

# BearPlot documentation and usage

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BearPlot is a Python-based program to draw graphics using an input-file-specified graphics primitives. BearPlot is intended to support C++ programs by providing graphics potential as a “second stage of execution” after the C++ program.



This sequence is a kludgy solution to a system problem: that C++ does not have a universal graphics standard; it's difficult to select and install graphics libraries to support the variety of environments needed.

BearPlot contains some error messages when data file lines cannot be interpreted.

BearPlot is licensed by Missouri State University using the MIT license.

Use BearPlot at your own risk.

Tkinter graphic library commands are documented at Tkinter documentation at

<http://infohost.nmt.edu/tcc/help/pubs/tkinter/web/index.html>.

## Coordinate system for BearPlot graphics

Like many graphics system, BearPlot's Y axis values are REVERSED in comparison to the standard Cartesian coordinate system. The coordinate system origin (0, 0) is at the upper left, and Y values increase going DOWN the graphics window. A line from the origin to the center of the graphics window would be drawn using the coordinates (0, 0) to (WIDTH/2, HEIGHT/2). The conversion from “standard” Cartesian coordinate system value (sx, sy) to graphics coordinate system (gx, gy) is:  $gx = sx$  (that is, no difference),  $gy = (HEIGHT - sy)$ .

## Contents of the data file for input to BearPlot graphics

**Every data file must contain on the first line a specification of the output graphics window** using the form

`pixelWidth pixelHeight color`

where `color` is one of the Tkinter known strings (see below for valid color names).

Example data file usage: `700 700 white`

**Graphics drawing primitives.** The data file may contain whatever of these primitives are needed to display the desired graphic output.

Graphics command. This is the first word or phrase on a line of the data file. <i>Uppercase or lowercase are allowed.</i>	Meaning	Data file form and example usage. <i>Fields in parentheses are <b>optional</b> – when that field does not appear in the data file, some default value is used.</i>

CIRCLE	Draws a circle, with coordinate bounding box, with top left and diameter given as parameters. Optional fill color, default is transparent (see below for valid color names).	circle topLeftX topLeftY diameter (color)  circle 50 50 20 blue
COORDINATE PLANE	Draws a basic coordinate plane, splitting the canvas into four equal halves. This command has no parameters other than the name itself.	coordinate_plane
DOTTED LINE	Draws a dotted line from startx starty to endx endy with an optional color as parameter 6. Default color is black. (See below for valid color names).	line_dotted startX startY endX endY (color)  line_dotted 50 50 20 200 blue
DOTTED RECTANGLE	Draws a rectangle with black dotted border, between two points, top left and bottom right, with optional fill color. Default color is transparent. (See below for valid color names).	rect_dotted topLeftX topLeftY bottomRightX bottomRightY (color)  rect_dotted 50 50 100 100 blue
LINE	Draws a line from startx and starty to endx and endy with an optional color option. Default color is black. (See below for valid color names).	line startX startY endX endY (optional color, default is black)  line 50 50 20 200 blue
OVAL	Draws an oval, with coordinates as a bounding box, with top left and bottom right given as parameters. Optional fill color, default is transparent. (See below for valid color names).	oval topLeftX topLeftY bottomLeftX bottomLeftY (color)  oval 50 50 200 100 blue
POINT	Draws a one pixel point at point x y. With an optional color. Default color is black. (See below for valid color names).	point x y (color)  point 50 50 blue
POSITIVE COORDINATE PLANE	Draws a basic positive coordinate plane, with the axis 2 pixels from the edge. This command has no parameters other than the name itself.	positive_coordinate_plane
RECTANGLE	Draws a rectangle between two points, top left and bottom right, with optional fill color. Default color is transparent. (See below for valid color names).	rectangle topLeftX topLeftY bottomRightX bottomRightY (color)  rectangle 50 50 100 100 blue
TEXT	Draws text using black color, centered on point given, numeric	text pointX pointY fontsize word1 word2 word3 . . .

	font size. Typical font size values are integers 10 (small) to 36 (extra-large). The text on the remainder of line will be displayed.	text 50 50 16 Hello World!
THICK LINE	Draws a thicker line from startx starty to endx endy with an optional color. Default color is black. (See below for valid color names).	line_solid startX startY endX endY (color)  line_solid 50 50 20 20 blue
TRIANGLE	Draws segments forming a triangle between three points, optional line color. Default color is black. (See below for valid color names).	triangle point1X point1Y point2X point2Y point3X point3Y (color)  triangle 50 50 20 20 50 20 blue

