Task Document - Python GUI Task

Task 2: Generate and Plot Waveforms

Objective:
Extend the existing PyQt5 application to support the dynamic generation and real-time plotting of various waveforms, including ***sine, cosine, and triangular waves***. Introduce user controls such as a dropdown menu for waveform selection, sliders for adjusting frequency and amplitude, and implement real-time plotting to visualize the selected waveform dynamically.

Requirements:
User Controls for Waveform Selection:

- Integrate a dropdown menu in the GUI to allow users to choose the waveform type (sine, cosine, triangular).
- Ensure the dropdown menu is easy to use and visually appealing.

Dynamic Adjustment of Frequency and Amplitude:

- Implement sliders or input fields for users to dynamically adjust the frequency and amplitude of the selected waveform.
- Provide a suitable range for adjustments that suits the characteristics of the waveforms.

Real-time Plotting:

- Enhance the plotting mechanism to accommodate real-time updates based on user input.
- When users change the waveform type, frequency, or amplitude, the plot should dynamically reflect these changes.

Clean and Intuitive User Interface:

- Maintain a clean and organised user interface.
- Ensure labels and controls are appropriately named and positioned for clarity.
- Use tooltips or additional information to guide users on how to interact with the controls.

Submission Guidelines:

- Provide a well-documented Python script with the implemented features.
- Include comments explaining the code logic and design choices.
- Attach a sample screenshot or GIF demonstrating the real-time plotting with dynamic adjustments.
- Create a one public git repository and upload your scripts and documents then share your repo link via mail.

This task evaluates your ability to design a user-friendly GUI application, handle file operations, and dynamically visualise data using pyqtgraph. It also assesses your error-handling skills and attention to providing informative feedback to the user. Good luck!