Qt GUI Applications in C++

Class outline

Preface

Several software group staff members have inherited Qt GUI applications upon the retirement of Marie Keesee. These applications require Qt, C++, and multi-threaded expertise to finish and/or maintain. An in-house class will be provided to help software developers get up to speed on these topics. The class will be given in the building 87 conference room once per week for 1.5 hours per session. The virtual Teams feature will be utilized for remote attendees. The individual class sessions will be on Wednesdays from 9:00 to 10:30, starting June 26. The class instructor will be Chris Slominski.

There will be weekly homework Qt programming assignments. Attendees are highly encouraged to do the assignments as they will reinforce concepts covered by the class.

Curriculum

The following topics will be presented over the duration of the class. The context, however will be very flexible and attendees are encouraged to contact the instructor providing detailed topics of interest. If you have inherited an application, browse the code and ask about anything that instigates discomfort. Please do this as soon as possible.

- General Qt GUI concepts.
  - Widgets and their life cycle.
    - Top level widgets.
  - Layout management.
  - Event loop processing.
    - System events versus application events.
    - Event handlers and their hierarchy.
    - Multiple event loops.
  - Qt slots and signals.
    - Meta Object Compiler (moc)
  - Keyboard Focus
  - Standard window with menu and status bars (QMainWindow).
  - Dialog windows.
  - Specific widgets of interest?
  - Model / View paradigm.
- Threads
  - General thread concepts.
  - Thread implementations.
    - QThread, thrlib::Thread, std::thread.
  - Never stall the event loop.
- C++ Topics
  - This topic was adequately covered in my previous class; however, I think some instruction will be beneficial. Input from attendees will help.

- o Memory management and how to avoid the dreaded seg-fault.
- o Standard filesystem (since c++17).
- Incorporating JLab specific libraries and features
    - o EPICS Channel Access.
    - o CED
    - o Databases
    - o Running external applications

Sessions

Because of the desired flexibility and inability to judge the time needed to cover the various topics, I cannot at this time provide the number of classes and their content. I should be able to provided more as we progress. I am considering a general class format of 1 hour of Qt and 30 minutes of C++, Channel Access or other related topics.

Session #1 June 26

- Class Introduction
- The basic C++ Qt GUI
    - o Standard main.cpp
    - o Top-level widgets
    - o Child widgets
    - o Slots and Signals
        - ▪ Meta Object Compiler
- Pointers and object life cycle, if time permits.

Session #2 July 3

TBD