# Computer Graphics Lab
# Day-1

##Graphics configure for code::blocks

1. First download WinBGIm GCC47 file from here.
2. unzip the WinBGIm_GCC47.zip
3. open "graphics.h" file. and replace 302 line with "int left=0, int top=0, int right=INT_MAX, int bottom=INT_MAX," line.
4. copy & paste "graphics.h" and "winbgim.h" into compiler include folder.
5. copy & paste libbgi.a file into compiler lib folder.
6. Now open code::blocks.
7. Go to settings -> Compiler -> Linker settings
8. Left side Linker libraries click add, and browse the file "libbgi.a" and add. In my pc this is "C:\Program Files (x86)\CodeBlocks\MinGW\lib\libbgi.a"
9. In Right side Other linker options text field copy paste this, "-lbgi -lgdi32 -lcomdlg32 -luuid -loleaut32 -lole32" (without quotes)
10. Press ok.

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- **What are pixels in an image?**

In digital imaging, a **pixel**, pel, dots, or **picture** element is a physical point in a raster **image**, or the smallest addressable element in an all points addressable display device; so it is the smallest controllable element of **a picture** represented on the screen.

**What is a pixel in computer graphics?**

The **pixel** (a word invented from "picture element") is the basic unit of programmable color on a **computer** display or in a **computer** image. Think of it as a logical - rather than a physical - unit. The physical size of a **pixel** depends on how you've set the resolution for the display screen.

### What are initgraph, gd and gm?

- gd = graphdriver;
- gm = graphmode;

**Syntax for initgraph:**

```
void initgraph (int *graphdriver, int *graphmode, char *pathtodriver) ;
```

**Description for initgraph:**

**initgraph**

initgraph is used to initialize the graphics system by loading a graphics driver from disk and thereby putting the system into graphics mode.

To start the graphics system, we first call the initgraph function. initgraph may use a particular graphics driver and mode, or it may auto-detect and pick the corresponding driver at runtime, according to our needs.

If we tell initgraph to autodetect, it calls detectgraph to select a graphics driver and mode. It also resets all graphics settings to their defaults values like current position, color, viewport and so on and also resets graph result to 0.

Normally, memory is allocated by initgraph to load a particular graphics driver through _graphgetmem, then it loads the appropriate BGI file from disk.

**pathtodriver**

pathtodriver denotes the directory path where initgraph must look for graphic drivers. initgraph first goes through the directed path to look for the files and if they are not found there, it goes to the current directory. The graphic driver must files must be present in the current directory if the pathtodriver is null.

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**graphdriver**

*graphdriver is the integer that specifies which graphics driver is to be used. We can give it a value using a constant of the graphics_drivers enum type, which is defined in graphics.h and listed below.

| graphics_drivers constant | Numeric value |
|---|---|
| DETECT | 0 (requests autodetect) |
| CGA | 1 |
| MCGA | 2 |
| EGA | 3 |
| EGA64 | 4 |
| EGAMONO | 5 |
| IBM8514 | 6 |
| HERCMONO | 7 |
| ATT400 | 8 |
| VGA | 9 |
| PC3270 | 10 |

**graphmode**

*graphmode is also an integer that specifies the initial graphics mode.

graphdriver and graphmode must be given proper values from the tables or we will get absurd and unexpected results. The exception here is when graphdriver = DETECT. In this case, initgraph sets *graphmode to the highest resolution available for the detected driver.

# Draw a line in C++ graphics

**graphics.h** library is used to include and facilitate graphical operations in program. graphics.h functions can be used to draw different shapes, display text in different fonts, change colors and many more. Using functions of graphics.h you can make graphics programs, animations, projects and games. You can draw circles, lines, rectangles, bars and many other geometrical figures. You can change their colors using the available functions and fill them.

**Explanation :**The header file graphics.h contains line() function which is described below :

Declaration : **void line(int x1, int y1, int x2, int y2);**

line function is used to draw a line from a point(x1,y1) to point(x2,y2) i.e. (x1,y1) and (x2,y2) are end points of the line.

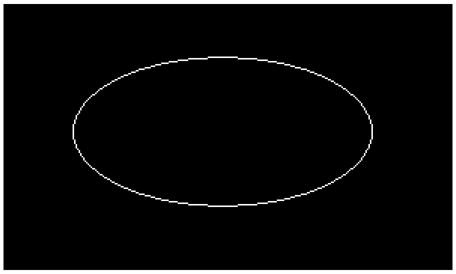
# Draw ellipse in C graphics

**Program to draw ellipse in C using graphics.h header file.**
graphics.h library is used to include and facilitate graphical operations in program. C graphics

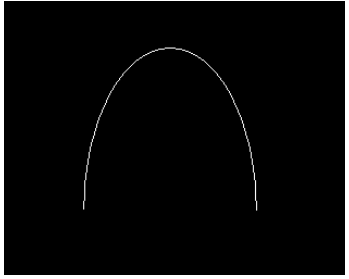
using graphics.h functions can be used to draw different shapes, display text in different fonts, change colors and many more. Using functions of graphics.h you can make graphics programs, animations, projects and games. You can draw circles, lines, rectangles, bars and many other geometrical figures. You can change their colors using the available functions and fill them.

