Project summary: I have a system with a Raspberry Pi with a UI screen communicating to 2 Arduinos. Each Arduino controls a single valve being either open or closed, and an analog input from a sensor.

The Arduino code is taken care of. The Arduino can receive a character over the serial port and open and close the valve. And at regular intervals (twice per second) the Arduino sends a string back to the Raspberry Pi in the format specified below.

I need some help getting the Python program laid out. I have a GUI laid out in Qt Creator, and a compiled version of it using pyqt5, and a base python program that demonstrates all the GUI elements are working correctly.

Main.py successfully compiles and run to give a demonstration of the GUI.

Serial_stuff.py is just my first attempt at figuring out the serial stuff.

So I need some help getting the serial port set up and the multi threading necessary to monitor the serial lines.

Suggested toolset:

- Python 3
- PyQt5
- Qt Creator
- Raspberry Pi

Raspberry Pi to Arduino Communication:

- Send single character
  - 'C' (close valve)
  - 'O' (open valve)
  - 'X' (identify Arduino connection)

Arduino to Raspberry Pi Communication

- Sends single string of characters in specified format at regular intervals: XSYZZZZ
  - X: single character identifier, either I for infuse or D for Drain
  - S: single character status, either 1 indicating all is good or 0 indicating an error
  - Y: single character valve state, either O for open or C for closed
  - ZZZZ: four digit number indicating analog input value
- Sends single character in response to receiving an 'X'
  - Replies with either 'I' for Infuse module or 'D' for drain module

RPi to Arduino Comm

Arduino to RPi Comm

Arduino to RPi Comm

RPi to Arduino Comm

Sensor

Valve

Sensor

Valve

Touch Screen