#### Other graphics data file commands.

Graphics command. <b>This is the first word on a line of the data file.</b> <i>Uppercase or lowercase are allowed.</i>	Meaning	Example data file usage. <i>Fields in parentheses are <b>optional</b> – when that field does not appear in the data file, some default value is used.</i>
COMMENT	Allows comments to be placed in data file. There is no graphical effect resulting from a comment.	comment word1 word2 word3 ...  comment It certainly is a fine day today!
PRESSKEY	Pause indefinitely while waiting for user to press ENTER key. <i>NOTE: Running BearPlot causes system to lose focus into the graphics window. User must first click in DOS or IDLE window to regain focus, then ENTER.</i>	presskey  presskey
SLEEP	Pauses execution of graphic display. Optional input in seconds as a floating-point value. Default is 2.	sleep (seconds)  sleep sleep 2.5

# Example

Desired outcome appearance of graphics, the data file used, the result obtained

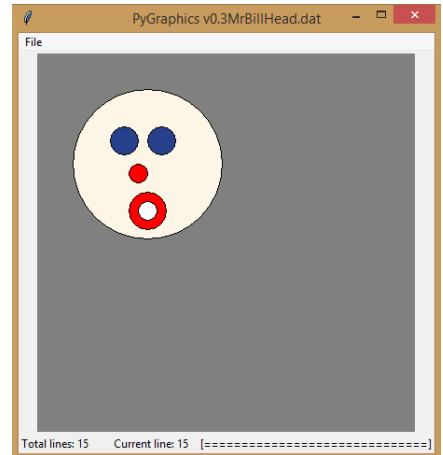


```
400 400 gray
comment Bill's head
circle 40 40 160 oldlace

comment Bill's eyes
circle 80 80 30 royalblue4
circle 120 80 30
royalblue4

comment Bill's nose
circle 100 120 20 red

comment Bill's mouth
circle 100 150 40 red
circle 110 160 20 white
```



# Valid color names

Choose Tkinter color names from color charts found on the web using the search term “Tkinter color name chart”.

