

# PLOTTER v0.2

5 August 2024

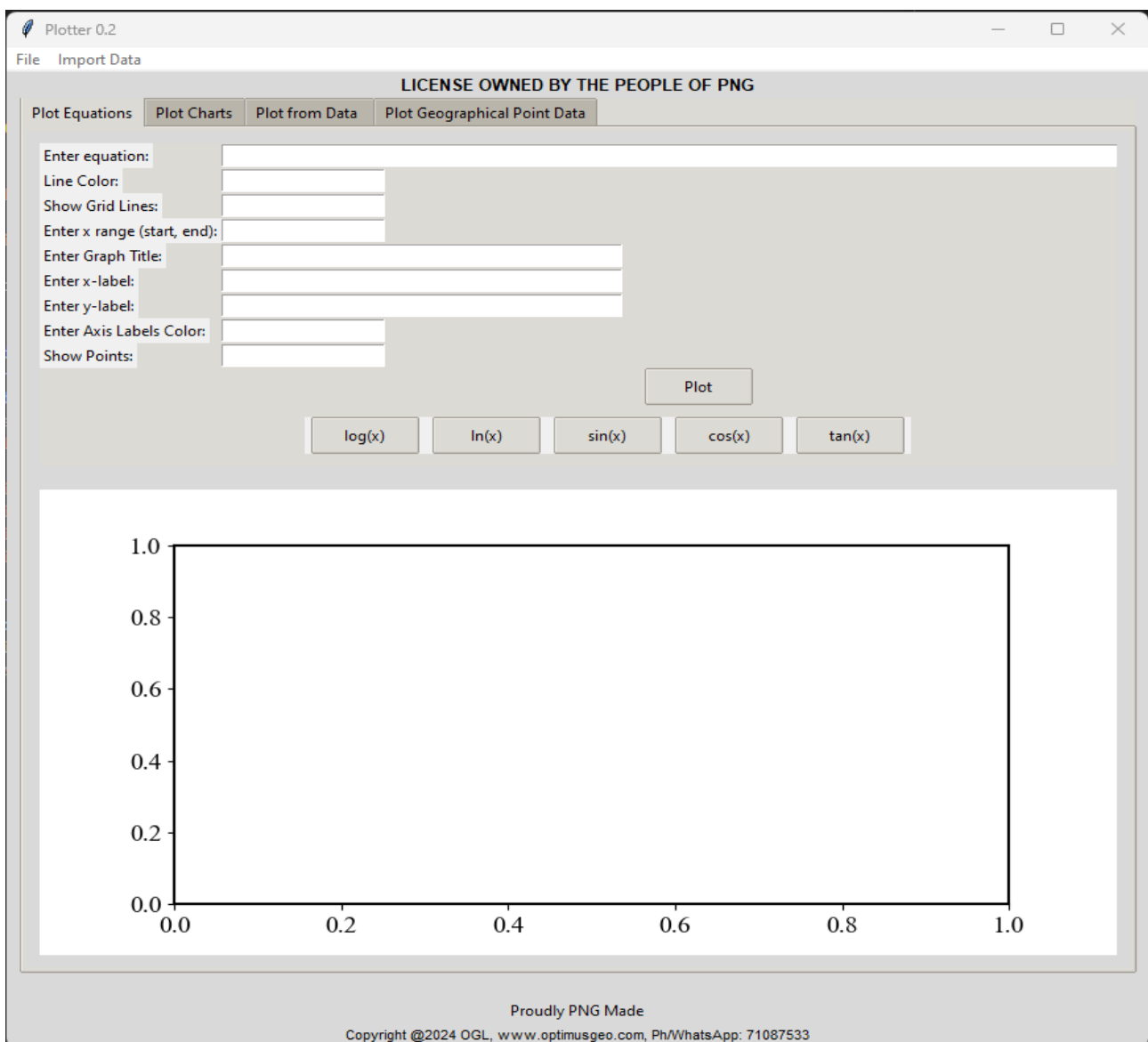
## 1. Introduction

A draft version of this app (**Plotter v0.1**) was released last week. This is an updated version with added new features. **Plotter v0.2** is a desktop app that plots graphs using:

1. common equations encountered in primary and secondary schools,
2. data (numbers) provided directly in the input tabs of the app, and
3. data imported from spreadsheet files (.csv, .x/sx)

## 2. User Interface

The app user interface is simple as shown in [Figure 1](#) below.



*Figure 1. Graphical user interface of Plotter 02 with four (4) main data entry tabs, a plotting canvas and two menu items called "File" and "Import Data".*

## 3. Data Entry Tabs

As shown in [Figure 1](#), there are 4 main tabs with respect to the types of graphs generated:

1. **Plot Equations tab,**
2. **Plot Charts tab,**
3. **Plot from Data tab, and**
4. **Geographical Point Data.**

### 3.1. Plot Equations: steps to creating plots

There are two main ways that you can use to create plots:

1. Polynomial functions (e.g.  $x^5 - 5x^4 + 3x^3 - x^2 + x - 4$ )
2. Other special functions ( $\log(x)$ ,  $\ln(x)$ ,  $\sin(x)$ ,  $\cos(x)$ ,  $\tan(x)$ )

Steps to plot polynomial functions:

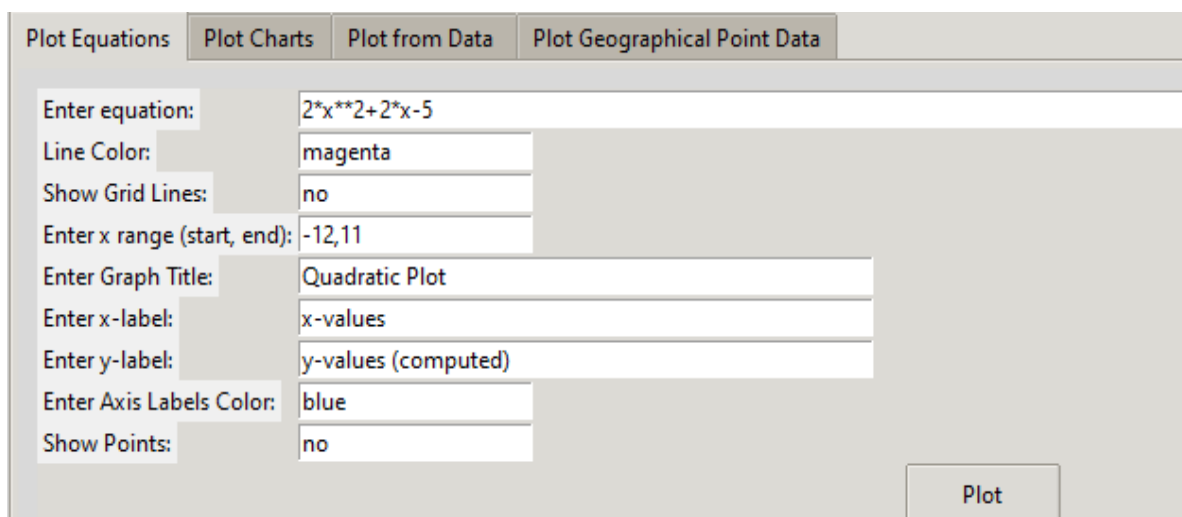
1. Enter the equation (e.g.  $3x^2 + x - 4$  can be entered as  $3*x^{**2}+x-4$ )
2. Enter all the plot properties (color, grid line, labels, etc.)
3. Note that some of the color that you can use are provided in the Appendix section of this document.
4. Enter start and end values of x (e.g. if x values are -3,-2,-1,0,1,2,3,4,5; then you need to enter this as -3,5).
5. Push the "Plot" button and the polynomial function will be plotted.

