SOFT8037 Embedded Systems Programming – Project – Part A

Completion Date: 5th March 2021

Value: 25 marks

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

Simple editor program for the emulated versatilepb board. You may use the supplied sample code in your editor. The supplied code is not optimised to aid usability e.g. it re-displays the whole editor window on a key press.

1. Give a very brief overview of how the editor will work using the *kputc*, *xmodemTransmit* functions and the *lines* array. Explain how kputc handles multiple escape sequences e.g. Up arrow is actually 3 characters – ascii character 27 followed by a [and followed by an A. Note the *lines* array is filled with spaces initially.

2. You will need to implement at least the following in your editor :-

a). left, right and down arrow keys (up arrow is 'done'). See here for escape sequences http://ascii-table.com/ansi-escape-sequences.php

b). backspace and delete.

c). delete a line e.g. ctrl -d.

d) insert mode – currently key strokes overwrite the previous character

e). save the file e.g. ctrl-s

f). Innovation e.g. copy and insert a line, delete multiple lines etc.

You would connect to the board using minicom and then use a serial comms protocol to transfer and save the file.

Qemu will connect the UART of the board to a serial device on your laptop with

qemu-system-arm -M versatilepb -m 128M -kernel t.bin -serial pty

QEMU will report the serial device it is using

Run minicom.

ctrl a-z to get minicom command window.

Select o and then "serial port setup"

Select A and change the serial device to the one qemu is using.

Select E to change the baud rate to 9600

You can now type into minicom and the data will be sent to the UART port on board and is displayed in your editor window.

To save the file use S in your editor. If you hit capital S in the editor it sends the txt in msg1 of t.c to the host.

Use ctrl A-r to pop up serial receive protocol window in minicom.

The code in editor1.zip implements a xmodem protocol when you hit S on keyboard. It sends a piece of text using code from

*https://www.menie.org/georges/embe*dded/xmodem.html

and crc16 from here

https://gist.github.com/qinfengling/d547f51f5e0930b5c341

Note There is a bug in the xmodem protocol implementation from the links above as the data is sent in multiples of the packet size of 128 only. So you see 0s at the end of the saved file.