

DESIGN OF ANALOG DATA ACQUISITION SYSTEM

DESIGN DOCUMENT OF USER INTERFACE

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SOFTWARE DESIGN DOCUMENTATION

LIBRARIES USED:

1. Tkinter

Tkinter is the most commonly used method for developing GUI. Python with Tkinter is the fastest and easiest way to create GUI applications.

Tkinter widgets used for developing GUI:

- Label
- Entry
- Canvas
- Option menu
- Frame
- Button

To create a tkinter app:

- Importing the module – tkinter
- Create the main window (container)
- Add any number of widgets to the main window

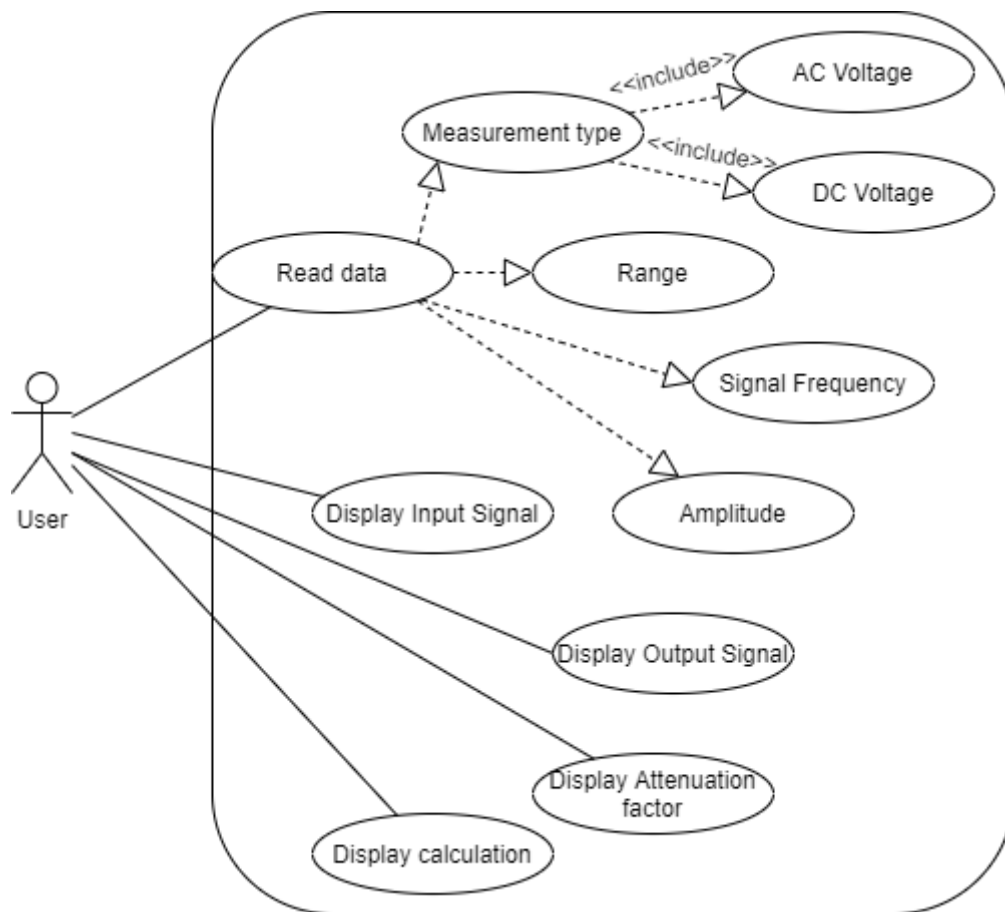
2. Matplotlib

- **Matplotlib** is a plotting library for the Python programming language and its numerical mathematics extension NumPy.
- It is mainly used for plotting graph.

3. Animation

- Animations make even more sense when depicting time series data
- Matplotlib's animation base class deals with the animation part.
- It provides a framework around which the animation functionality is built.
- FuncAnimation is the main object that makes an animation by repeatedly calling a function func.

USE CASE DIAGRAM:

*Figure 1 Use case Diagram*

The above use cases diagram describes that the user has to input required data.

- Type of measurement: The user will have a choice of selecting among two types of waveforms such as AC voltage and DC voltage.
- Range: The user must select the range in terms of volts.
 - a. If the measurement type is AC, then the range is 110, 230, 440 and 500
 - b. If the measurement type is DC, then the range is 10, 24 and 48
- Signal Frequency: The user can enter the signal frequency.
- Amplitude: The user can enter the amplitude in the terms of volts.