Steps to plot the other special functions:

1. No need to enter any equation here. Just enter the rest of the information then select the special function of your choice and the graph will be generated.

#### Example 1: Plotting the equation $y = 2x^2+2x-5$

- Simply enter all the required information, then clock the 'Plot' button.
- Note that the power symbol is written using two stars (\*\*) e.g.  $x^{**2}$ .
- Note that the multiplication sign is written using one star (\*), e.g.  $2*x$



Plot Equations	Plot Charts	Plot from Data	Plot Geographical Point Data
Enter equation:	2*x**2+2*x-5		
Line Color:	magenta		
Show Grid Lines:	no		
Enter x range (start, end):	-12,11		
Enter Graph Title:	Quadratic Plot		
Enter x-label:	x-values		
Enter y-label:	y-values (computed)		
Enter Axis Labels Color:	blue		
Show Points:	no		
<input type="button" value="Plot"/>			

*Figure 2. Using the Plot Equations tab: providing inputs for the plot  $y = 2x^2+2x-5$ .*

The above inputs generates a graph as shown in [Figure 3](#).

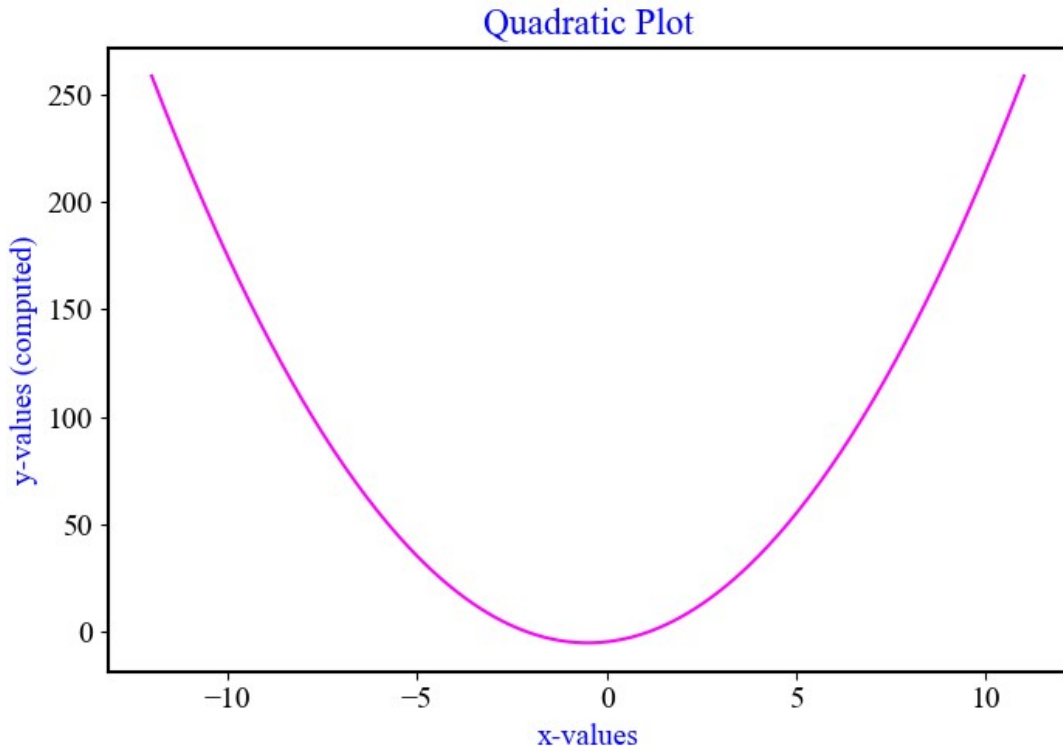


Figure 3. Plot generated from the inputs shown in Figure 1.

**Example 2: Plotting the equation  $y = \sin(x)$**

- To plot  $y = \sin(x)$ , you can enter the inputs then click the  $\sin(x)$  button.
- For this example, we will just use the same inputs as in Figure 2, and change only 3 inputs: (a) the title to "Sin(x) Plot", (b) the axis color to indigo, and the (c) Show Points to yes.

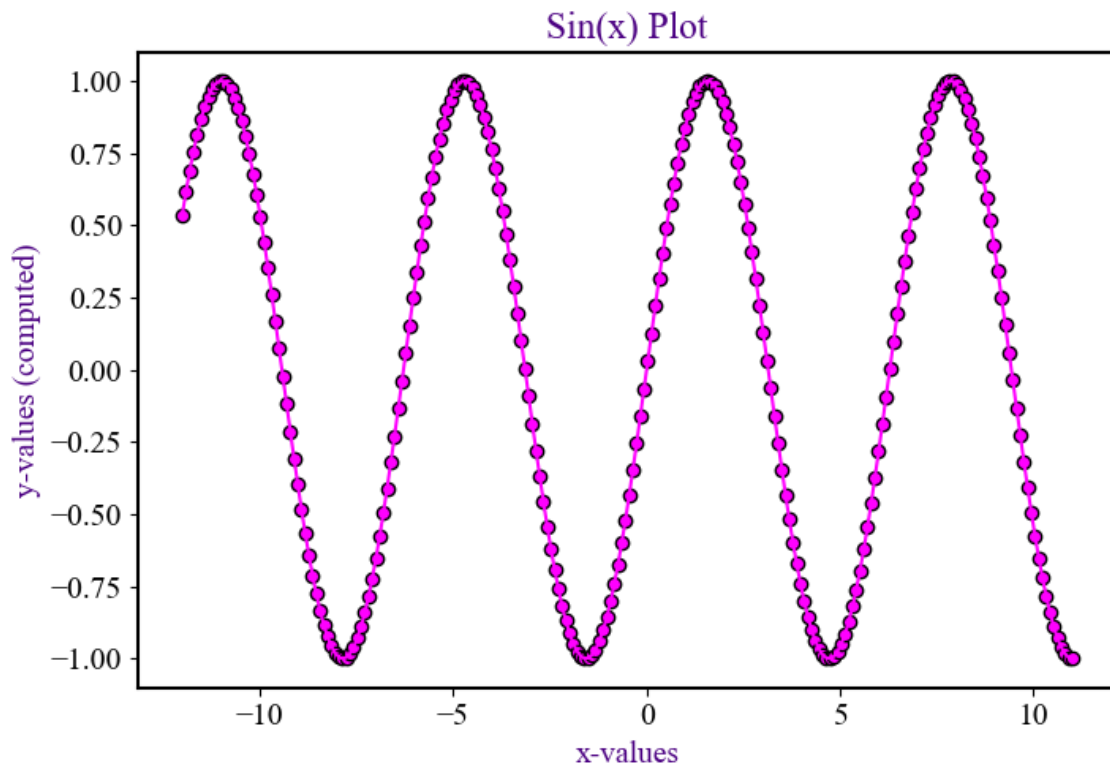


Figure 4. Sample plot of  $\sin(x)$ .

