Working on Existing Software Systems

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In this project we have modified the existing popular project 'tkinter' GUI development tool of python. At first we have tried to fix some bugs and then implemented a new feature in tkinter which was previously not in tkinter. The new feature is graphplotter in tkinter.

Additional Key Words and Phrases: System Architecture, GUI, Version Control, Project Documentation

1 INTRODUCTION

Tkinter is a popular GUI development library which is built in python. In this assignment we have fixed some bugs in tkitner. The first bug was gif files either does not open correctly or it shows static, the gif does not moves and the second bug was the word counter in text widget was not working correctly and the third bug was two fonts of the same name could not be created. We've tried to slove them and got successful in two of them but to solve the third one was too hard to solve. And we felt that we should some more work,then we have decided a new feature which was not the part of the proposal.

2 THE EXISTING SOFTWARE PROJECT, WHAT IT DOES, AND ITS ARCHITECTURE AND MAJOR COMPONENTS

We wish to work on the existing project 'tkinter'. git repository. This is used to build GUI's and this is written python. Let's discuss the architecture of tkinter:

'tkinter' is bulit using the Tcl, Tk, Ttk modules. (as found form the official docs)

Tcl: This is a programming language like python. "Unlike Python, Tcl's execution model is designed around cooperative multitasking, and Tkinter bridges this difference"

Tk: "Tk is a Tcl package implemented in C that adds custom commands to create and manipulate GUI widgets. Each Tk object embeds its own Tcl interpreter instance with Tk loaded into it. Tk's widgets are very customizable, though at the cost of a dated appearance. Tk uses Tcl's event queue to generate and process GUI events.

Ttk: "Themed Tk (Ttk) is a newer family of Tk widgets that provide a much better appearance on different platforms than many of the classic Tk widgets. Ttk is distributed as part of Tk, starting with Tk version 8.5. Python bindings are provided in a separate module, tkinter.ttk."

The more about these modules is here.

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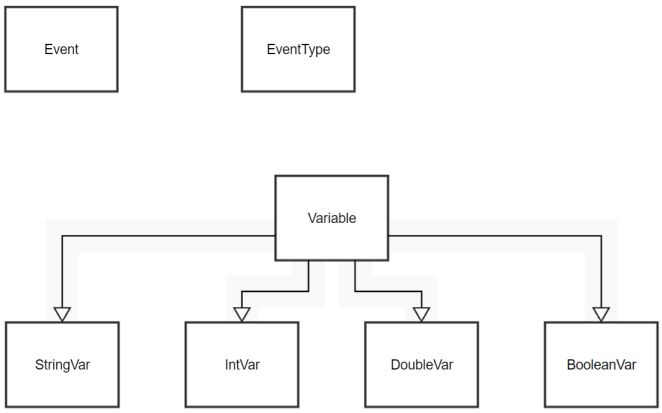

