COMP8049 – Embedded Systems Engineering - Labs

Completion Date: 23rd October 2020

Value: 15 marks

On completion please zip up your files and upload to Canvas.

Q1

Write a c program which reads in a text file and finds all the identifiers in the file. An identifier is a token (sequence of characters) that starts with an underscore or a letter and continues with underscores or letters or digits.

You are to sort all the identifiers in the input text file and output them in alphabetical order.

Q2

Create a model for the traffic light simulation and state machine that is detailed in section 10.4 of the traffic-light-simulator.pdf also here

http://users.ece.utexas.edu/~valvano/Volume1/E-Book/C10_FiniteStateMachines.htm

This model is a c program that runs on your laptop in Linux. You can use the code in traffic-model.c. You can then emulate a button press by simple key presses on the keyboard. For example:-

a) enter the letter N to indicate that the North button is on.

b) enter the letter E to indicate that the East button is on.

c) enter the letter B to indicate that both buttons are on.

d) any other key to indicate that both buttons are off

Q3

Using your code in Q2 build a traffic light controller model and simulation that is cross compiled for an ARM based SOC.

You can use the qemu-system-arm emulator https://wiki.qemu.org/Documentation/Platforms/ARM.

See here for steps to build a binary for the qemu emulated versatilepb board.

https://balau82.wordpress.com/2010/02/28/hello-world-for-bare-metal-arm-using-qemu/

See emulating-arm-pl011-serial-ports.pdf for an example which emulates the serial communications to the qemu emulated `versatilepb board`.

https://balau82.wordpress.com/2010/11/30/emulating-arm-pl011-serial-ports/