### 3.2. Plot Charts: steps to creating charts

The data entry canvas for the “Plot Chart” tab looks like Figure 5.

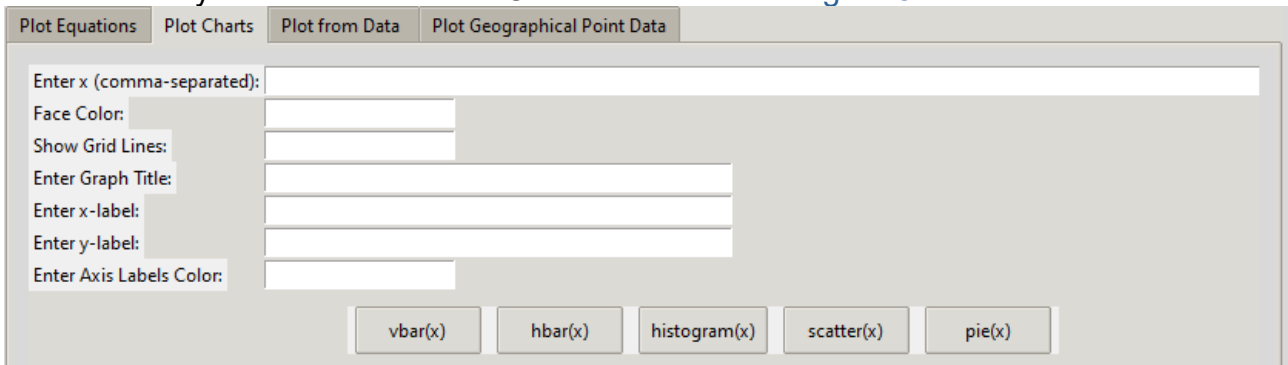


Figure 5. Data entry canvas for the “Plot Chart” tab.

Steps to plot charts

1. Manually enter the data (comma separated numbers, e.g. -5, 0, 4.5, 12)
2. Fill in the rest of the information
3. Click the button of the chart you want to generate.

*Example 2: Generate a bar chart using the  $vbar(x)$  function.*

- Enter some random values as shown in Figure 6 and click ‘ $vbar(x)$ ’ button.

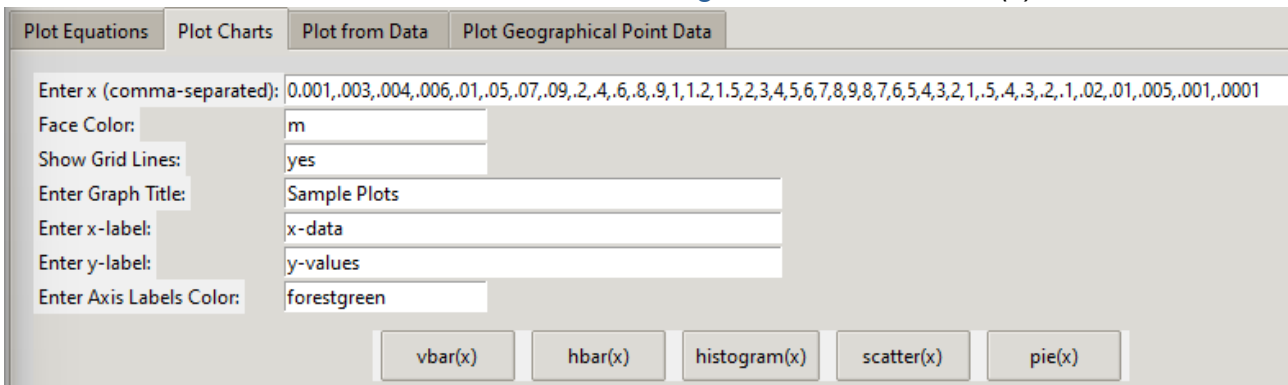


Figure 6. Sample inputs to generate charts.

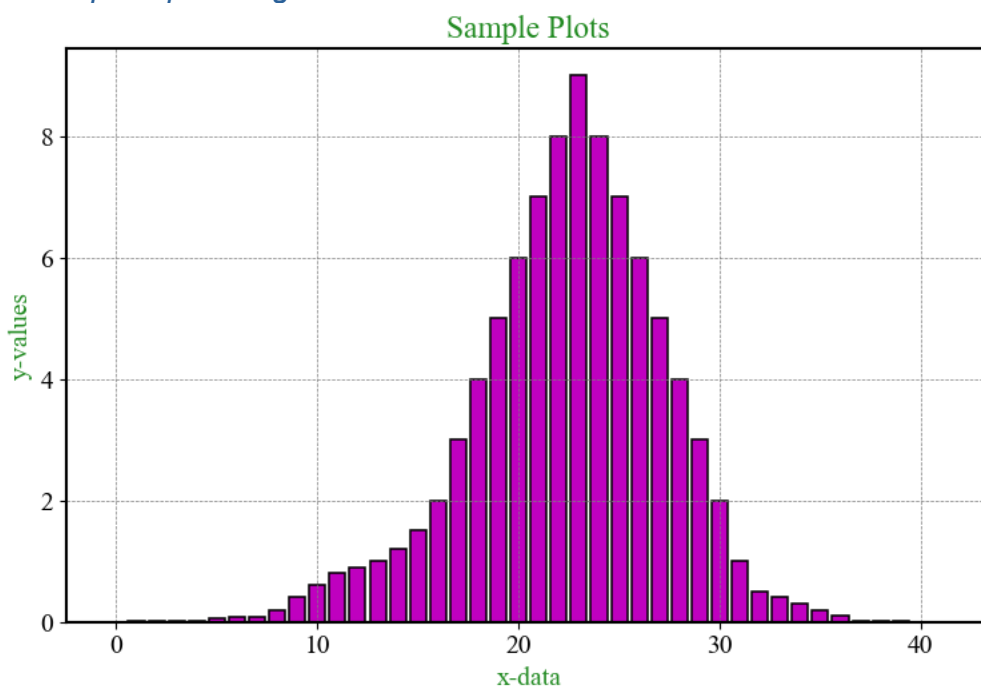


Figure 7. Plot generated using the  $vbar(x)$  button from the inputs shown in Figure 6.

### 3.3. Plot Data: steps to creating plots from imported spreadsheet data

The data entry interface for the Plot Data tab is as shown in Figure 8.

Figure 8. Data entry canvas for the “Plot from Data” tab.

There are 3 main steps to create plots in this tab:

1. Import the data (must be in .csv or .xlsx spreadsheet),
2. Enter all the required inputs as shown in Figure 8.
3. Select the appropriate chart button of your choice.