**Examples:**

Input : x=250, y=200, start_angle = 0,
        end_angle = 360, x_rad = 100, y_rad = 50
Output :



Input : x=250, y=200, start_angle = 0,
        end_angle = 180, x_rad = 80, y_rad = 150
Output :



**Explanation :**The header file graphics.h contains ellipse() function which is described below :

**void ellipse(int x, int y, int start_angle, int end_angle, int x_radius, int y_radius)**

In this function x, y is the location of the ellipse. x_radius and y_radius decide the radius of form x and y.
start_angle is the starting point of angle and end_angle is the ending point of angle. The value of angle can vary from 0 to 360 degree

# Draw Rectangle in C graphics

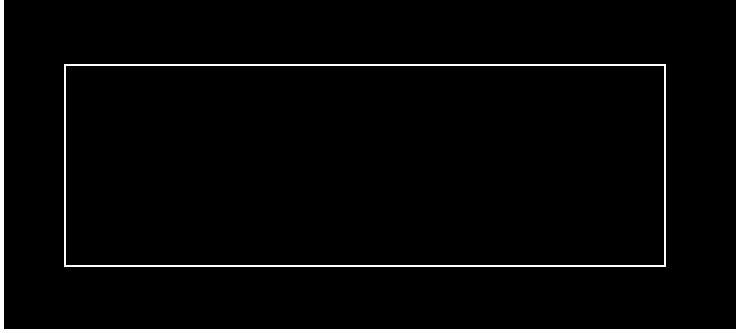
**rectangle()** is used to draw a rectangle. Coordinates of left top and right bottom corner are required to draw the rectangle. left specifies the X-coordinate of top left corner, top specifies the Y-coordinate of top left corner, right specifies the X-coordinate of right bottom corner, bottom specifies the Y-coordinate of right bottom corner.

**Syntax :**

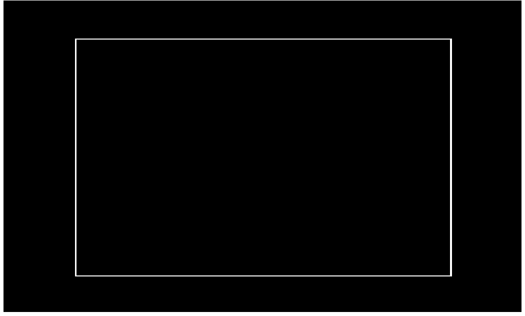
rectangle(int left, int top, int right, int bottom);

**Examples:**

Input : left = 150, top = 250, right = 450, bottom = 350;
Output :



Input : left = 150, top = 150, right = 450, bottom = 450;
Output :



# Draw circle in C graphics

The header file graphics.h contains **circle()** function which draws a circle with center at (x, y) and given radius.

**Syntax :**

circle(x, y, radius);

where,
(x, y) is center of the circle.
'radius' is the Radius of the circle.

**Examples :**

Input : x = 250, y = 200, radius = 50
Output :

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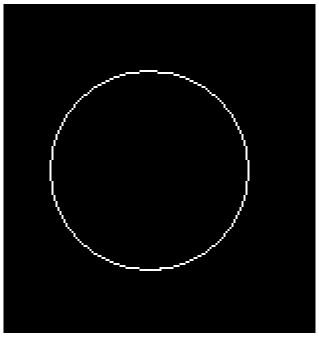
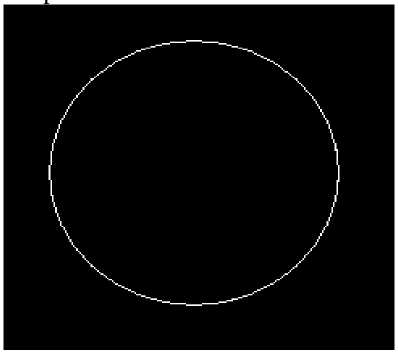


Input : x = 300, y = 150, radius = 90
Output :



# setfillstyle() and floodfill() in C

The header file graphics.h contains **setfillstyle()** function which sets the current fill pattern and fill color. **floodfill()** function is used to fill an enclosed area. Current fill pattern and fill color is used to fill the area.

### Syntax :

```
void setfillstyle(int pattern, int color)

void floodfill(int x, int y, int border_color)
```

### Examples :

```
Input : pattern = HATCH_FILL, Color = RED
        circle : x = 250, y = 250, radius = 100
        floodfill : x = 250, y = 250, border color =15
Output :
```

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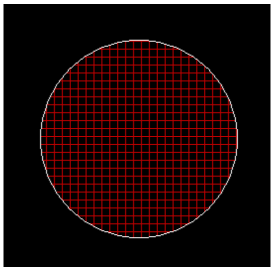
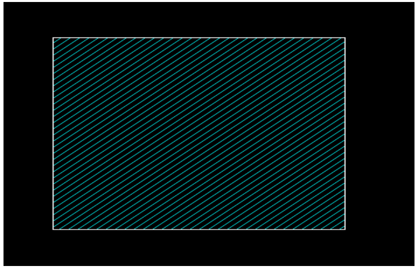


```
Input : pattern = LTSLASH_FILL, Color = RED
       rectangle : left = 200, top = 200, right = 450, bottom = 450
       floodfill : x = 201, y = 201, border_color = 15
Output :
```



Below is the table showing INT VALUES corresponding to Colors :

| **COLOR** | **INT VALUES** |
|---|---|
| BLACK | 0 |
| BLUE | 1 |
| GREEN | 2 |
| CYAN | 3 |
| RED | 4 |
| MAGENTA | 5 |
| BROWN | 6 |
| LIGHTGRAY | 7 |
| DARKGRAY | 8 |
| LIGHTBLUE | 9 |
| LIGHTGREEN | 10 |
| LIGHTCYAN | 11 |
| LIGHTRED | 12 |
| LIGHTMAGENTA | 13 |
| YELLOW | 14 |
| WHITE | 15 |

Below is the table showing INT VALUES corresponding to Patterns :

| **PATTERN** | **INT VALUES** |
|---|---|
| EMPTY_FILL | 0 |
| SOLID_FILL | 1 |
| LINE_FILL | 2 |
| LTSLASH_FILL | 3 |
| SLASH_FILL | 4 |
| BKSLASH_FILL | 5 |
| LTBKSLASH_FILL | 6 |