snow	deep sky blue	gold	seashell3	SlateBlue2	LightBlue3	SpringGreen2	DarkGoldenrod1	brown4	pink3	purple1	gray26	gray64
ghost white	sky blue	light goldenrod	seashell4	SlateBlue3	LightBlue4	SpringGreen3	DarkGoldenrod2	salmon1	pink4	purple2	gray27	gray65
white smoke	light sky blue	goldenrod	AntiqueWhite1	SlateBlue4	LightCyan2	SpringGreen4	DarkGoldenrod3	salmon2	LightPink1	purple3	gray28	gray66
gainsboro	steel blue	dark goldenrod	AntiqueWhite2	RoyalBlue1	LightCyan3	green2	DarkGoldenrod4	salmon3	LightPink2	purple4	gray29	gray67
floral white	light steel blue	rosy brown	AntiqueWhite3	RoyalBlue2	LightCyan4	green3	RosyBrown1	salmon4	LightPink3	MediumPurple1	gray30	gray68
old lace	light blue	indian red	AntiqueWhite4	RoyalBlue3	PaleTurquoise1	green4	RosyBrown2	LightSalmon2	LightPink4	MediumPurple2	gray31	gray69
linen	powder blue	saddle brown	bisque2	RoyalBlue4	PaleTurquoise2	chartreuse2	RosyBrown3	LightSalmon3	PaleVioletRed1	MediumPurple3	gray32	gray70
antique white	pale turquoise	sandy brown	bisque3	blue4	PaleTurquoise3	chartreuse3	RosyBrown4	LightSalmon4	PaleVioletRed2	MediumPurple4	gray33	gray71
papaya whip	dark turquoise	dark salmon	bisque4	blue3	PaleTurquoise4	chartreuse4	IndianRed1	orange2	PaleVioletRed3	thistle1	gray34	gray72
blanched almond	medium turquoise	salmon	PeachPuff2	DodgerBlue2	CadetBlue1	OliveDrab1	IndianRed2	orange3	PaleVioletRed4	thistle2	gray35	gray73
bisque	turquoise	light salmon	PeachPuff3	DodgerBlue3	CadetBlue2	OliveDrab2	IndianRed3	orange4	maroon1	thistle3	gray36	gray74
peach puff	cyan	orange	PeachPuff4	DodgerBlue4	CadetBlue3	OliveDrab3	IndianRed4	DarkOrange1	maroon2	thistle4	gray37	gray75
navajo white	light cyan	dark orange	NavajoWhite2	SteelBlue1	CadetBlue4	DarkOliveGreen1	sienna1	DarkOrange2	maroon3		gray38	gray76
lemon chiffon	cadet blue	coral	NavajoWhite3	SteelBlue2	turquoise1	DarkOliveGreen2	sienna2	DarkOrange3	maroon4		gray39	gray77
mint cream	medium aquamarine	light coral	NavajoWhite4	SteelBlue3	turquoise2	DarkOliveGreen3	sienna3	DarkOrange4	VioletRed1		gray40	gray78
azure	aquamarine	tomato	LemonChiffon2	SteelBlue4	turquoise3	DarkOliveGreen4	sienna4	coral1	VioletRed2		gray41	gray79
alice blue	dark green	orange red	LemonChiffon3	DeepSkyBlue2	turquoise4	khaki1	burlywood1	coral2	VioletRed3		gray42	gray80
lavender	dark olive green	red	LemonChiffon4	DeepSkyBlue3	cyan2	khaki2	burlywood2	coral3	VioletRed4		gray43	gray81
lavender blush	dark sea green	hot pink	cornsilk2	DeepSkyBlue4	cyan3	khaki3	burlywood3	coral4	magenta2		gray44	gray82
misty rose	sea green	deep pink	cornsilk3	SkyBlue1	cyan4	khaki4	burlywood4	tomato2	magenta3		gray45	gray83
dark slate gray	medium sea green	pink	cornsilk4	SkyBlue2	DarkSlateGray1	LightGoldenrod1	wheat1	tomato3	magenta4		gray46	gray84
dim gray	light sea green	light pink	ivory2	SkyBlue3	DarkSlateGray2	LightGoldenrod2	wheat2	tomato4	orchid1		gray47	gray85
slate gray	pale green	pale violet red	ivory3	SkyBlue4	DarkSlateGray3	LightGoldenrod3	wheat3	OrangeRed2	orchid2		gray48	gray86
light slate gray	spring green	maroon	ivory4	LightSkyBlue1	DarkSlateGray4	LightGoldenrod4	wheat4	OrangeRed3	orchid3		gray49	gray87
gray	lawn green	medium violet red	honeydew2	LightSkyBlue2	aquamarine2	LightYellow2	tan1	OrangeRed4	orchid4		gray50	gray88
light grey	medium spring green	violet red	honeydew3	LightSkyBlue3	aquamarine3	LightYellow3	tan2	red2	plum1		gray51	gray89
midnight blue	green yellow	medium orchid	honeydew4	LightSkyBlue4	DarkSeaGreen1	LightYellow4	tan4	red3	plum2		gray52	gray90
navy	lime green	dark orchid	LavenderBlush2	SlateGray1	DarkSeaGreen2	yellow2	chocolate1	red4	plum3		gray53	gray91
cornflower blue	yellow green	dark violet	LavenderBlush3	SlateGray2	DarkSeaGreen3	yellow3	chocolate2	DeepPink2	plum4		gray54	gray92
dark slate blue	forest green	blue violet	LavenderBlush4	SlateGray3	DarkSeaGreen4	yellow4	chocolate3	DeepPink3	MediumOrchid1		gray55	gray93
slate blue	olive drab	purple	MistyRose2	SlateGray4	SeaGreen1	gold2	firebrick1	DeepPink4	MediumOrchid2		gray56	gray94
medium slate blue	dark khaki	medium purple	MistyRose3	LightSteelBlue1	SeaGreen2	gold3	firebrick2	HotPink1	MediumOrchid3		gray57	gray95
light slate blue	khaki	thistle	MistyRose4	LightSteelBlue2	SeaGreen3	gold4	firebrick3	HotPink2	MediumOrchid4		gray58	gray96
medium blue	pale goldenrod	snow2	azure2	LightSteelBlue3	PaleGreen1	goldenrod1	firebrick4	HotPink3	DarkOrchid1		gray59	gray97
royal blue	light goldenrod yellow	snow3	azure3	LightSteelBlue4	PaleGreen2	goldenrod2	brown1	HotPink4	DarkOrchid2		gray60	gray98
blue	light yellow	snow4	azure4	LightBlue1	PaleGreen3	goldenrod3	brown2	pink1	DarkOrchid3		gray61	gray99
dodger blue	yellow	seashell2	SlateBlue1	LightBlue2	PaleGreen4	goldenrod4	brown3	pink2	DarkOrchid4		gray62	gray63

## Execution of BearPlot software

BearPlot contains some error messages when data file lines cannot be interpreted.

**From a DOS shell** in a folder containing BearPlot.py and the data file

```
python BearPlot.py datafile.txt
```

**From an IDLE window** select Run -> Run Module and enter the data filename when prompted