There are few important points to consider to successfully generate the plots:

- You need to enter the column names (C1, C2) as exactly as the column name of your spreadsheet file that contains the data you want to plot.
- Note that that only the last two buttons (*plot(C1-C2)* and *scatter(C1-C2)*) require two columns of data from your spreadsheet file. One column is plotted against the other. The rest of the buttons only require one column of data in spreadsheet to plot.

**Example 3: Generate a horizontal bar chart using a single column of data.**

- Let’s say we have some data in excel file as shown in Figure 9.

	A	B	C	D	E	F	G	H
1	X		Y	values		Year	GDP (Billion USD)	
2	1200		12501	22000		2000	11	
3	1350		13001	22500		2001	13	
4	1500		13501	23000		2002	15	
5	1234		18765	23500		2003	15	
6	1800		14501	24000		2004	16	
7	2543		16543	24500		2005	15	
8	2100		15501	25000		2006	16	
9	2250		23543	25500		2007	17	
10	3243		16501	26000		2008	17	
11	2550		23240	26500		2009	18	
12	1590		12143	35000		2010	14	
13	2850		18001	23555		2011	16	
14	1543		23454	28000		2012	17	
15	3150		19001	28500		2013	17	
16	2341		22431	29000		2014	28	
17	3450		20001	29500		2015	28	
18	4000		21345	30000		2016	29	
19	2353		12543	30500		2017	30	
20	4121		21501	35000		2018	30	
21	4050		17543	23000		2019	32	
22	3421		16543	32000		2020	31	
23	4576		15435	32500		2021	31	
24	4500		23501	33000		2022	32	
25	3453		12530	22000		2023	33	
26	4800		14256	34000		2024	33	
27								

Figure 9. Sample spreadsheet data to be imported and plotted.

- We want to plot the data in the column called 'values' in an excel file called 'test'. We want our plot to be in horizontal bars.

Step 1 – Import the data using the import function in the menu.

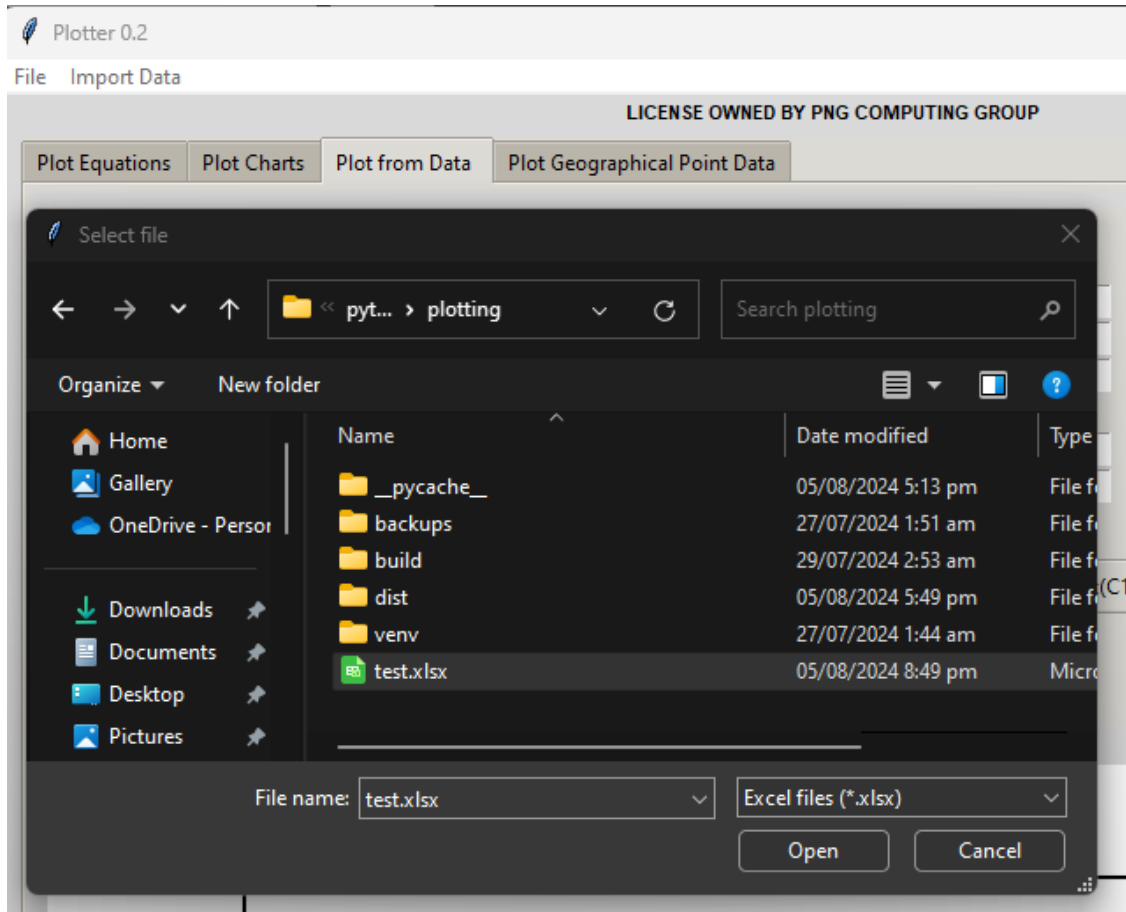


Figure 10. Importing spreadsheet data using the “Import Data” function in the top menu. In the figure, note that the file type is indicated as “Excel files (\*.xlsx)” at the bottom right corner. Here, you can click and change file type to .csv if your data is in csv file.

Step 2 – Fill in the rest of the information with careful naming of the “values” column as shown in Figure 11. Then click the 'hbar(C1)' button.

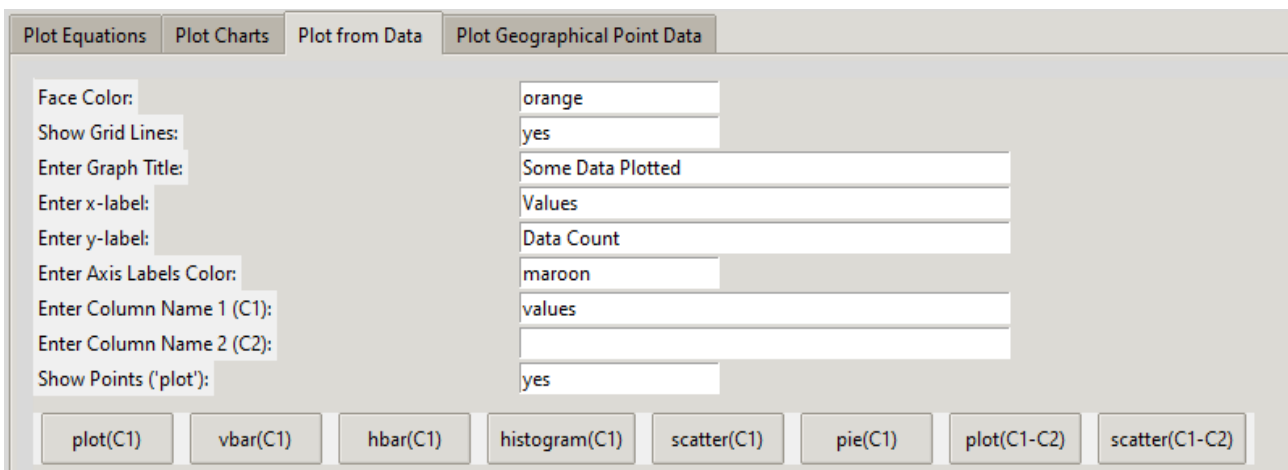


Figure 11. Filling in the rest of the information.

