chapter 3 of the book. The program should be robust and handle all possible orientation of line segments and correctly report the outcome that could be verified visually.



Problem-II

You have been asked to implement a Sutherland-Hodgeman Polygon Clipping algorithm discussed in the class. The user should be able to choose from a menu a polygon to be drawn by selecting a set of points on the canvas by clicking the mouse. The user can then select a rectangular window from the menu by selecting two diagonally opposite corners. At this point, the canvas will be rendered somewhat as depicted in the figure below. On selecting the button from the menu by clicking on mouse, the program should clip portion of the polygon that lies outside the clipping window. The result should be displayed in the graphical window. You are free to use canvas.cpp code given in the chapter 3 of the book. The program should be robust and handle all possible types of simple polygons and correctly report the outcome that could be verified visually.