Fig. 1. System Architecture

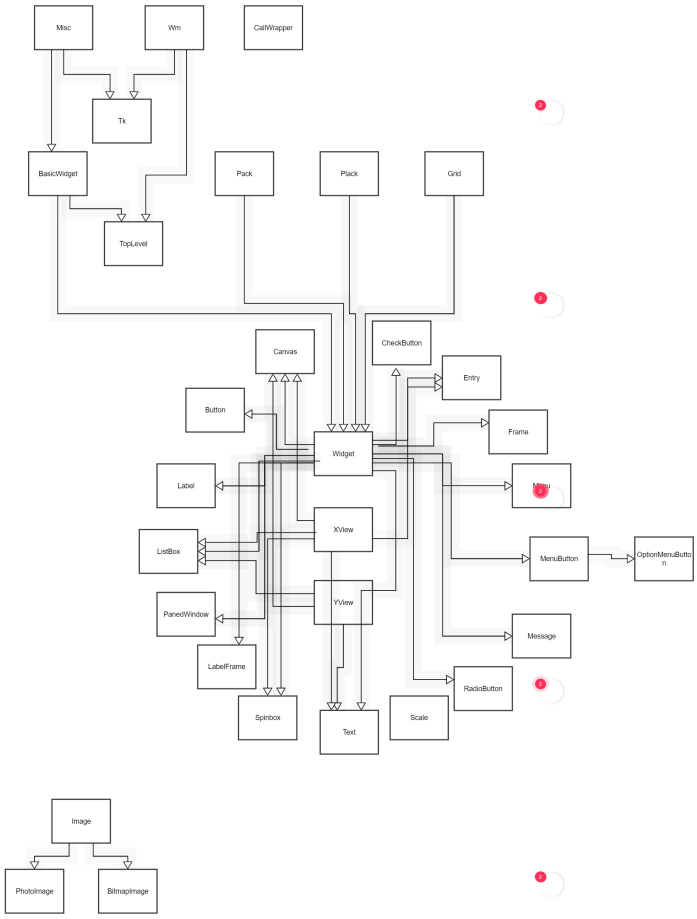

Fig. 2. System Architecture

3 ARCHITECTURE AND DATA FLOW

3.1 Fixing the BadGif

To Fix the BadGif Loading a new gif class is created. When we pass the address (absolute address) of the gif image file, the class extracts each frame of the gif and also it calculates the duration of each frame. Then the class iterates through the frames and keeps on updating the frames after the duration of each frame.

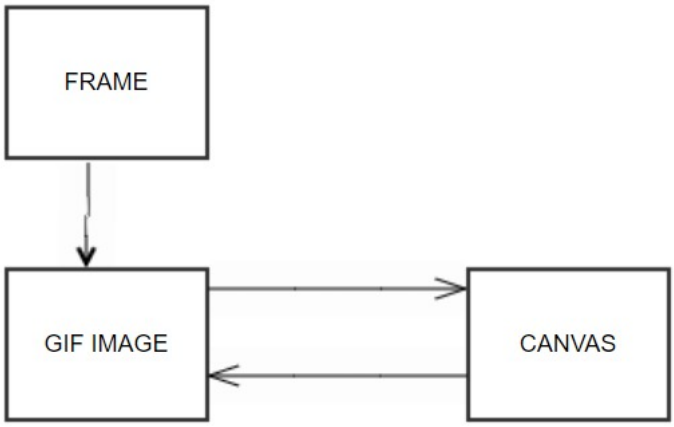

Fig. 3. System Architecture

3.2 Implementing the new feature: Graphplotter

The new feature is implemented in the tkinter. It is the graphplotter of tkinter. It can plot any 2d function on the screen. It can also plot the scatter plot. Let's see its architecture.