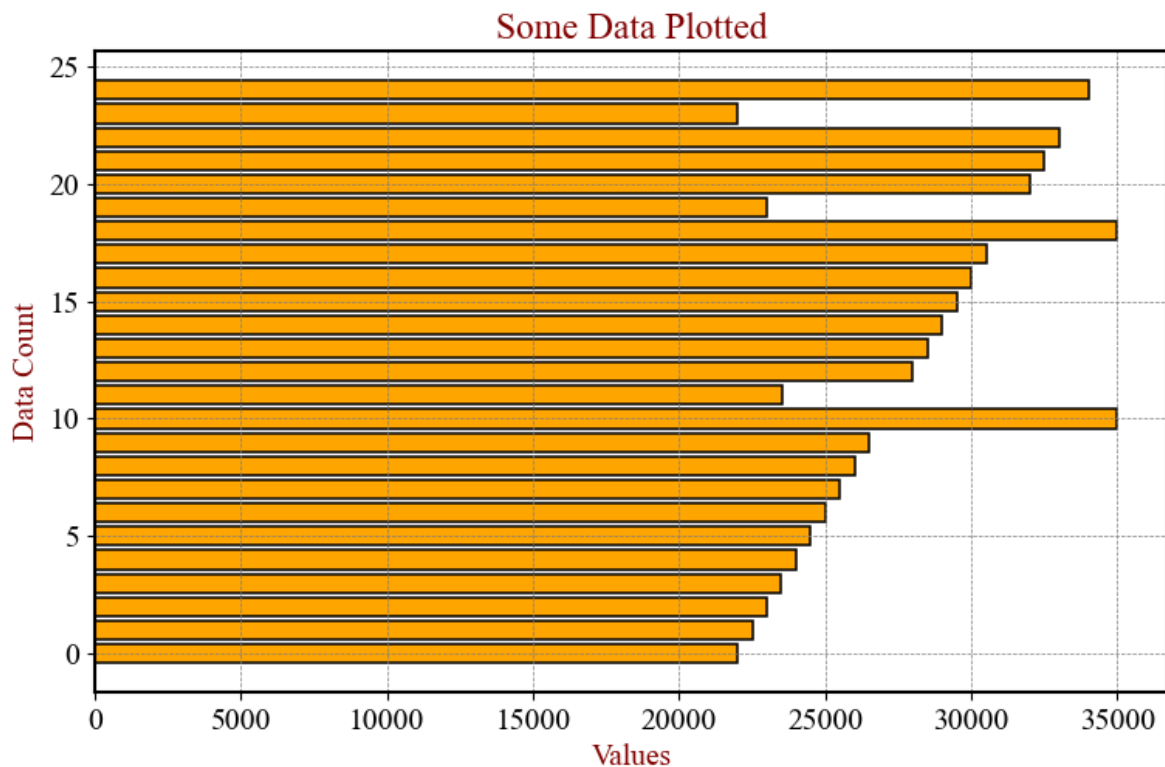


Figure 12. Chart generated from the spreadsheet data and the inputs in Figure 11.

**Example 4: Potting data from two column of data.**

- Lets use the same spreadsheet as in *Example 3*. But here we want to plot data from two columns.
- Let's say column F and G in the spreadsheet file (Figure 9) have PNGs GDP from 2000 to present. We want to plot this data.

Step 1. Import the data using the Import Data function in the menu.

Step 2. Fill in the rest of the information as shown in Figure 13.

Step 3. Click the 'plot(C1-C2)' button.

Plot Equations	Plot Charts	Plot from Data	Plot Geographical Point Data
Face Color:		blue	
Show Grid Lines:		yes	
Enter Graph Title:		PNG GDP SINCE 2000	
Enter x-label:		Year	
Enter y-label:		GDP in Billions of USD	
Enter Axis Labels Color:		purple	
Enter Column Name 1 (C1):		Year	
Enter Column Name 2 (C2):		GDP (Billion USD)	
Show Points ('plot'):		yes	
<input type="button" value="plot(C1)"/> <input type="button" value="vbar(C1)"/> <input type="button" value="hbar(C1)"/> <input type="button" value="histogram(C1)"/> <input type="button" value="scatter(C1)"/> <input type="button" value="pie(C1)"/> <input type="button" value="plot(C1-C2)"/> <input type="button" value="scatter(C1-C2)"/>			

Figure 13. Filling in the rest of the inputs. Note: careful naming of the columns C1 and C2.

This generates a plot as shown in Figure 14.

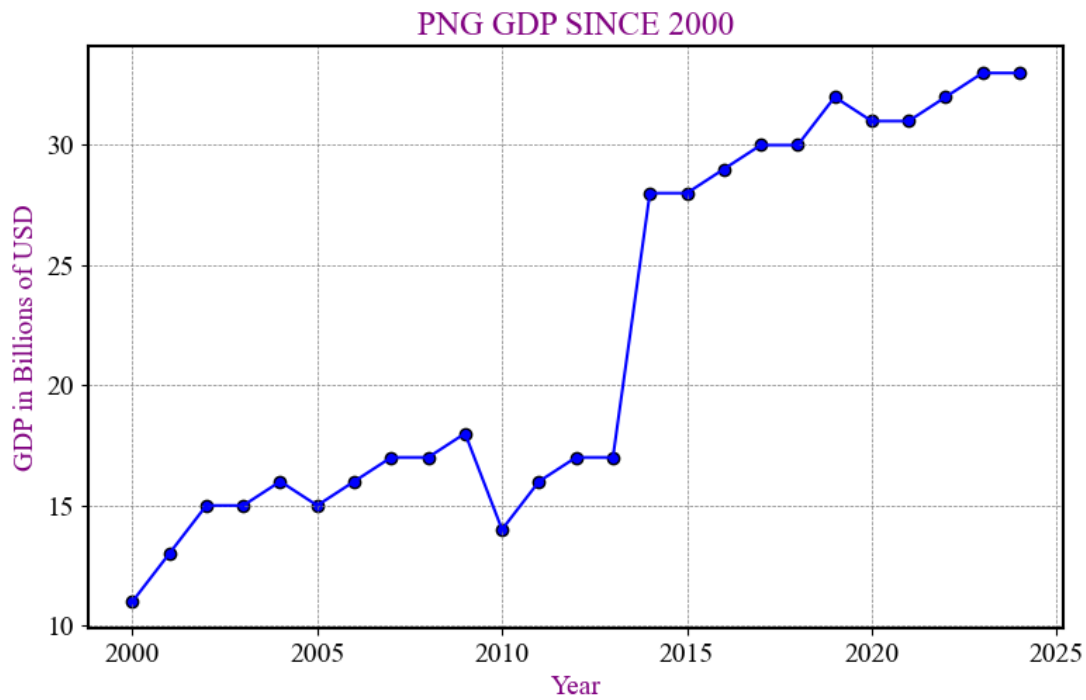


Figure 14. Plot generated from the imported data and the inputs in Figure 13. Note: this data is just made up and does not reflect the actual PNG's GDP over the plotted period.

