United Technical College, Bharatpur, Chitwan
Lab2

Bresenham's Line Drawing Algorithm

| Date Assigned: Nov 30, 2022		Date Due: Dec 07,

Bresenham's line algorithm is an algorithm which determines which order to form a close approximation to a straight line between two given points. Write a C program for determining pixel activation list between two given points in order to draw line segment using bresenham's Line drawing algorithm?

Aim: To implement Bresenham's line drawing algorithm for drawing a line segment between two given endpoints A (x1, y1) and B(x2, y2).

Description:

Basic Concept:

- Move across the x axis in unit intervals and at each step choose between two different y coordinates when slope m<1.
- For example, from position (2, 3) we have to choose between (3, 3) and (3, 4). We would like the point that is closer to the original line.
- Move across the y axis in unit intervals and at each step choose between two different x coordinates when slope is m>=1.
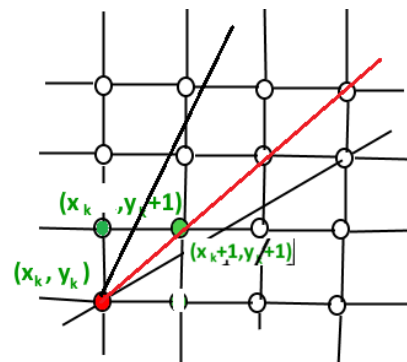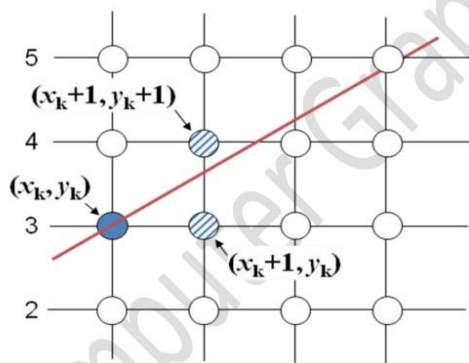
- So we have to take decision to choose next point. So next pixels are selected based on the value of decision parameter p. The equations are given in below algorithm.

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Bresenham's Line Drawing Algorithm

Step 1 : Start

Step 2: Input starting point $P_1(x_1, y_1)$ and ending point $P_2 (x_2, y_2)$

Step 3 : Calculate the slope(m) of the required Line.

Step 4 : Identify the value of slope(m). m = dy/dx

Step 4.1 : If slope(m) is Less than 1 i.e: m < 1

* **Step 4.1.1** : Calculate the constants dx, dy,, and (2dy – 2dx) and get the first value for the decision parameter as -

* p0 = 2dy – dx

* **Step 4.1.2** : At each Xk along the line, starting at k = 0, perform the following test –

* If pk < 0, the next point to plot is (xk + 1,yk) and

pk+1 = pk + 2dy

else

* plot (xk+1,yk + 1)

* pk+1 = pk + 2dy – 2dx

* **Step 4.1.3** : Repeat until x_2>=x_1..

- **Step 4.2** : If slope(m) is greater than or equal to 1 i.e: m >= 1

* **Step 4.2.1** : Calculate the constants dx, dy, and (2dx – 2dy) and get the first value for the decision parameter as -

* p0 = 2dx – dy

* **Step 4.2.2** : At each yk along the line, starting at k = 0, perform the following test –

* If pk < 0, the next point to plot is (xk,yk + 1) and

pk+1 = pk + 2dx

else

* plot (xk + 1,yk+1)

* pk+1 = pk + 2dx – 2dy

* **Step 4.2.3** : Repeat until y_2>=y_1.

Step 5 : Exit.

Bresenham's Algorithm C Program: Students are expected to write c program in lab.