Mr. Giansante

C++ Programming Graphics

August 2018

C++ Graphics

Setting Up Graphics With Dev C++

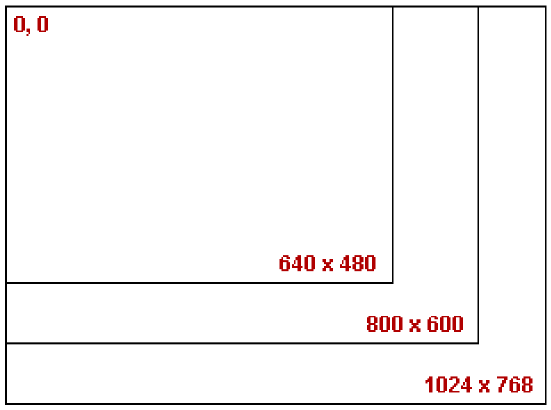
In order to use Graphics with Dev C++, you must follow the instructions in the booklet entitled "Setting Up Graphics With Dev C++".

Colours Codes

Colour	Value
Black	0
Blue	1
Green	2
Cyan	3
Red	4
Magenta	5
Brown	6
Light Gray	7
Dark Gray	8
Light Blue	9
Light Green	10
Light Cyan	11
Light Red	12
Light Magenta	13
Yellow	14
White	15

Coordinate System

When programming with C++, points can be specified using the x and y coordinate system. The point (0, 0) is found in the upper left-hand corner.



initwindow()

`initwindow()` initializes the graphics system by loading a graphics driver (or validating a registered driver), and putting the system into graphics mode.

`initwindow(vertical size, horizontal size);`

example. `initwindow(300, 300);`

closegraph()

`closegraph()` closes the graphics mode, deallocates all memory allocated by graphics system and restores the screen to the mode it was in before you called `initgraph()`.

example. `closegraph();`

cleardevice()

The `cleardevice()` function clears the screen in graphics mode and sets the current position to (0,0). Clearing the screen consists of filling the screen with current background color.

setcolor()

`setcolor()` sets the current drawing color for lines, circles, ellipses, etc.

The parameter is a number between 0 and 15. Refer to the chart at the top left of this page.

example. `setcolor(15); // Sets color to White`

setbkcolor()

`setbkcolor()` sets the background color of the graphics area. You must use `cleardevice()` to see the result.

The parameter is a number between 0 and 15. Refer to the chart at the top left of this page.

example. `setbkcolor(4); // Sets background to Red`

putpixel()

`putpixel()` plots a pixel at location (x, y) of specified color.

example. `putpixel(35,35,2); // Green at (35, 35)`

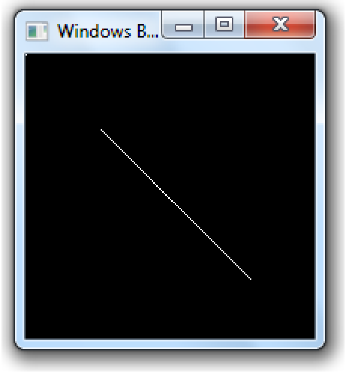
getpixel()

`getpixel()` returns the color of pixel present at location(x, y).

Drawing Lines

The `line(x1, y1, x2, y2);` function is used to draw a line from a point (x1, y1) to point (x2, y2)

example. `line(20, 20, 150, 150);`

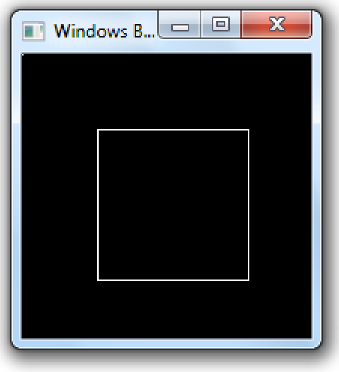


Drawing Rectangles

The `rectangle(x1, y1, x2, y2);` function is used to draw a rectangle. Coordinates of left top and right bottom corner are required to draw the rectangle.

example. `rectangle(50, 50, 150, 150);`

Draws a rectangle with top left corner at (50, 50) and bottom right corner at (150, 150).



