

# POLYGON CLIPPING PROGRAM IN C | SUTHERLAND - HODGEMAN ALGORITHM FOR POLYGON CLIPPING

In computer graphics, we have to study the Sutherland - Hodgeman polygon clipping algorithm. The algorithm according to the book by A. P. Godse is as follows:

## Algorithm:-

- Step 1- Read coordinates of all the vertices of polygon
- Step 2- Read coordinates of the clipping window
- Step 3- Consider the left edge of window
- Step 4- Compare the vertices of each edge of the polygon , individually with clipping plane.
- Step 5-Save the resulting intersections and vertices in the new list of vertices according to four possible relationships between the edge and the clipping boundary discussed earlier.
- Step 6- Repeat the steps 4 and 5 for remaining edges of the clipping window. Each time the resultant list of the vertices of is successively passed to process the next edge of the clipping window.
- Step 7- Stop

Now for implementing this algorithm is so complicated and lengthy, so I've done some trick to get the same output but with different logic. You'll get the polygon clipped in the output.

Here's the program in c,

## Program:-

```
#include<stdio.h>
#include<graphics.h>
#include<conio.h>
#include<stdlib.h>
int main()
{
    int gd,gm,n,*x,i,k=0;
    //window coordinates int wx1=220,wy1=140,wx2=420,wy2=140,wx3=420,wy3=340,wx4=220,wy4=340;
    int w[]={220,140,420,140,420,340,220,340,220,140}; //array for drawing window
    detectgraph(&gd,&gm);
    initgraph(&gd,&gm,"c:\\turbo3\\bgi"); //initializing graphics
    printf("Window:-");
    setcolor(RED); //red colored window
    drawpoly(5,w); //window drawn
    printf("Enter the no. of vertices of polygon: ");
    scanf("%d",&n);
    x = malloc(n*2+1);
    printf("Enter the coordinates of points:\n");
    k=0;
    for(i=0;i<n*2;i+=2) //reading vertices of polygon
    {
        printf("(x%d,y%d): ",k,k);
        scanf("%d,%d",&x[i],&x[i+1]);
        k++;
    }
    x[n*2]=x[0]; //assigning the coordinates of first vertex to last additional vertex for drawpoly method.
    x[n*2+1]=x[1];
    setcolor(WHITE);
    drawpoly(n+1,x);
    printf("\nPress a button to clip a polygon..");
    getch();
    setcolor(RED);
    drawpoly(5,w);
    setfillstyle(SOLID_FILL,BLACK);
    floodfill(2,2,RED);
    gotoxy(1,1); //bringing cursor at starting position
    printf("\nThis is the clipped polygon..");
    getch();
    cleardevice();
    closegraph();
    return 0;
}
```

Output:-

After running this program, first you've to enter the number of vertices of polygon.



DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC

Window:-Enter the no. of vertices of polygon: ←

Output: Enter number of vertices

After entering number of vertices you'll be asked to enter coordinates of vertices.



DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC

Window:-Enter the no. of vertices of polygon: 3

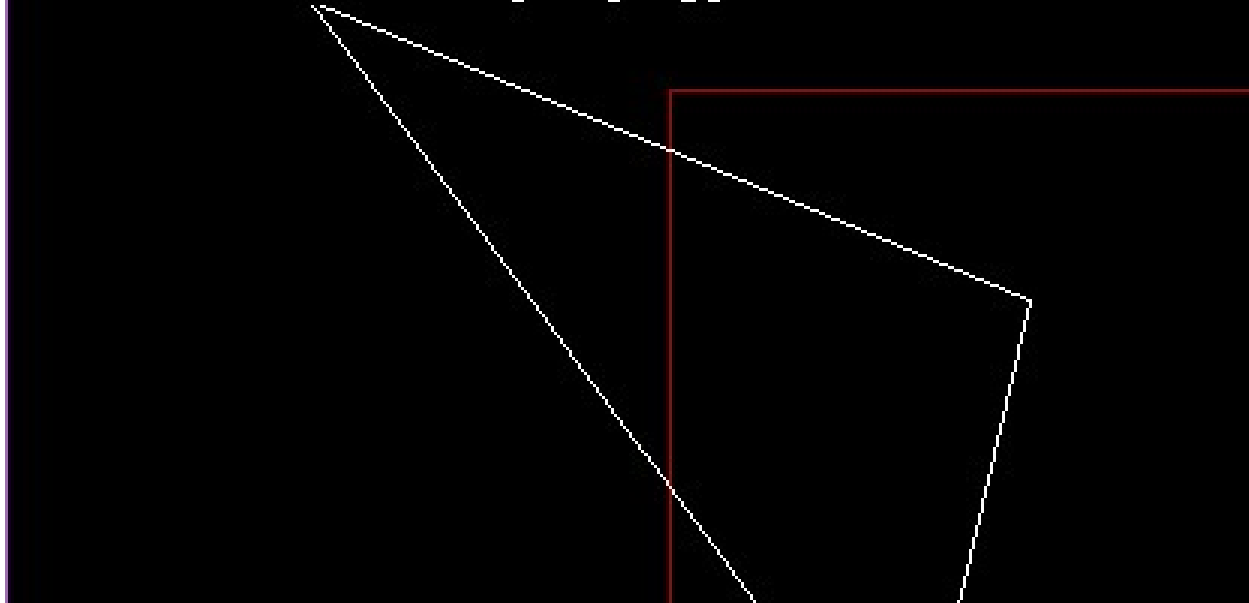
Enter the coordinates of points:

(x0,y0): 100,110

(x1,y1): 340,210

(x2,y2): 300,380

Press a button to clip a polygon..

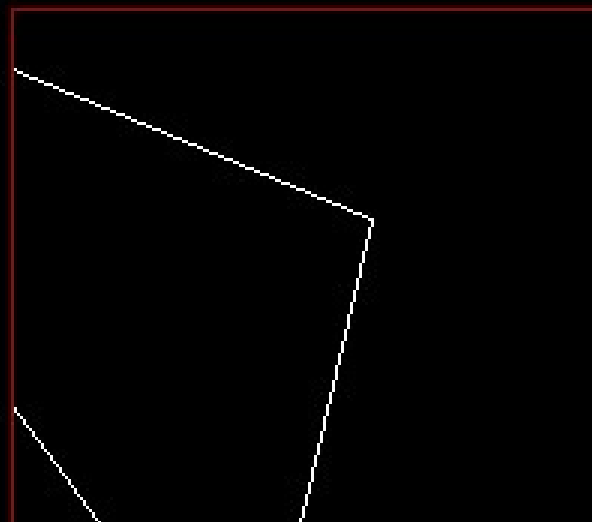


Output: Enter coordinates of vertices

After entering vertices' coordinates just press a button a polygon will be drawn with white color. Now press a button to clip the polygon and you'll simply get the clipped polygon in the output.

 DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC

This is the clipped polygon..



Clipped Polygon