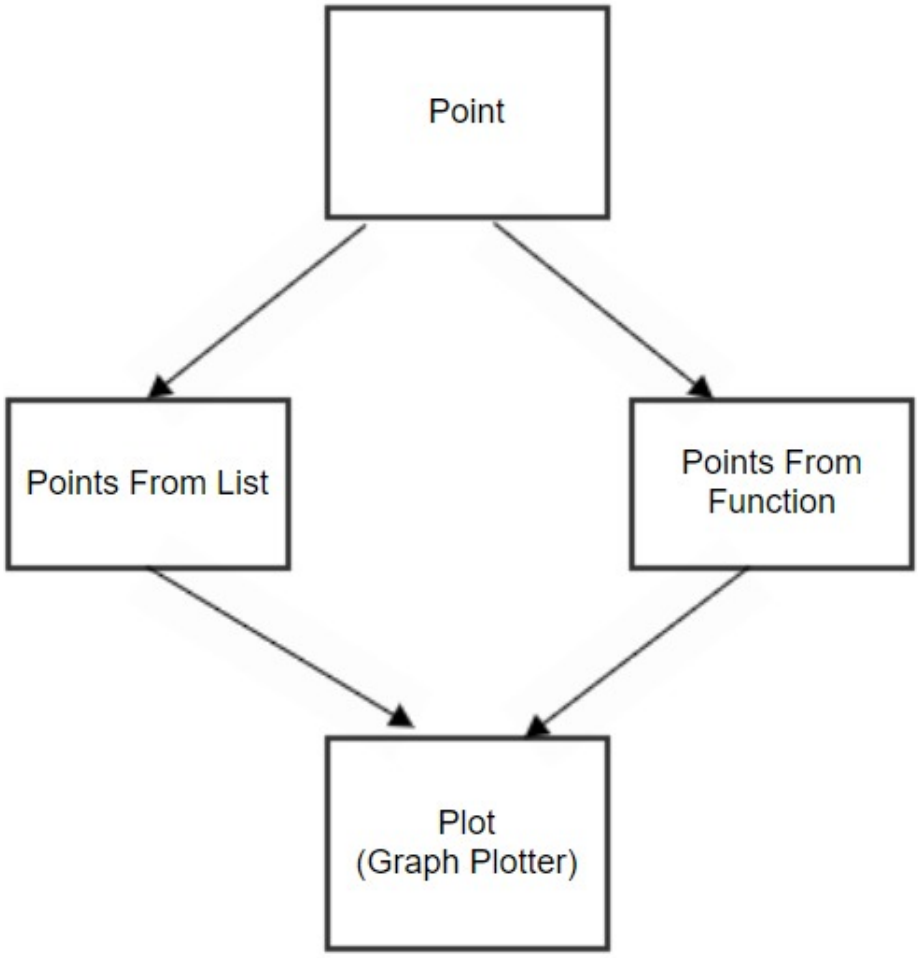

Fig. 4. Data flow

4 DETAILS OF NEW FEATURE AND FIXING THE OLD BUG

4.1 Fixing the old bug

The gif file is being read differently when we specify 'format', it renderns only the changes from the previous frame. It does so to decreae the size of the file. But tkinter shows only the changes when called with the format option and the 'format' option is intended to use in that way. So it is not a bug, it is the expected way it is shown. But to really render the image, and specially to make some changes such that the gif becomes animated we have created another class **GifImage** which is inherited from the **Frame** class. So our **GifImage** class has all the properties that of a **Frame** class. It creates a new thread and keeps on iterating the frames there.

5 THIRD OPTION IN THE PROPOSAL

The overall architecture is So, the python tkinter calls the tk to do all the stuffs. Tkinter works as a wrapper to the tk

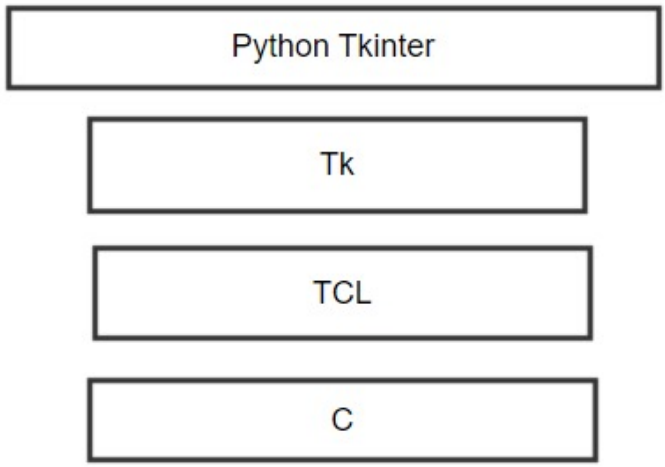

Fig. 5. Showing all available articles

and which uses tcl interpreter which in turn is written in C. We have tried to figure out the architecture and workflow of tcl but we did not found any such docs which tell about the architecture. What we have seen that to create font, it specifically call 'self.tk.call'. which is present in an $'_tkinter'$ file which is a binary file. This binary file gets produced only after compiling the tcl and tk source code. When we have inspected the source code of tcl and tk the we found the target code can be specified in 'generic' directory of the source code. At this point we went lost. In-spite of spending ample amount of time we didn't even figure out what is the entry point of the code. That's why we have decided to omit the third proposed change.