Drawing a Filled-in Rectangle

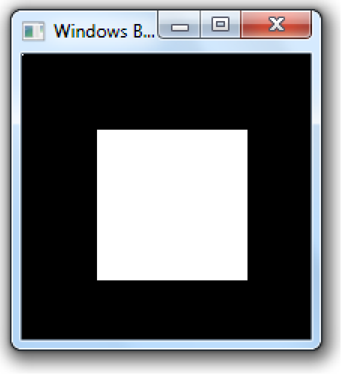
The `bar(x1, y1, x2, y2);` function is used to draw a filled-in rectangle. Coordinates of left top and right bottom corner are required to draw the rectangle.

To set the color for the `bar()` function, use ...

```
setfillstyle(SOLID_FILL, 4);  // 4 = Red
```

example.

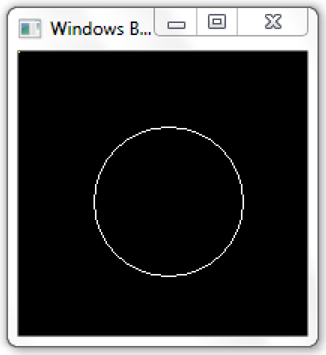
```
setfillstyle(SOLID_FILL, 15);  // 15 = Red
bar(50, 50, 150, 150);
```



Drawing a Circle

The `circle(x, y, r);` function is used to draw a circle with center at (x, y) and radius = r.

example. `circle(100,100,50);`

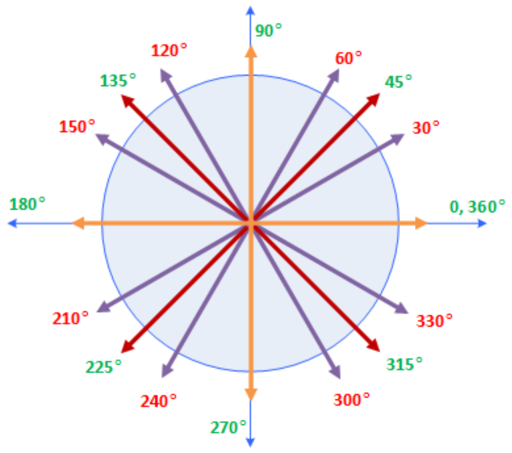


Drawing an Ellipse

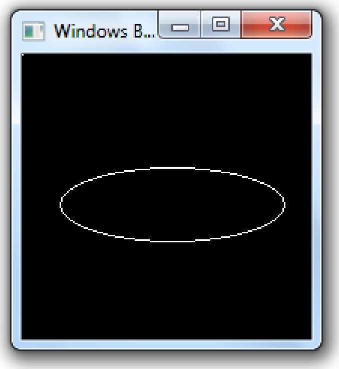
The `ellipse(x, y, start angle, end angle, x radius, y radius);` function is used to draw an ellipse.

`(x,y)` are coordinates of center of the ellipse
`start angle` is the starting angle (see diagram below)
`end angle` is the ending angle (see diagram below)
`x radius` is the horizontal radius
`y radius` is the vertical radius

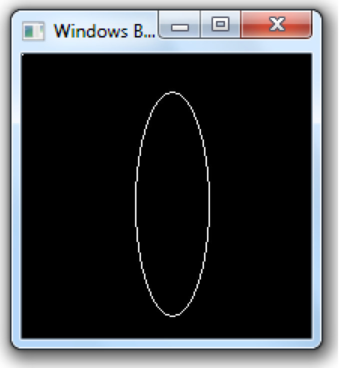
To draw a complete ellipse `start angle` and `end angle` should be 0 and 360 respectively.