### 3.4. Plot Geographical Point Data

The data entry canvas for the “Plot Geographical Point Data” tab looks like Figure 15.

Figure 15. Data entry canvas for the “Plot Chart” tab.

#### Example 5: Plotting Geographical Point Data

- Here we have referred to the tab as “Geographical Point Data”, which infers plotting some point data on a geographical coordinates or grid. However, you are not limited to plotting only geographical. You can customize the plots to any data in spreadsheet with three columns.
- For this example, let's use the same data in our excel file in Figure 9, also shown in Figure 16.
- Assume column 'X' and 'Y' are coordinates (say Easting and Northing) of fuel stations in a town and the “values” column has weekly income in PGK of the fuel stations. Let's plot this information.

Step 1. Import the data using the Import Data function in the menu.

Step 2. Fill in the rest of the information as shown in Figure 17.

Step 3. Click the 'Generate Plot (C1-C2)' button.



	A	B	C	D	E	F	G	H
1	X		Y	values		Year	GDP (Billion USD)	
2		1200	12501	22000		2000		11
3		1350	13001	22500		2001		13
4		1500	13501	23000		2002		15
5		1234	18765	23500		2003		15
6		1800	14501	24000		2004		16
7		2543	16543	24500		2005		15
8		2100	15501	25000		2006		16

Figure 16. Part of the data as shown in Figure 9. Here, X and Y are coordinates of fuel stations of a town and “values” column has the weekly income (PGK) of the fuel stations.

Plot Equations | Plot Charts | Plot from Data | **Plot Geographical Point Data**

Show Grid Lines:

Enter Graph Title:

Enter x-y labels (comma separated: x, y):

Enter Axis Labels Color:

Enter Column Names (comma separated: C1,C2):

Enter Column Having Data:

Enter Legend Label:

Figure 17. Filling in the inputs. Note: careful naming of the columns x-y labels as well as C1 and C1 are now entered side-by-side separated with a comma.

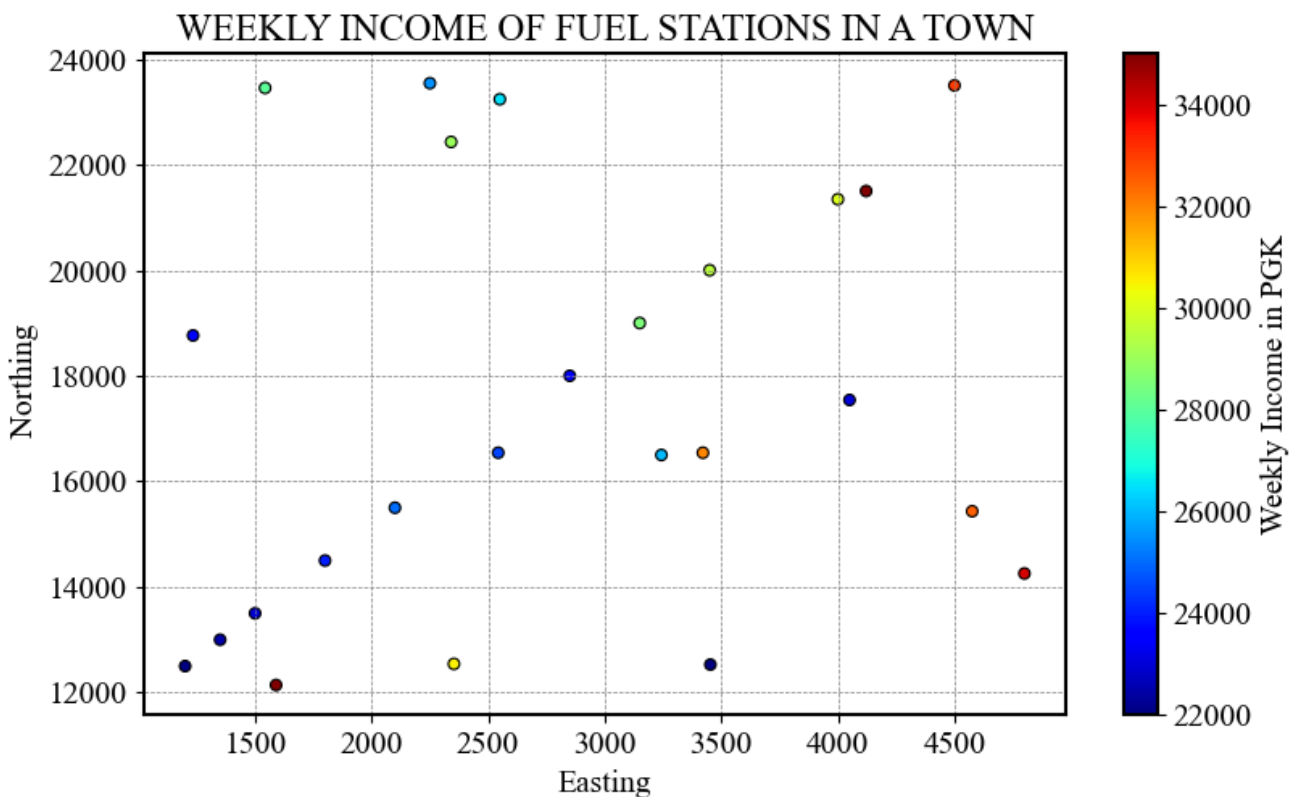


Figure 18. Plot generated from the inputs in Figure 17 and data from the excel file. The plot assumes weekly income of fuel stations in a town plotted over a easting-northing projected coordinate system.




