Assignment No 4

Problem Statement:
Implement the following polygon filling methods : i) Flood fill / Seed fill ii) Boundary fill ; using mouse click, keyboard interface and menu driven programming

Objective:
To understand the basic concepts of a polygon filling

Outcome:
To implement a polygon filling methods using Flood fill / Seed fill and Boundary fill

CO Relevance: CO3

PO/PSOs Relevance: PO1, PO2, PO5, PO6

Theory Concepts*:*

- **Polygon Filling Approaches:**

There are two types of seed fill algorithms.
1. Boundary Fill Algorithm
2. Flood Fill Algorithm.

- **Boundary Fill Algorithm:-**
  Boundary Fill is algorithm used for the purpose of coloring figures in computer graphics. Boundary fill fills chosen area with a color until the given colored boundary is found.

Algorithm :

Step 1 : The boundary fill procedure accepts the input as coordinates of an interior point (x, y), a fill color, and a boundary color.

Step 2 : Starting from (x, y)which is seed pixel, the procedure tests the neighboring positions to determine whether they are boundary color.

Step 3 : If not, they are painted with the fill color, and the neighbors are tested.

Step 4 : This process continues until all pixels up to the boundary color for the area have been tested.

There are two methods for filling the pixel and find the neighbor pixel :

(i) 4-connected.

(ii) 8-connected.

(i) 4-Connected Method :

```
Four_Fill (x, y, fill_col, bound_color)
if (curr_pixel_color != bound_color) and (curr_pixel_color != fill_col) then
set_pixel(x, y, fill_col)
Four_Fill (x+1, y, fill_col, bound_col);
Four_Fill (x-1, y, fill_col, bound_col);
Four_Fill (x, y+1, fill_col, bound_col);
Four_Fill( x, y-1, fill_col, bound_col);
end;
```

(ii) 8-Connected Method

The fill operation can proceed above, below, right and left side as well as through diagonal pixels of the current pixels. This process will continue until we find a boundary with different color.

- **Flood Fill**

The purpose of Flood Fill is to color an entire area of connected pixels with the same color.

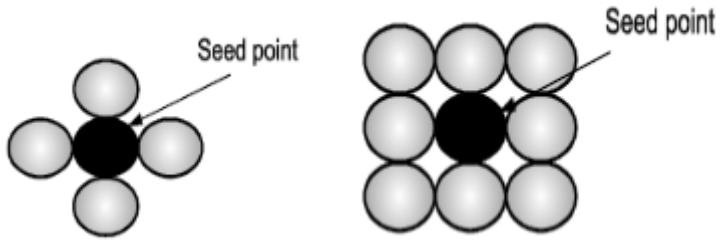

Fig.: Four connected method and Eight connected method

Similarly boundary fill algorithm, we start with seed pixel, seed pixel is examined for specified interior color instead of boundary color

- **Pseudo Code for boundry fill Algorithm**

```
void boundaryFill4(int x, int y, int fill_color,int boundary_color)
{
   if(getpixel(x, y) != boundary_color &&
      getpixel(x, y) != fill_color)
   {
      putpixel(x, y, fill_color);
      boundaryFill4(x + 1, y, fill_color, boundary_color);
      boundaryFill4(x, y + 1, fill_color, boundary_color);
      boundaryFill4(x - 1, y, fill_color, boundary_color);
```

```
        boundaryFill4(x, y - 1, fill_color, boundary_color);
    }
}
```

- **Pseudo Code for Flood fill Algorithm**

```
Procedure floodfill (x, y,fill_ color, old_color: integer)
    If (getpixel (x, y)=old_color)
{
    setpixel (x, y, fill_color);
    fill (x+1, y, fill_color, old_color);
    fill (x-1, y, fill_color, old_color);
    (x, y+1, fill_color, old_color);
    (x, y-1, fill_color, old_color);
}
```

Output:

(Execute the program and attach the printout here)

Conclusion:

In This way we have studied that how to fill polygon using Flood fill / Seed fill and Boundary fill method.

Viva Questions:

1.Explain Flood fill algorithm
2.Explain boundary fill algorithm
3. Explain inside outside test to fill polygon
4. What is seed pixel.
5. Explain 4-connected method
6. Explain 8-connected method

Date:	
Marks obtained:	
Sign of course coordinator:	
Name of course Coordinator :	