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Aim:- To implement DDA algorithm for drawing a line segment between two given end points $A(x_1, y_1)$ & $B(x_2, y_2)$.

Software used:- Turbo C++

Theory:- DDA algorithm is an incremental scan conversion method. In the DDA algorithm, either horizontal or vertical displacement for other direction is calculated using the slope.
Consider a line equation $y = mx + b$, where $m = \frac{y_2 - y_1}{x_2 - x_1}$ and b is y intercept.
In DDA we need to consider two cases:

1) When $|m| \leq 1$ i.e. $(y_2 - y_1) \leq (x_2 - y_1)$
   - We assume x to be major axis in ~~both cases~~
   - We sample x axis at unit intervals and find the y values corresponding to each x value.
   - We have the slope equations as: $\Delta y = m\Delta x : (y_2 - y_1) = m(x_2 - x_1)$
   - In general terms we say that $y_{i+1} - y_i = m(x_{i+1} - x_i)$. But here $\Delta x = 1$, therefore the equation reduces to $y_{i+1} = y_i + m = y_i + dy/dx$.

2) When $|m| > 1$ i.e. $(y_2 - y_1) > (x_2 - x_1)$
   - We assume y to be major axis.
   - We sample y axis at unit intervals and find the x values corresponding to each y value.
   - We have slope equations as: $\Delta y = m\Delta x$
     $(y_2 - y_1) = m(x_2 - x_1)$

Algorithm:-

1) Start
2) Initialize variable x, y, x1, x2, y1, y2, dx, dy, step, xincr, yincr, k and also initialize gd = DETECT, gm.
3) Input start and end co-ordinates
4) Initialize graphic mode. to correct part to binary files in TC folder.
5) Load (x_1, y_1) into the frame buffer, plot first point. Put x=x1, y=y1
6) Calculate $dx = abs(x_2 - x_1)$, $dy = abs(y_2 - y_1)$
7) If dx > dy, do s = dx
8) Otherwise s = dy
9) Then xincr = dx/step, yincr = dy/step
10) Start from K = 0 and continue till K < s, the points will be

$$x = x + xincr$$

$$y = y + yincr$$

11) Plot pixels using putpixel at points (x, y), in specific colour.
12) Close Graph and STOP.

Conclusion:- Thus, we have successfully implemented DDA Line drawing algorithm.