# 4. Appendix

## 4.1. Color Codes for Customizing Plot Colors









### Base Colors

 b	 c	 k
 g	 m	 w
 r	 y	

### Tableau Palette

 tab:blue	 tab:brown
 tab:orange	 tab:pink
 tab:green	 tab:gray
 tab:red	 tab:olive
 tab:purple	 tab:cyan

### CSS Colors

 black	 bisque	 forestgreen	 slategrey
 dimgray	 darkorange	 limegreen	 lightsteelblue
 dimgrey	 burlywood	 darkgreen	 cornflowerblue
 gray	 antiquewhite	 green	 royalblue
 grey	 tan	 lime	 ghostwhite
 darkgray	 navajowhite	 seagreen	 lavender
 darkgrey	 blanchedalmond	 mediumseagreen	 midnightblue
 silver	 papayawhip	 springgreen	 navy
 lightgray	 moccasin	 mediumspringgreen	 darkblue
 lightgrey	 orange	 mediumaquamarine	 mediumblue
 gainsboro	 wheat	 aquamarine	 blue
 whitesmoke	 oldlace	 turquoise	 slateblue
 white	 floralwhite	 lightseagreen	 darkslateblue
 snow	 darkgoldenrod	 mediumturquoise	 mediumslateblue
 rosybrown	 goldenrod	 azure	 mediumpurple
 lightcoral	 cornsilk	 lightcyan	 rebeccapurple
 indianred	 gold	 paleturquoise	 blueviolet
 brown	 lemonchiffon	 darkslategray	 indigo
 firebrick	 khaki	 darkslategrey	 darkorchid
 maroon	 palegoldenrod	 teal	 darkviolet
 darkred	 darkkhaki	 darkcyan	 mediumorchid
 red	 ivory	 aqua	 thistle
 mistyrose	 beige	 cyan	 plum
 salmon	 lightyellow	 darkturquoise	 violet
 tomato	 lightgoldenrodyellow	 cadetblue	 purple
 darksalmon	 olive	 powderblue	 darkmagenta
 coral	 yellow	 lightblue	 fuchsia
 orangered	 olivedrab	 deepskyblue	 magenta
 lightsalmon	 yellowgreen	 skyblue	 orchid
 sienna	 darkolivegreen	 lightskyblue	 mediumvioletred
 seashell	 greenyellow	 steelblue	 deeppink
 chocolate	 chartreuse	 aliceblue	 hotpink
 saddlebrown	 lawngreen	 dodgerblue	 lavenderblush
 sandybrown	 honeydew	 lightslategray	 palevioletred
 peachpuff	 darkseagreen	 lightslategrey	 crimson
 peru	 palegreen	 slategrey	 pink
 linen	 lightgreen		 lightpink

## 4.2. Other Sample Plots

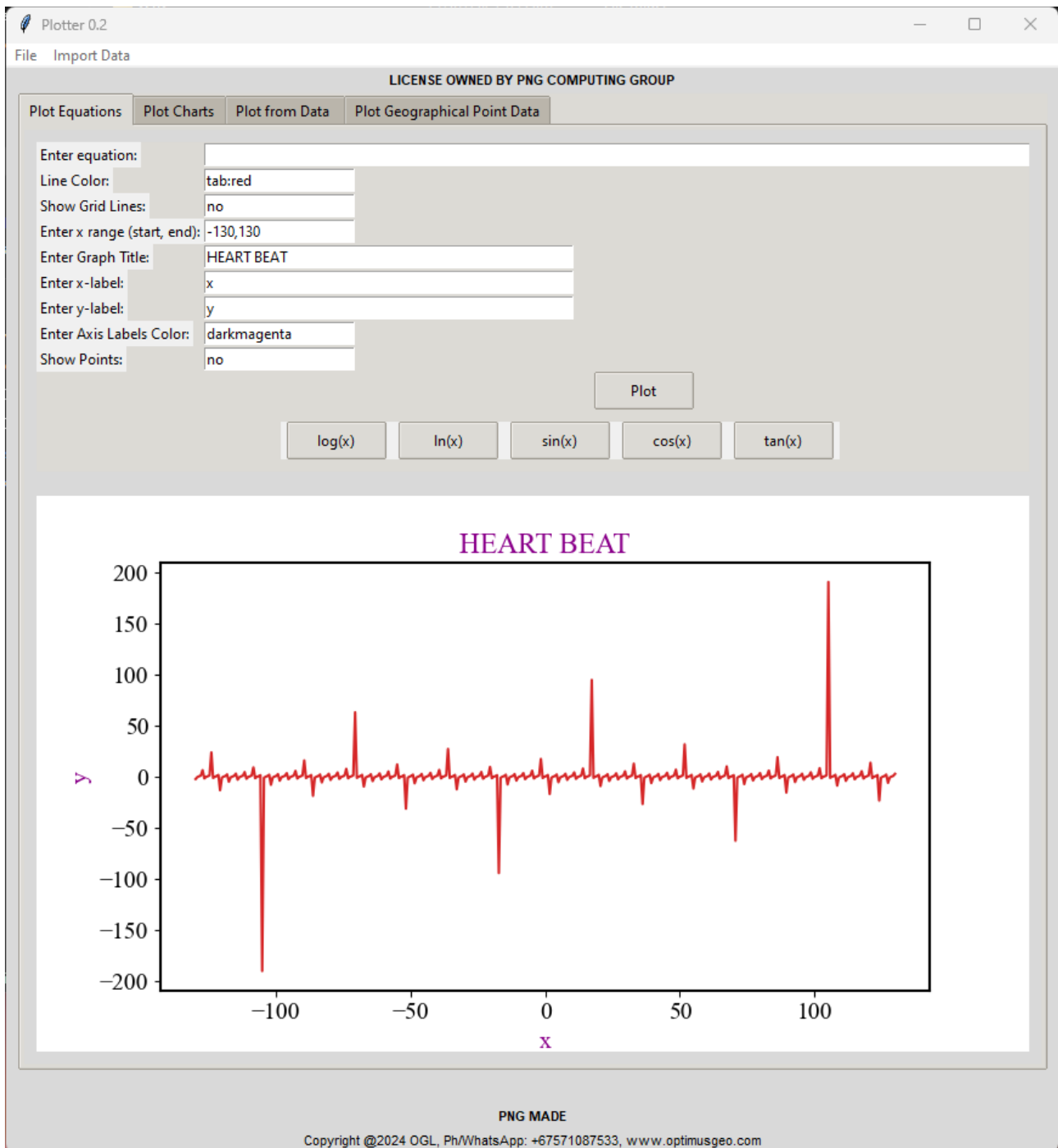


Figure 19. Sample plot using the  $\tan(x)$  button.

