CMPUT 275 **Winter 2020**

Weekly Exercise #1

Display and Joystick

Make sure your submission follows the Code Submission Guidelines on eClass.

In this exercise you will fix some undesirable elements from the map + joystick code covered in class on Thursday, January 9. Modify this code to improve the following features.

Your Tasks

- When the cursor is moved there should be no black trail (or multiple cursors displayed at once). To do this you will need to redraw the background (the map) on top of the old position of the cursor before redrawing it in its new location. **Note: redrawing the whole map whenever the cursor is moved is too slow and distracting to be an acceptable solution.** Just redraw the very small square portion of the map around the old cursor position.
- The cursor movement speed should vary based on how far the joystick is being pressed. It should not move too fast at its maximum speed, but faster than a gentle push. Any solution that demonstrates variable cursor speeds that are visible to the human eye is acceptable.
- When not moving the joystick, the cursor should not "flicker". That is, if you complete the first part of this exercise successfully you may still see a flickering cursor if you are constantly redrawing the patch of the Edmonton map at the "old cursor position" even if the cursor is not moving. For full marks, you should avoid this flicker (e.g. by not redrawing if the cursor is not moving). It is ok if the cursor flickers while moving.
- The cursor should not be allowed to move off the edge of the map. The cursor should stop at the edges of map as if it hit a wall. See the picture below for an example of where the cursor should stop. To be clear, the cursor cannot enter the blacked out 60 columns of pixels on the right side of the display.

  The constrain function may be helpful for this part.

Getting Started:

You will need the files `lcd_image.h` and `lcd_image.cpp` in your working directory. After the second lecture, you can find them on eClass. You are allowed to build on the code developed in class from lecture 2 on Thursday, January 10.

As usual, follow the Code Submission Guidelines.

Wiring:

You should use the same wiring for the joystick that we have been using so far. The display wiring can be found at the top of Block 2 on eClass. The joystick wiring is as follows:

- Arduino analog pin A8 should connect to joystick VRy
- Arduino analog pin A9 should connect to joystick VRx
- Arduino digital pin 53 should connect to joystick pin SW

Submission Guidelines:

Submit all of the following files as `cursor.tar.gz` or `cursor.zip`:

- `joy_cursor.cpp`, containing your solution to the weekly exercise
- the Makefile
- your `README`, following the Code Submission Guidelines

Global Variables & Break:

Last term, we generally restricted the use of global variables to hardware-related variables. We will not be as strict about it this time, but style guidelines still apply. If a global variable should have been a local variable, you may receive a style deduction. If it makes more sense to return a value from a function instead of using a global variable, you may receive a deduction.

Hardware-related variables may still be global variables. You may also use `break` :)