FLOW CHART OF CONFIGURATOR UI

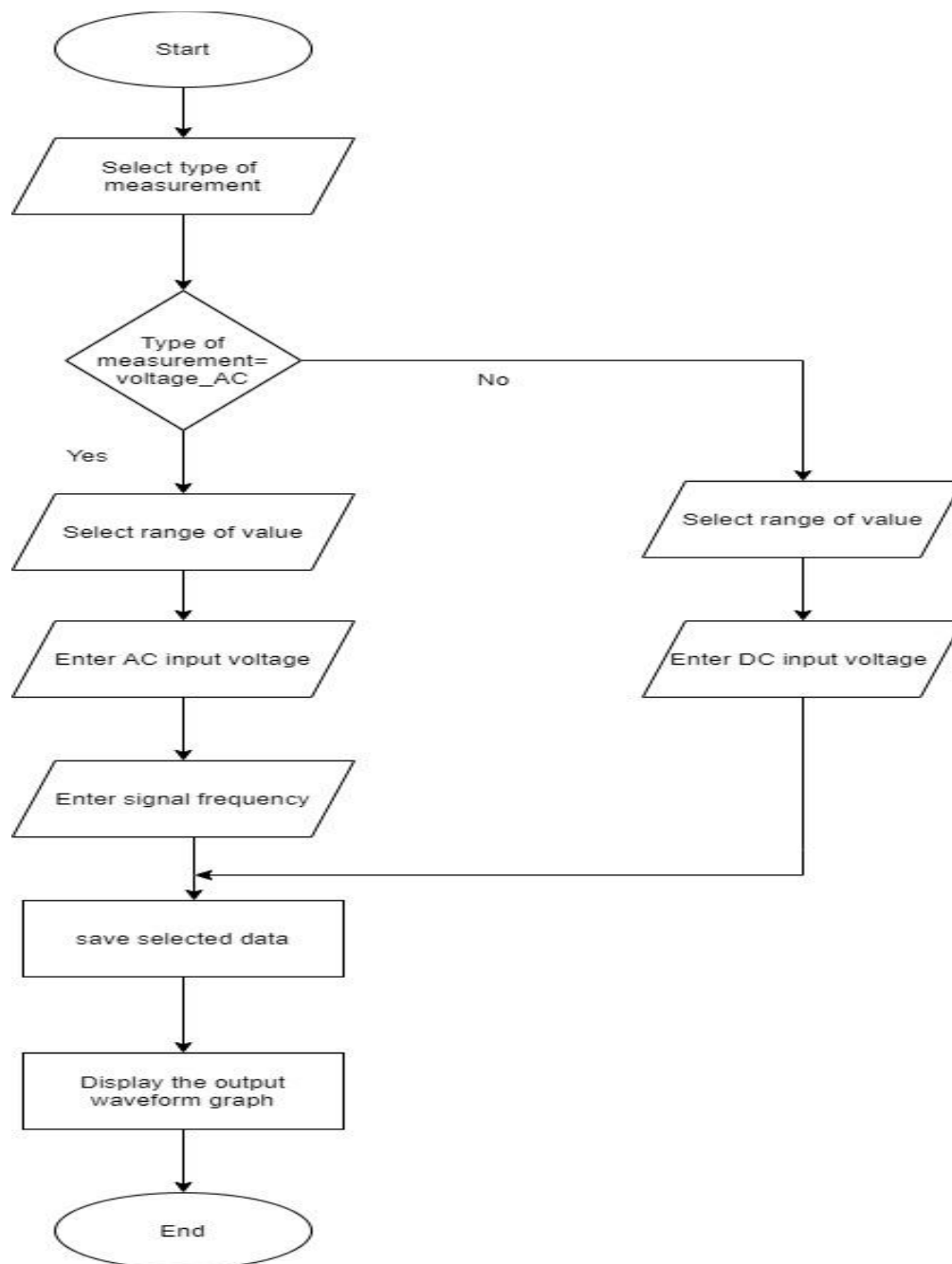
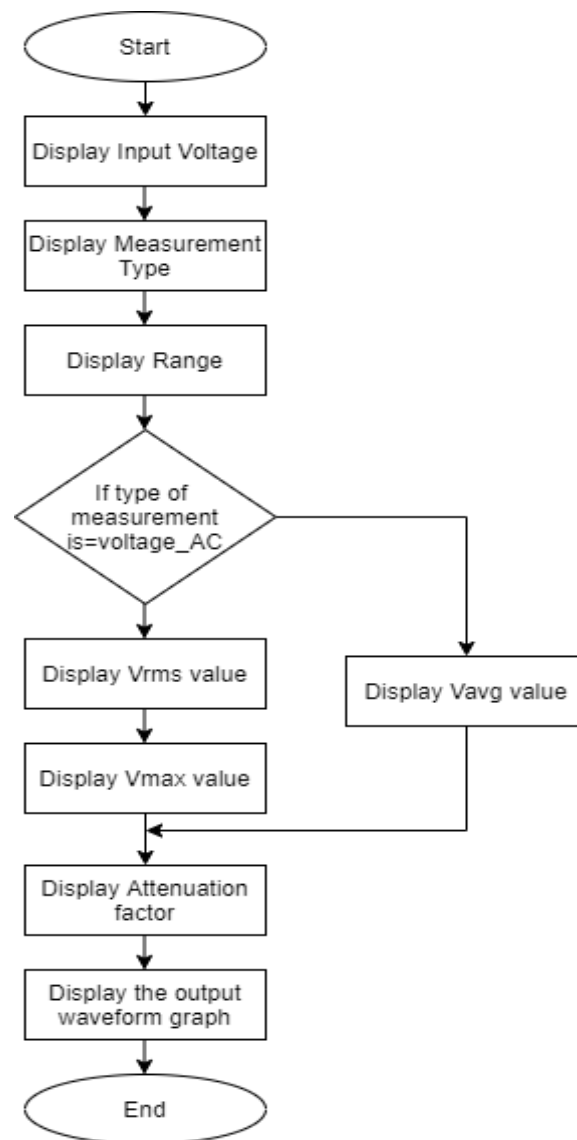


