GRAPHING CALCULATOR

A Python project by :

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AIM:

A python project that extensively uses buttons and modules to innovatively obtain a graph plotted for a given function which is inputted by the usage of the buttons. It also works like a normal calculator if and whenever required and therefore it has dual applications.

FUNCTIONALITY:

It first creates a dialog box consisting of button, variables and functions including a message box where, if a button is pressed, the equation is shown. There is a separate button called graph which plots the equation if the given equation contains atleast one variable. If no variable is supplied, it can only act as a normal calculator and therefore, the graph button has no usage there.

The normal calculator has lots of functions such as the basic operations, trigonometric values, exponents and logarithms. It follows the rule of BODMAS and also can be used for calculations involving large numbers.

The graph is formed in a new window with a scale that can be changed accordingly. The graph keeps changing as and when the scale is changed. Hence the graph can also show for really small scale, which means, as the width and length are constant, it can plot the graph for high values of the dependent variable.

METHODOLOGY:

Basic GUI for python has been used namely modules such as Tkinter, pygame, math and sys. The equation which is initially stored as a list is later converted to a string and then evaluated. The path now divides into two. If a variable has been used then it doesn't act like a normal calculator but as a graphic one.

Some predefined functions used:

Tkinter:

- Tkinter.Button() function is used to create various buttons which are aligned using grid function.
- Tkinter.Entry() function is used to create a text box where eqn appears whenever a button is pressed. This is also aligned in the Tkinter Calculator window using grid function.
- Whenever a button is pressed , the corresponding function gets called.

Pygame:

- Pygame.display.setmode() function is used to create a pygame display window. It takes two arguments height and width which defines the size of the display window.
- Pygame.display.set_caption() is used to set the caption for the pygame window. It takes a string as argument and sets it as the caption.
- Pygame.draw.line() is used to draw lines from one point to another(used while drawing graph). It's various arguments includes the name of the

pygame window, color of the line to be drawn , the two points between which line is to be drawn and the thickness of the line.

- set_clip() to set the current clipping area.
- fill() function to fill the screen with a particular color which is passed as an argument.
- Pygame.display.update() to update the display area of the pygame window.

Math

- Various functions and values are imported and used from math module such as sin(),cos(), tanh(),pi etc.

Sys

- sys.exit() to exit from the window when corresponding command is passed.

Various other functions such as append(),join(),insert() etc as and when required.

Some user defined functions:

- Append() – It takes the value corresponding to pressed button as argument and appends it to the end of equation.
- Eval()- It evaluates the value of expression when “=” is pressed and no variable is present in the equation.
- Graph()- This function is used to create graph when graph button is pressed and atleast one variable is present in equataion.

- Graphpaper() – This function is used to draw the various grid lines of graph and call the grapheqn() function.
- Grapheqn()- This function is used to draw the graph. it takes various values of x , evaluates the corresponding y as per eqn and then draw line between those two types.

DRAWBACKS :

- The scaled graph is not numbered.
- Decimal division is not implemented. i.e. 2/3 will print 0 and not 0.66
- Few important functions aren’t implemented

SOURCES :

- Stackoverflow
- Tutorials point(for learning tkinter)
- Pythonprogramming.net(for learning pygame)