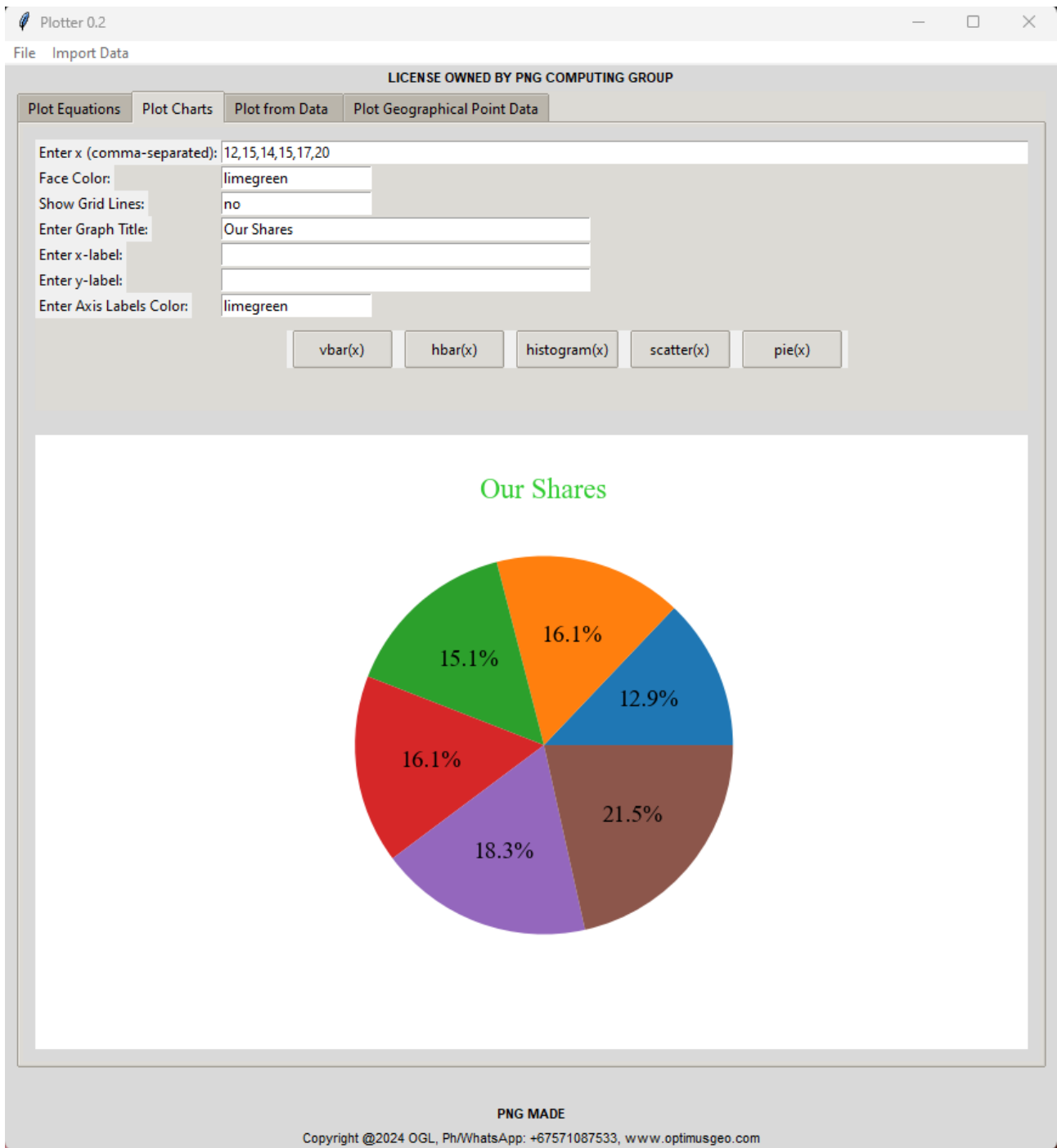


Figure 20. Sample plot using the pie(x) button.



Figure 21. Sample plot using the histogram(C1) button.

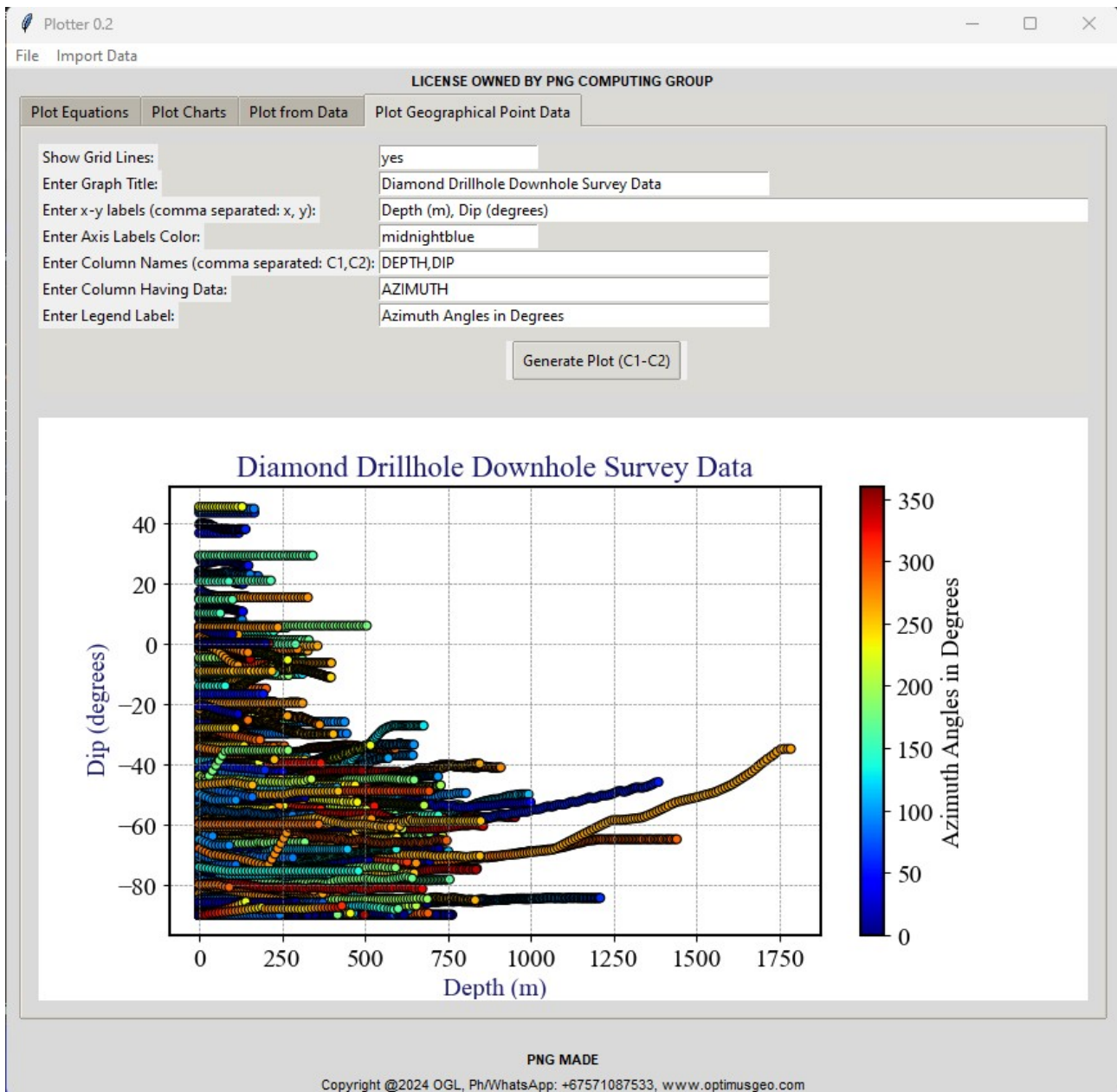


Figure 22. Sample plot of some drill-hole survey data in spreadsheet.

## 5. Closing

The trial version has up to 10 days before expiry. You can share the trial version with your friends and colleagues. For full licence or for further customization of this app to suit specific requirements in your work, kindly contact 71087533 or email [optimuservices@gmail.com](mailto:optimuservices@gmail.com). **Plotter** software is a product of Optimus Geotechnics Limited, a fully PNG owned start-up that provides a range of technical services including advanced data analytics and custom software development (web, desktop) with artificial intelligence (AI) capabilities.

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