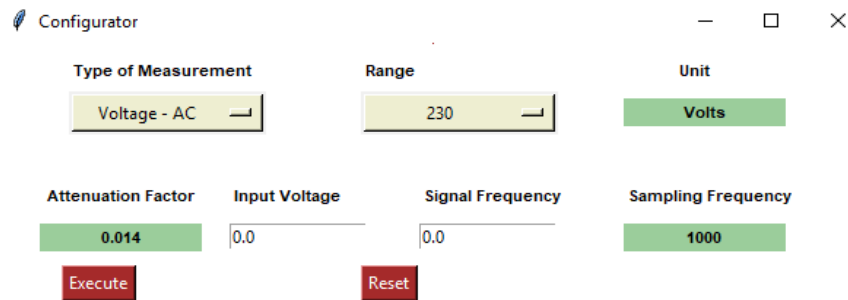
Figure 2 Flow chart of Configurator

FLOW CHART OF DISPLAY UI

*Figure 3 Flowchart of Display*

GUI FOR CONFIGURATOR

Screenshots:

*Figure 4 GUI for Configurator*

- The above is GUI for Configurator, which has
 1. Option menu for selecting type of measurement and range.
 2. Label for displaying the unit, attenuation factor and sampling frequency.
 3. Entry for taking input of voltage and signal frequency from user.
 4. Button for read data and plot the input signal.
- The input from the user will read from the Configurator GUI.
- That data will have sent to source.

INPUT SIGNAL

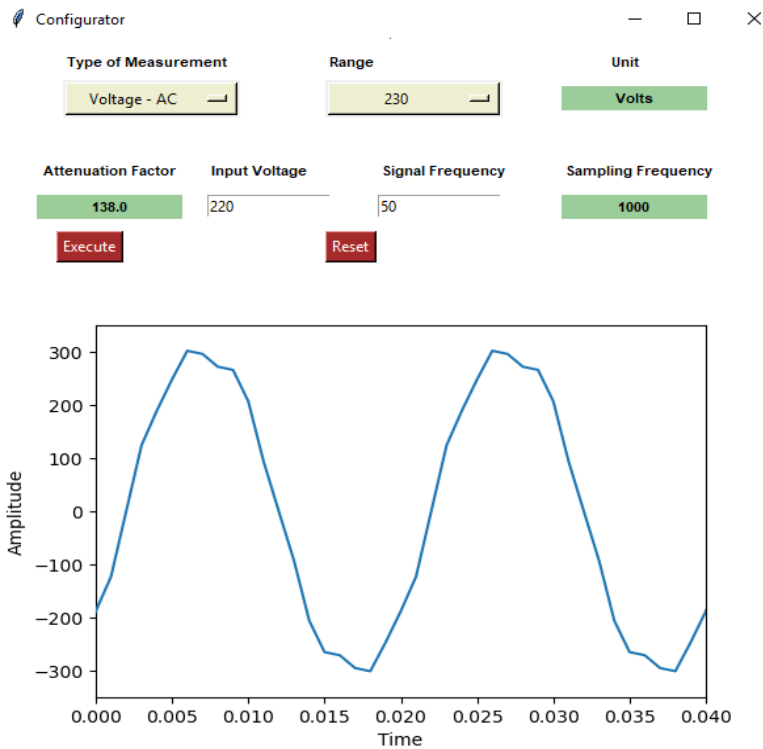


Figure 5 GUI for Input Signal

- The above GUI shows that the data from the user will take and the plot the input graph.

