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Subject :- Computer Graphics & Animation (PBC-602)

Sem. :- VIth

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Problem Solution :- DDA Algorithm

- Starting coordinate = (x_0, y_0)
- Ending coordinate = (x_n, y_n)

The points generation using DDA Algorithm involves the following steps :-

Step-01 :- Calculate Δx , Δy and m from the given input,

We know that the slope of a straight line m is given as :-

These parameters are calculated as :-

$$\Delta x = x_n - x_0$$

$$\Delta y = y_n - y_0$$

$$m = \Delta y / \Delta x \Rightarrow m = \frac{y_n - y_0}{x_n - x_0}$$

Step-02 :- Find the number of steps or points in between the starting and ending coordinates.

if $(\text{absolute}(\Delta x) > \text{absolute}(\Delta y))$

steps = $\text{absolute}(\Delta x)$;

else

steps = $\text{absolute}(\Delta y)$;

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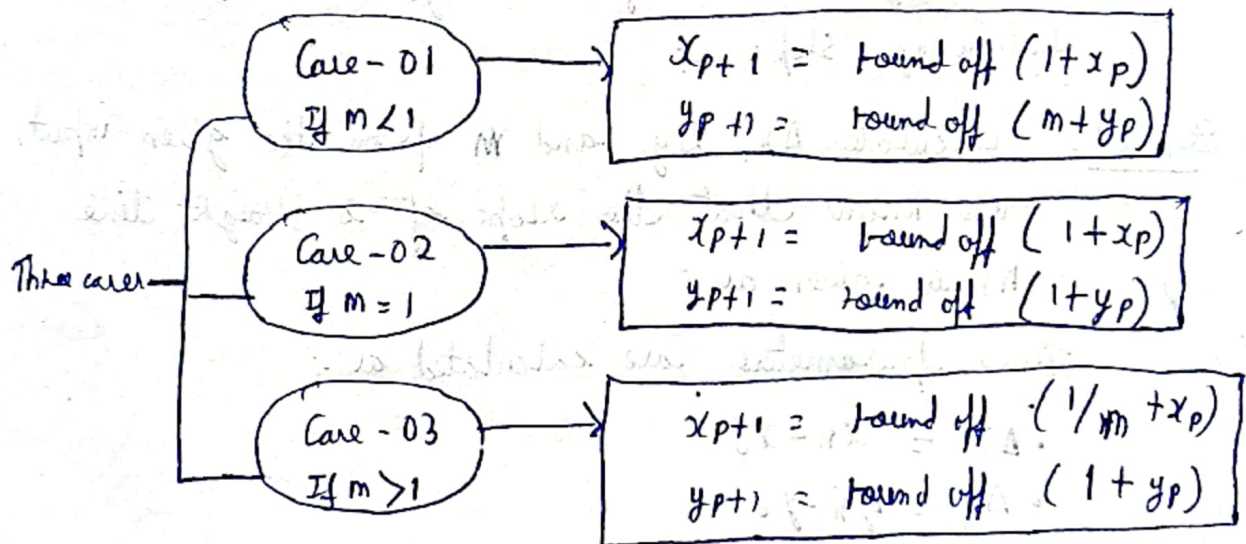
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Step-03: Suppose the current point is (x_p, y_p) and the next point is (x_{p+1}, y_{p+1}) .

Find the next by following below three cases;



Step-04: Keep repeating step-03 until the end point is reached or the number of generated new points (including the starting and ending points) equal to the steps count.

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DDA program:

```
#include <stdio.h>
```

```
#include <graphics.h>
```

```
int main ()
```

```
{ int tou ( float num)
```

```
{ return num < 0? num - 0.5: num + 0.5;
```

```
}
```

```
int x1 = 100, x2 = 250, y1 = 100, y2 = 250, step;
```

```
int gd = DETECT, gm;
```

```
float x, y, m;
```

```
int dx = x2 - x1;
```

```
int dy = y2 - y1;
```

```
m = dy/dx;
```

```
if (dx > dy)
```

```
step = dx;
```

```
else
```

```
step = dy;
```

```
initgraph (&gd, &gm, "");
```

```
outtextxy (x1, y1, "A");
```

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```
outtextx (x2, y2, "B");
```

