LINE CLIPPING

Computer Graphics & Animation

Lecture #8

INTRODUCTION

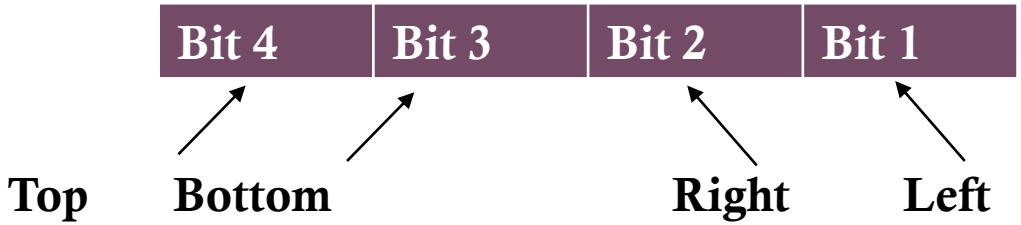
- Any procedure that eliminates those portions of a picture that are either inside or outside a specified region of space is referred to as a **Clipping Algorithm** or **Clipping**.
- A line clipping algorithm processes each line in a scene through a series of tests and intersection calculations to determine whether the entire line or any part of it is to be saved.

Difficulty: Calculating the intersection points.

- Goal: Minimize the intersection calculations.

COHEN SUTHERLAND LINE CLIPPING ALGORITHM

- Step 1: Read the two end points of the line say $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$.
- Step 2: Read the corners of the window i.e left, top, right and bottom.(say W_{x1}, W_{y1}, W_{x2}, W_{y2}).
- Step 3: Assign the region codes of two end points P1 and P2 using following steps.



- Step 4: Check for visibility of line P1P2

CONTD..

A) If region codes for both end points P1 and P2 are zero then the line is completely visible. Hence draw the line and go to step 9.

B) If region codes for the endpoint are not zero and logical ANDing of them is also nonzero then the line is completely invisible, so reject the line and go to step 9.

C) If region codes for endpoints do not satisfy the condition in 4A) and 4B) the line is partially visible.

CONTD..

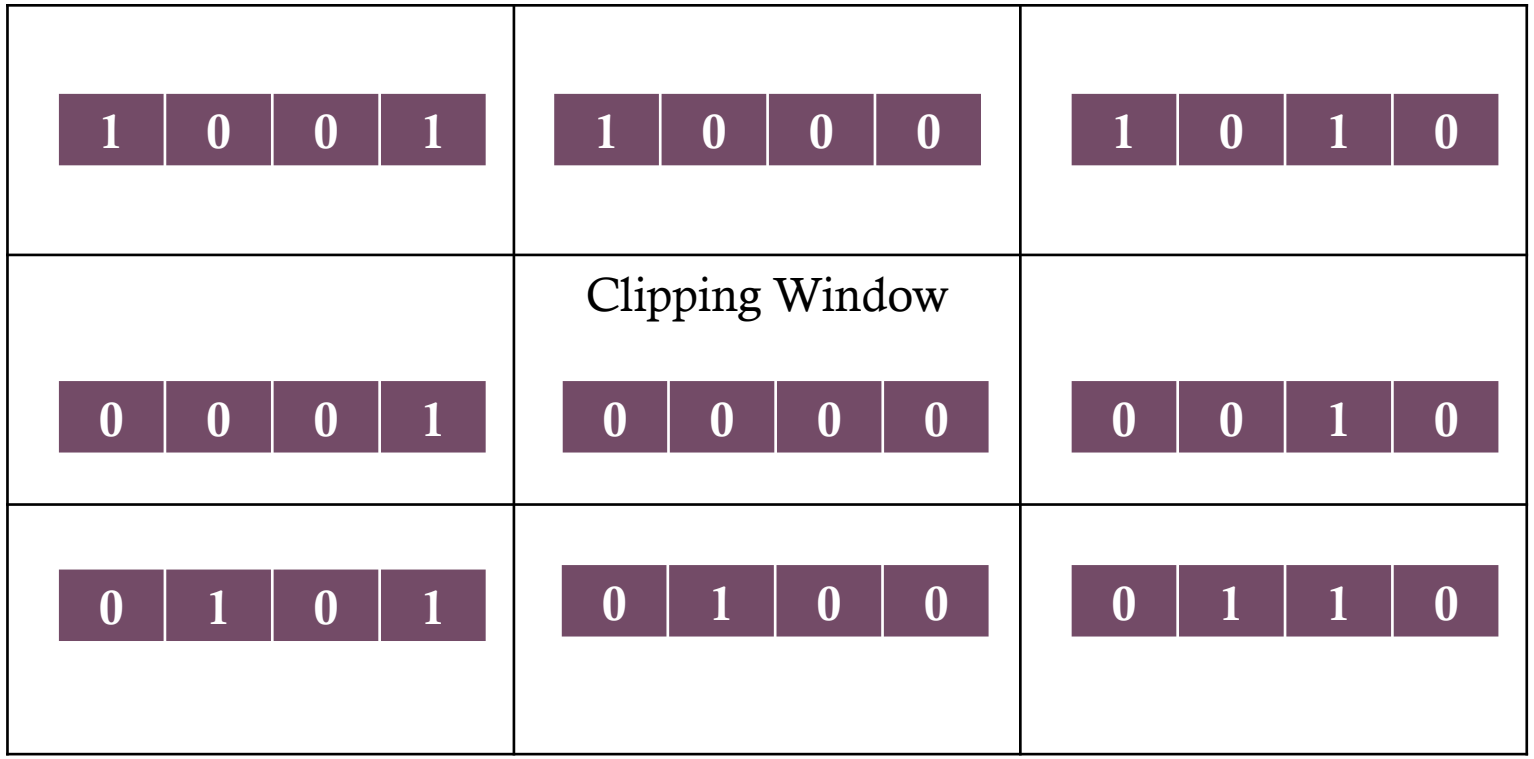
- Step 5: Determine the intersecting edge of the clipping edge of the window by inspecting the region codes of the two endpoints.