GUI FOR DISPLAY

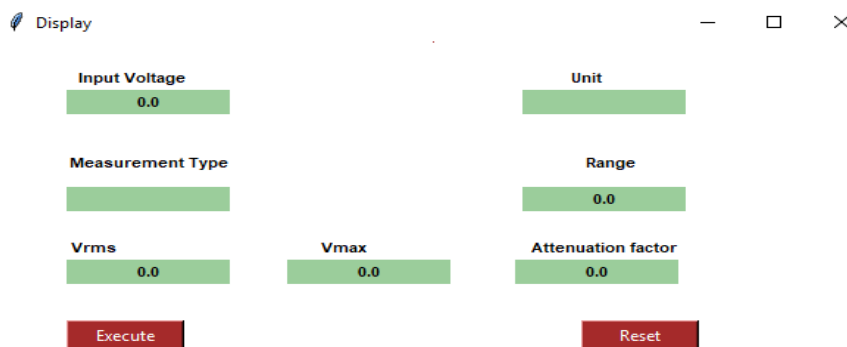


Figure 6 GUI for Display

The above is GUI for Display, which has

- Label for displaying the input voltage, unit, measurement type, range and attenuation factor.
- If the measurement type is AC, the Vrms and Vmax value will be displayed in the GUI.
- If the measurement type is DC, only the Vavg value will be displayed in the GUI.
- Button to plot the output signal

OUTPUT SIGNAL

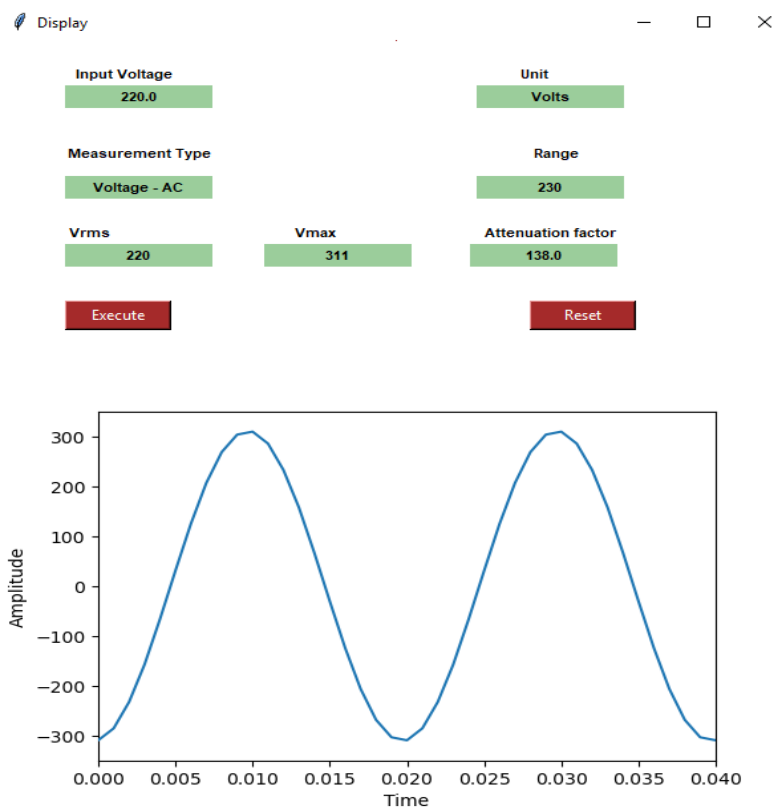


Figure 7 GUI for Output Signal

SOFTWARE REQUIREMENT

Anaconda



Anaconda is an open-source distribution of the Python and R programming languages for scientific computing, that aims to simplify package management and deployment. The distribution includes data-science packages suitable for Windows, Linux, and macOS.

Visual Studio Code



Visual Studio Code

Visual Studio Code is a free source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.