6 SCREENSHOTS OF GUI

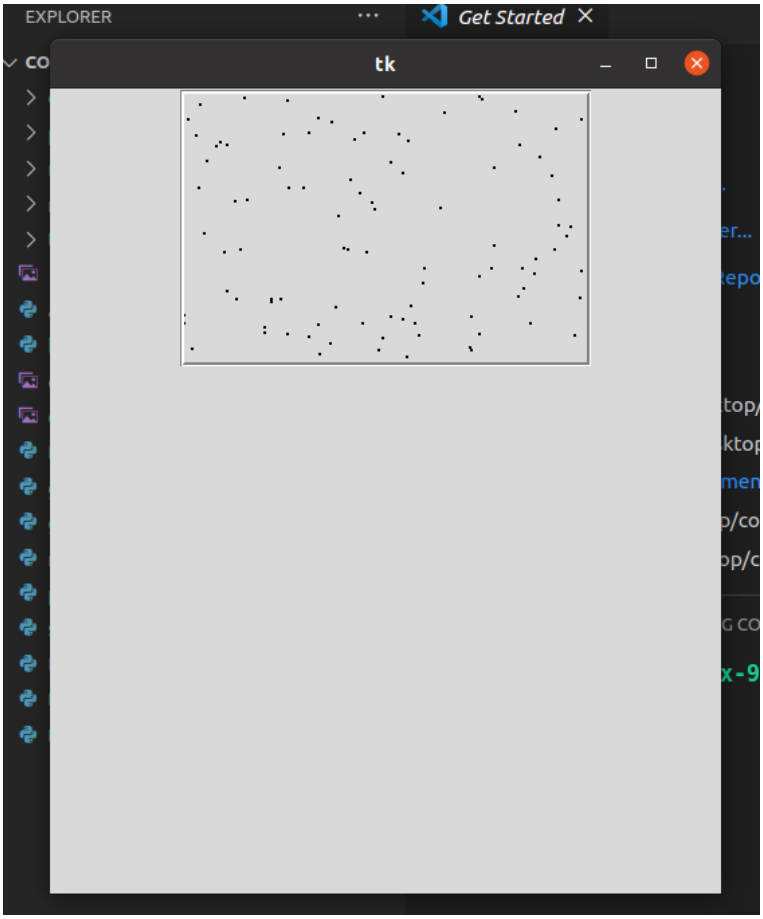

Fig. 6. Scatter Plot

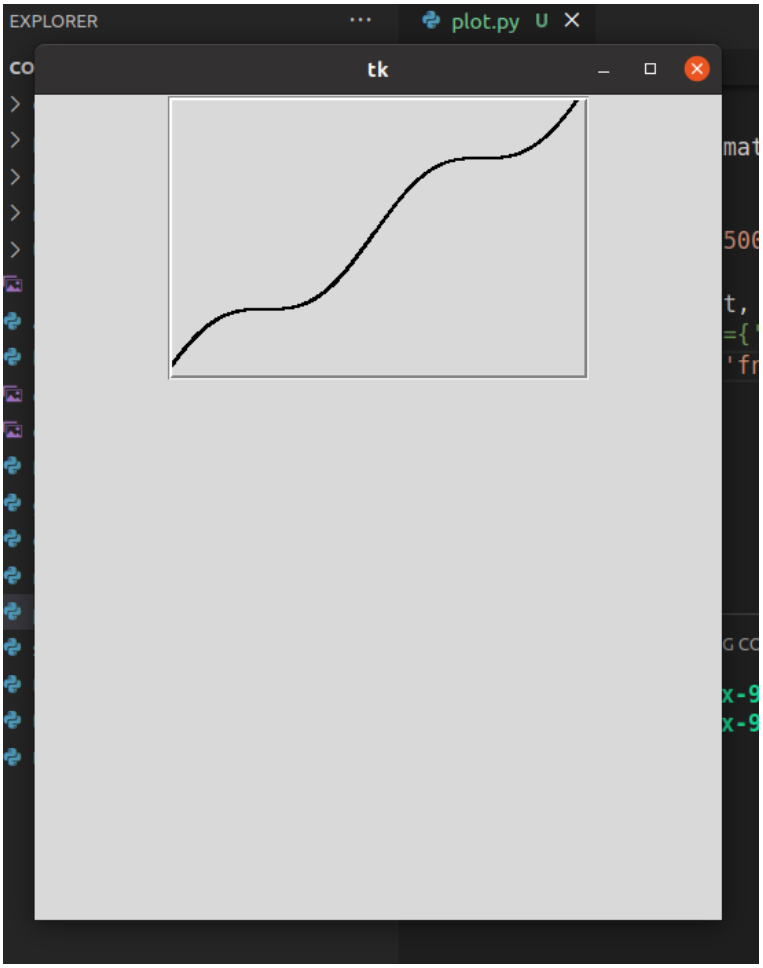

Fig. 7. Graph of x + math.sin(x)