  A) If region codes for both the endpoints are non-zero, find intersection point P1' and P2' with boundary edge of the clipping window with respect to point P1 and P2 respectively.

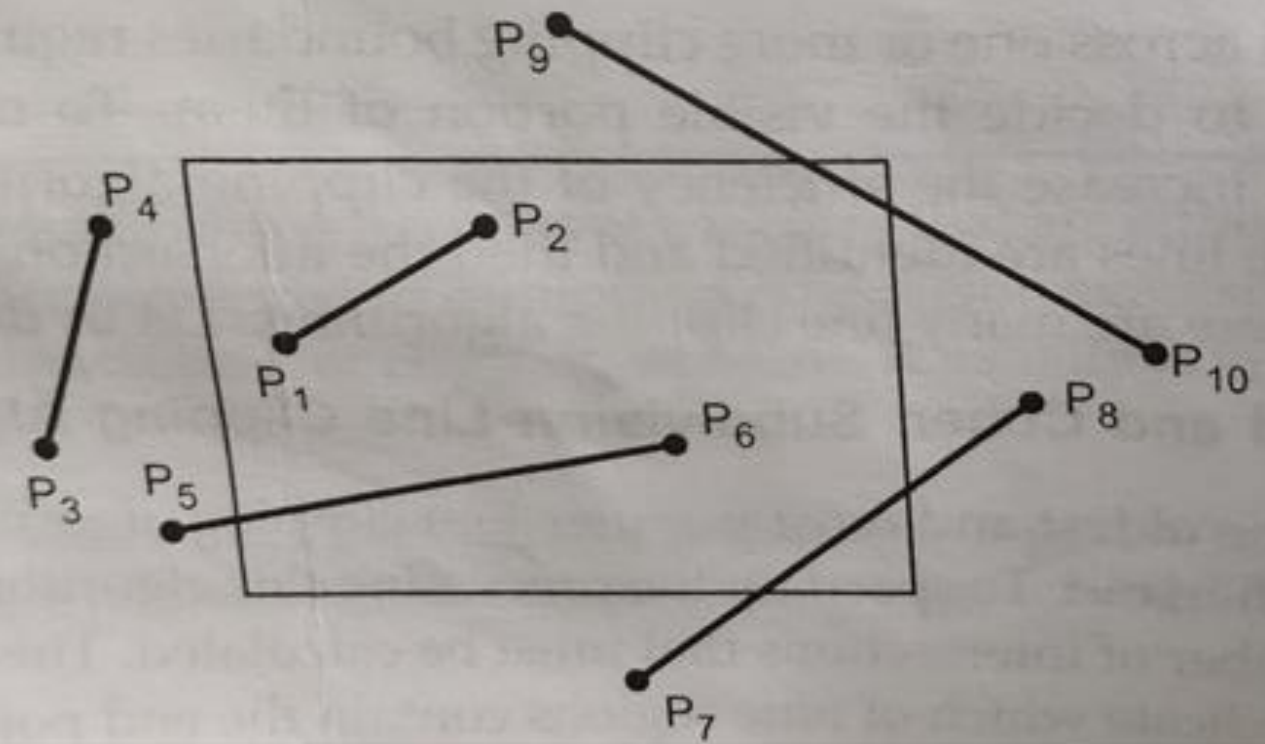
  B) If region code for any one end point is non-zero then find intersection point P1' or P2' with boundary edge of the clipping window with respect to it.

- Step 6: Divide the line segments considering the intersection points.
- Step 7: Reject the line segment if its endpoints lie completely outside of the window.
- Step 8: Draw the remaining line segments.

ASSIGNING OPCODE OR OUTCODE



: Consider the clipping window and the lines shown in Fig. 5.10. Find the region codes for each end point and identify whether the line is completely visible, partially visible or completely invisible.



QUIZ

THANK YOU