```
x = x1, y = y1;
```

```
while (step > 0)
```

```
{ if (m < 1)
```

```
{ x = x + 1;
```

```
y = y + m;
```

```
} if (m >= 1)
```

```
{
```

```
x = x + 1 / m;
```

```
y = y + 1;
```

```
}
```

```
putpixel (rou(x), rou(y), RED);
```

```
step --;
```

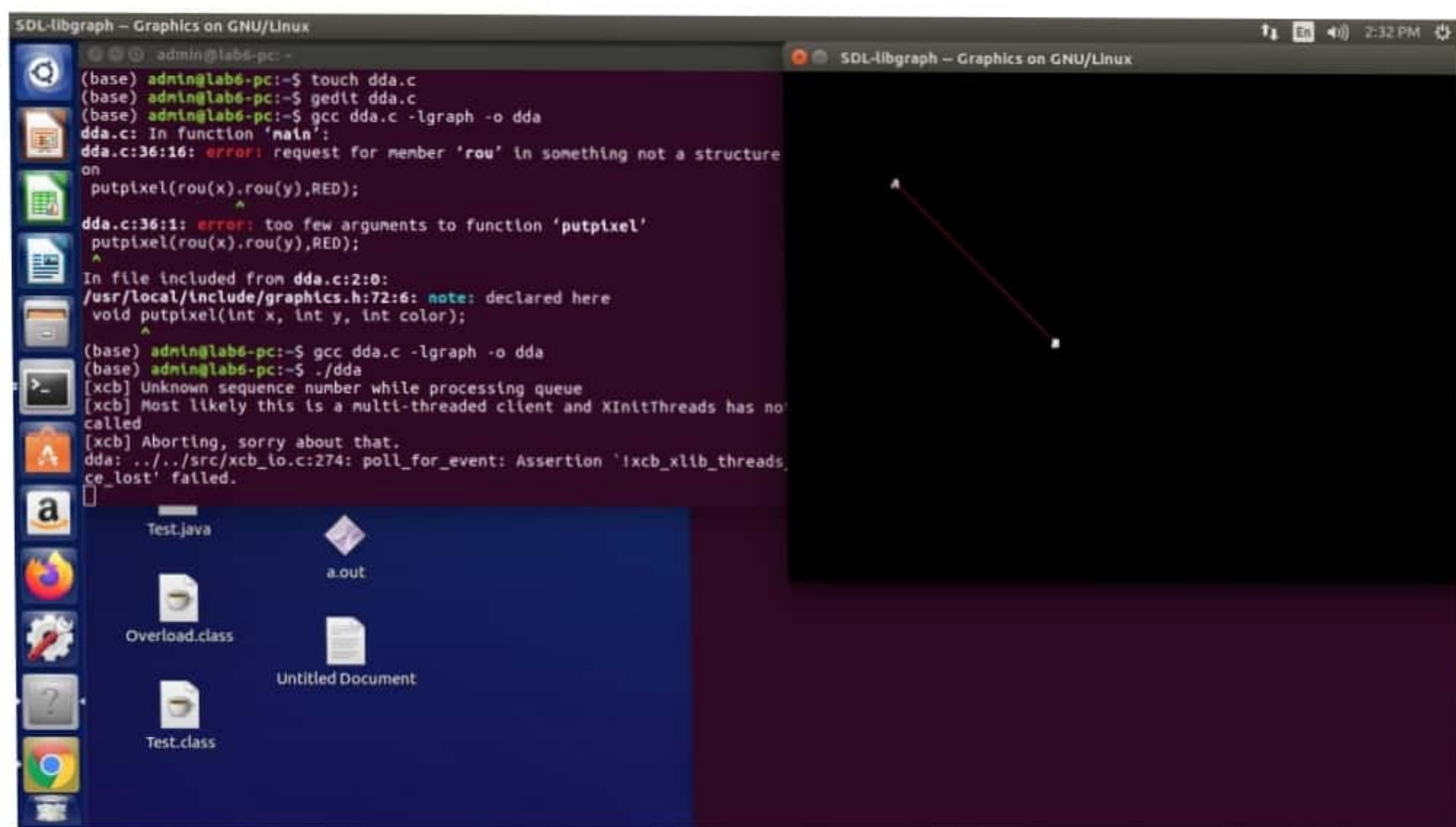
```
}
```

```
getch();
```

```
return 0;
```

```
}
```


OUTPUT



The screenshot shows a Linux desktop environment. On the left is a vertical dock with icons for various applications. The main area contains two windows. The left window is a terminal titled 'admin@lab6-pc: -' showing the following commands and output:

```
(base) admin@lab6-pc:~$ touch dda.c
(base) admin@lab6-pc:~$ gedit dda.c
(base) admin@lab6-pc:~$ gcc dda.c -lgraph -o dda
dda.c: In function 'main':
dda.c:36:16: error: request for member 'rou' in something not a structure
on
putpixel(rou(x).rou(y),RED);
           ^
dda.c:36:1: error: too few arguments to function 'putpixel'
putpixel(rou(x).rou(y),RED);
^
In file included from dda.c:2:0:
/usr/local/include/graphics.h:72:6: note: declared here
void putpixel(int x, int y, int color);
      ^
(base) admin@lab6-pc:~$ gcc dda.c -lgraph -o dda
(base) admin@lab6-pc:~$ ./dda
[xcb] Unknown sequence number while processing queue
[xcb] Most likely this is a multi-threaded client and XinitThreads has not
called
[xcb] Aborting, sorry about that.
dda: ../../src/xcb_io.c:274: poll_for_event: Assertion '!xcb_xlib_threads_
ce_lost' failed.
```

The right window is titled 'SDL-libgraph - Graphics on GNU/Linux' and displays a black canvas with a red line drawn from the top-left towards the bottom-right. The desktop background is dark purple, and several files are visible on the desktop, including 'Test.java', 'a.out', 'Overload.class', 'Untitled Document', and 'Test.class'.