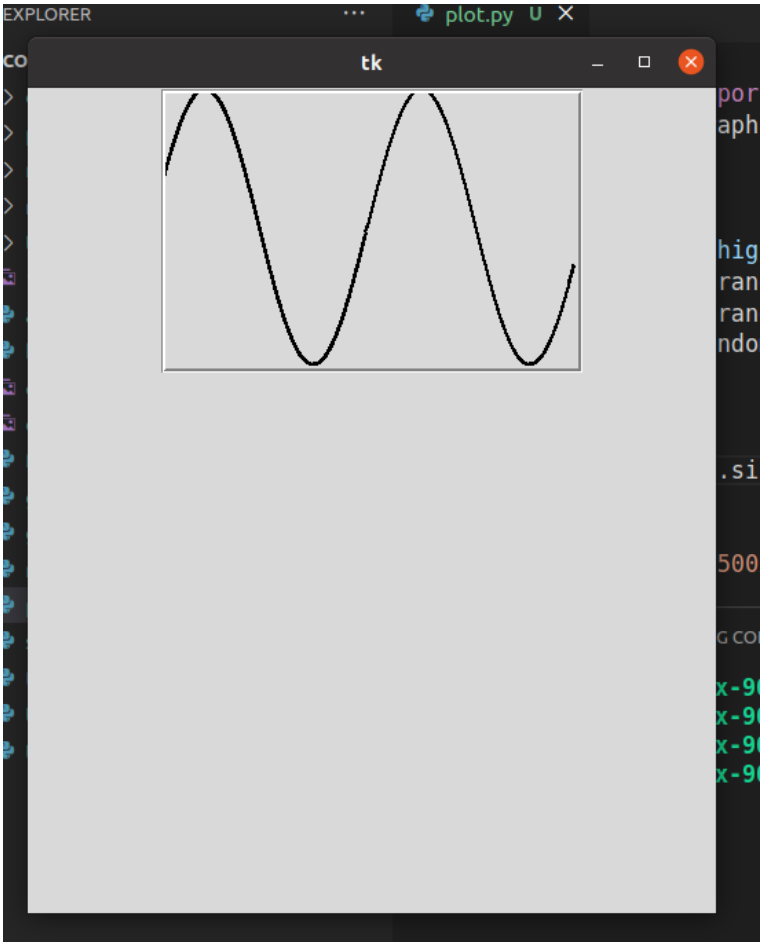

Fig. 8. Graph of sin(x)

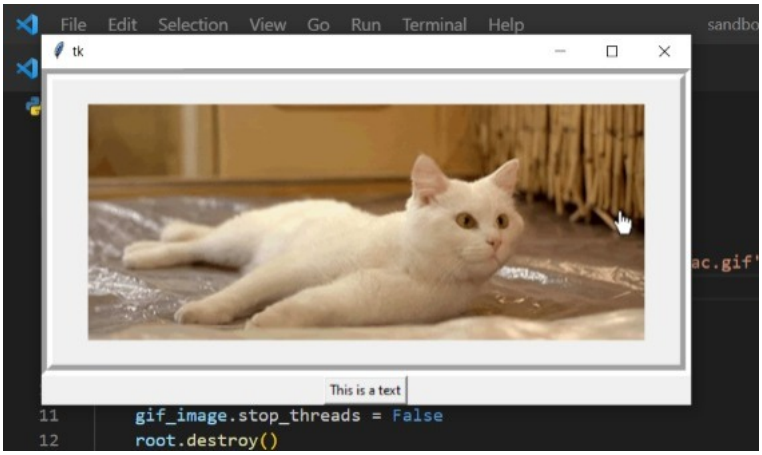

Fig. 9. Animated Gif

7 REQUIREMENTS SATISFIED

- Version Control Using github.com. The link to git repository: https://github.com/rittwickBhabak/COP701-Assignment-3
- Project documentation using Sphinx Library
- Unit Testing
- Redistributable Package

8 FURTHER SCOPE

- If we can find developer guide of tcl or some resource using which we can modify the tcl code itself then it will be more soid work.
- The therad on which Gif is animated, the therad is bening infinite. We have tried to stop the thread when the gif object is destroyed but the thread is never ending. This issue can be solved in future.

9 CONTRIBUTION BY DIFFERENT GROUP MEMBERS

- `Rittwick Bhabak`: Made the architecture of the new feature and does the reading and searching stuffs to solve the proposal and implemented Polt, PointsFromFunction, and resolved the BadGif image load bug.
- `Manik Jain`: Contributed in searching ways to fix bugs, implemented Point, PointFromList class, corrected the text count bug.

ACKNOWLEDGMENTS

We would like to express our special thanks of gratitude to my teacher Rahul Narain sir as well as our TA and we learnt so many new things. We are really thankful to them.