



SE3910 Lab 5: Building a QT Interface

Due: April 23, 2014 (Dr. Schilling's Section)

Due: April 21, 2014, 11PM (Dr. Yoder's Section)

1. Introduction

In last week's lab, we learned how to build a simple script which would capture an image from the camera. We used that image to build a simple camera. In this week's lab, we are going to build a simple embedded image viewer so that we can view the results of taking our pictures on an embedded screen.

This lab is an individual lab. Please write an individual lab report and see Section 5 (Building your basic application).

2. Lab Objectives

- Understand how to use QtCreator to create a simple GUI Application
- Use QtCreator to create an application which can run on both the desktop and on a remote embedded target.

3. Prelab

On the course website, there are two videos that you will want to watch. The first video deals with changing the mac address of your virtual machine to avoid broken pipes. It stars a lovable furry monster. The second video is a little bit harsher in its stars, but walks you through writing a simple application with QtCreator, compiling the application, plugging in the LCD display, and compiling the code on the Beaglebone.

4. Library Installation on your virtual machine

Unfortunately, your virtual machine did not have all of the development libraries installed on it. Thus, you will need to issue a simple command to install the QT libraries on your machine. This command is:

```
sudo apt-get install qtcreator
```

This will install the qt creator program on your virtual machine.

You will also need to run these commands (as root) on the BeagleBone

```
apt-get install qt4-demos
```

This will install many other packages, including:

```
apt-get install qt4-qmake # May auto-install with next command  
(and others necessary to make our programs compile).
```

Make sure you have enough disk space (about 253 MB) before running these commands. Run the command `df -h` to see current usage. There should be enough space in the "/" mount to install the files. In fact, there should be several GB of free space:



Filesystem	Size	Used	Avail	Use%	Mounted on
rootfs	15G	1.3G	13G	9%	/
udev	10M	0	10M	0%	/dev
tmpfs	100M	628K	99M	1%	/run
/dev/mmcblk0p2	15G	1.3G	13G	9%	/
tmpfs	249M	0	249M	0%	/dev/shm
tmpfs	249M	0	249M	0%	/sys/fs/cgroup
tmpfs	5.0M	4.0K	5.0M	1%	/run/lock
tmpfs	100M	0	100M	0%	/run/user
/dev/mmcblk0p1	96M	69M	27M	72%	/boot/uboot
/dev/mmcblk1p2	1.7G	1020M	590M	64%	/media/Angstrom

If there is not enough free space, you will need to run those disk-resizing commands from Lab1:

```
cd /opt/scripts/tools
git pull
./grow_partition.sh
reboot
```

5. Building your basic application

Once you have the QT Creator installed, you are to build a simple image viewer application. This image viewer material is available online as a tutorial for QT at <http://qt-project.org/doc/qt-4.8/widgets-imageviewer.html>. Each individual is to build the application on their virtual machine and execute the program. You can use any image as a test image. In building the application modify the title pane so that your name is included across the top of the main panel.

6. Executing the program on your Beaglebone Virtual Machine

Once you have the program working on your virtual machine, transfer the program down to the embedded host and issue a qmake and make command sequence. This will build the code on the embedded target. Execute the program on the embedded target with the LCD panel attached. (It is OK to attach the LCD display to the beaglebone white, despite the description on the board.) Using your camera code from last week, take a picture and load that picture onto the screen. With a cell phone or other device, take a picture of the setup showing your image showing on the screen and this program executing.

7. Deliverables / Submission

Each person will be responsible for submitting one report with the following contents:

1. Introduction -> What are you trying to accomplish with this lab? This section shall be written IN YOUR OWN WORDS. DO NOT copy directly from the assignment.
2. Things gone right / Things gone wrong -> This section shall discuss the things which went correctly with this experiment as well as the things which posed problems during this lab.
3. Example photos / screen captures
 - a. In your report, include a screen shot of the program loaded on your virtual machine showing your name on the title bar.
 - b. Include a screen shot showing the image viewer running on the embedded host opening a picture which was captured with last weeks program.
4. Conclusions -> What have you learned with this experience? What improvements can be made in this experience in the future?
5. Appendix -> Source code
 - a. For each program, include the source code you used. Code should be well commented and documented.



This material should be submitted as a single pdf file.

If you have any questions, consult your instructor.