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1. Diketahui titik awal P(1,1) dan titik akhir di Q(10,10) dengan area clipping $x_{\min}=1$, $y_{\min}=1$, $x_{\max}=7$. Selesaikan masalah ini dengan clipping *Cohen-Sutherland*.

Garis P(1,1)

$L = 0$; Karena $1 < \frac{x_{\min}}{1}$

$R = 0$; Karena $1 < \frac{x_{\max}}{7}$

$B = 0$; Karena $1 < \frac{y_{\min}}{1}$

$T = 0$; Karena $1 < \frac{y_{\max}}{7}$

Vertex P=0000

Garis Q(10,10)

$L = 0$; Karena $10 < \frac{x_{\min}}{1}$

$R = 0$; Karena $10 < \frac{x_{\max}}{7}$

$B = 0$; Karena $10 < \frac{y_{\min}}{1}$

$T = 0$; Karena $10 < \frac{y_{\max}}{7}$

Vertex Q=0101 → Regional Code 0000 AND 0101 = 0000

$$\bullet \quad m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 1}{10 - 1} = \frac{9}{9} = 1$$

$$\bullet \quad x_{P_1} = x_1 + \frac{y_{\min} - y_1}{m} = 1 + \frac{1 - 1}{1} = 1 + \frac{0}{1} = 1$$

Jadi, Titik Potong = $(x_{P_1}, y_{\min}) = (1, 1)$ pada garis PQ

2. Berdasarkan soal No.1 lakukan clipping menggunakan algoritma Liang-Barsky dimana $x_l=1$, $x_r=7$, dan $y_t=7$.

$$\circ \quad dx = x_2 - x_1 = 10 - 1 = 9$$

$$P_1 = -dx = -9$$

$$P_2 = dx = 9$$

$$P_3 = -dy = -9$$

$$P_4 = dy = 9$$

$$\circ \quad dy = y_2 - y_1 = 10 - 1 = 9$$

$$Q_1 = x_1 - x_l = 1 - 1 = 0$$

$$Q_2 = x_r - x_1 = 7 - 1 = 6$$

$$Q_3 = y_1 - y_b = 1 - 1 = 0$$

$$Q_4 = y_t - y_1 = 7 - 1 = 6$$

- $\frac{Q_1}{P_1} = \frac{0}{-9} = 0$
- $\frac{Q_2}{P_2} = \frac{6}{9} = \frac{2}{3}$
- $\frac{Q_3}{P_3} = \frac{0}{-9} = 0$
- $\frac{Q_4}{P_4} = \frac{6}{9} = \frac{2}{3}$
- Untuk $(P_1 < 0) T_1 = \text{"max"} (0,0,0) = 0$
- Untuk $(P_1 < 0) T_2 = \text{"max"} (\frac{2}{3}, \frac{2}{3}, 0) = \frac{2}{3}$

Jadi, $T_1 < T_2$

- $T_1 = 0$
 $x_1 = x_1 + dx * T_1 = 1 + 9 * 0 = 1$
 $y_1 = y_1 + dy * T_1 = 1 + 9 * 0 = 1$
 $(x_1, y_1) \rightarrow (1,1)$
- $T_2 = \frac{2}{3}$
 $x_2 = x_1 + dx * T_2 = 1 + 9 * \frac{2}{3} = 7$
 $y_1 = y_1 + dy * T_1 = 1 + 9 * \frac{2}{3} = 7$
 $(x_2, y_2) \rightarrow (7,7)$