P7

Latin Squares on the Raspberry Pi

At the end of this laboratory, you should have successfully built a Qt5 GUI program which allows you to enter a Sudoku problem, solve it, and display your solution.

You should already have your own text-based Sudoku solver. You will use this as the logical basis of your graphical program.

Preparation time : 0 hours

Lab time : 3 hours

Items provided

Tools : None

Components : None

Equipment : DVI-D capable monitor

Software : Win32 disk imager

Qt5 Raspbian SD images

Example Qt5 applications.

Items to bring

- Essentials. A full list is available on the Laboratory website at https://secure.ecs.soton.ac.uk/notes/ellabs/databook/essentials/
- Raspberry Pi boot image
- Raspberry Pi
- Raspberry Pi power supply
- Raspberry Pi SD card
- Raspberry Pi HDMI to DVI-D cable
- Raspberry Pi keyboard
- Raspberry Pi mouse

Academic Integrity – *If you undertake the work jointly with other students, it is important that you acknowledge this fact in your logbook. Similarly, you may want to use sources from the internet or books to help answer some of the questions. Again, record any sources in your logbook.*

Aims, Learning Outcomes and Outline

This laboratory exercise aims to:

- Develop confidence in the use of C++ graphics.
- Develop the ability to convert a a working algorithm into a GUI program.

Having successfully completed the lab, you will be able to:

- Develop Qt5 programs on the *Raspberry Pi*.
- Make effective use of the model-view-controller paradigm.

1 Laboratory Work

Subsection 1

Set up your Raspberry Pi for Qt5 development. You should use the support notes at https://secure.ecs.soton.ac.uk/notes_so/elec1204/misc/raspberrypi/RaspberryPiSupport.pdf

Subsection 2

Confirm that you can build and run the two Qt5 examples supplied on the images, and the additional example program here:

https://secure.ecs.soton.ac.uk/notes_so/elec1204/misc/raspberrypi/dan.zip

Subsection 3

Use the **`dan.zip`** example as the basis of a Qt5 GUI program for Sudoku problem entry. I suggest you initially display a grid of lines and allow mouse clicks within the grid to cycle the text displayed from “blank” through one to nine and back to blank again. Provide a mechanism to start your solver, and display the final result in the grid.

2 Optional Additional Work

Marks will only be awarded for this section if you have already completed all of Section 3 to an excellent standard and with excellent understanding.

1. Use a *dancing-links* solver.

Revision History

March 11 2014	Denis Nicole (dan)	2014 version of this lab created