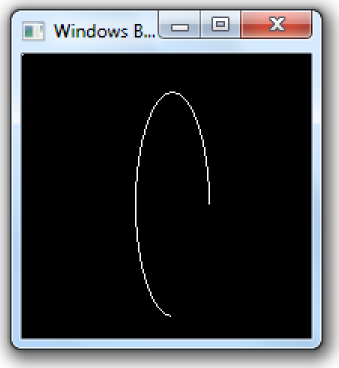
example. `ellipse(100, 100, 0, 360, 75, 25);`



example. `ellipse(100, 100, 0, 360, 25, 75);`



example. `ellipse(100, 100, 0, 270, 25, 75);`

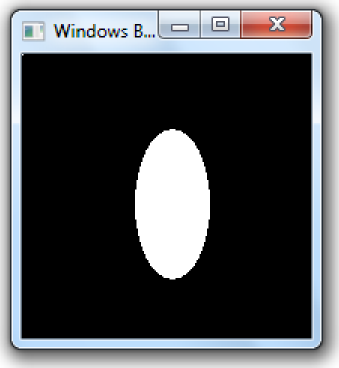


Drawing a Filled-in Ellipse

The `fillellipse(x, y, x radius, y radius);` is used to draw a filled-in ellipse.

`(x,y)` are coordinates of center of the ellipse
`x radius` is the horizontal radius
`y radius` is the vertical radius

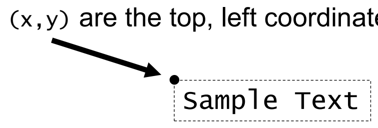
example. `fillellipse(100, 100, 25, 50);`



C++ Graphics

outtextxy(x, y, "Sample Text");

The `outtext();` function is used to place text in the graphics window.



settextstyle(font, direction, size);

`settextstyle()` sets the text font, the direction in which text is displayed, and the size of the characters.

settextstyle - font

One 8x8 bit-mapped font and several "stroked" fonts are available. The 8x8 bit-mapped font is the default.

8x8 bit-mapped Font:

```
DEFAULT_FONT
```

Stroked Fonts:

```
TRIPLEX_FONT              SMALL_FONT
SANS_SERIF_FONT           GOTHIC_FONT
SCRIPT_FONT               SIMPLEX_FONT
TRIPLEX_SCR_FONT          COMPLEX_FONT
EUROPEAN_FONT             BOLD_FONT
```

The default bit-mapped font is built into the graphics system. Stroked fonts are stored in *.CHR disk files, and only one at a time is kept in memory. When you select a stroked font the corresponding *.CHR file must be loaded from disk.

settextstyle - direction

Font directions supported are horizontal text (left to right) and vertical text (rotated 90 degrees counterclockwise). Horizontal text is the default.

```
HORIZ_DIR
VERT_DIR
```

settextstyle - size

The size of each character can be magnified using the charsize factor.

If charsize equals 1, outtext and outtextxy displays characters from the 8x8 bit-mapped font in an 8x8 pixel rectangle onscreen.

If charsize equals 2, these output functions display characters from the 8x8 bit-mapped font in a 16*16 pixel rectangle, and so on (up to a limit of ten times the normal size).

Printing Variables in Graphics Mode

by Rohit Rathi
Source: https://graphicswithc.wordpress.com/2016/06/12/print-variable-values-in-graphics-mode/

Graphics mode in C allows us to print text on the screen in various sizes and at various locations by using `outtextxy()` function. However, `outtextxy()` function has a significant drawback.

While creating different graphics, we often need to print values of variables on the screen in graphics mode. For example: player score, health points, time, etc.

One cannot accomplish the task of printing such variable data by using only `outtextxy()`. This is because the `outtextxy()` function accepts only a simple string and not a formated string.

The code below will NOT work as desired generate errors.

```
int i;

for(int i=0;i<10;i++)
{
     cleardevice();
     outtextxy(100,100,i); //First try
     outtextxy(100,100,"%d",i); //Second try
     delay(1000);
}
```

Luckily, there is a simple workaround that enables us to get variable values printed on output screen in graphics mode.

```
int i;
char str[3];

for(int i=0;i<10;i++)
{
     cleardevice();
     sprintf(str,"%d",i);
     outtextxy(100,100,str);
     delay(1000);
}
```

The code above will work perfectly and we will get the changing values of i in output as desired.

`sprintf()` simply writes the text in string str as described by format string. This happens each time the loop gets executed. So the string passed to the function `outtextxy()` is a simple string each time containing new value of i.

`sprintf()` works similar to that of `printf()` with only difference that it prints the text in string rather than in the output window.