Advance Microprocessors Lab Final Project

By

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Lab TA: Haotian Cao

Device(s):

TI-RSLK MAX Kit

Procedure:

Part A: Main Project

The goal of Part A was to create a C code to make a robot run forward from the finish line, around a bottle, then come back to a stop after the finish line.

In order to do this, I modified my code from the second midterm. My strategy here was to beeline straight forward, left or right, then straight back. Another aspect of my approach was guessing and testing for-loop delays, which I do not recommend.
My code implements the following pseudocode:

- Define Delay and MCLK_Frequency
- Hold WDT
- Initialize S1 and S2
- Initialize the motors
- Configure Port2 for PWM
- Configure Timer_A0 for left and right motors
- Main: if S1 is pressed…
    - Delay for 3 seconds
    - Set motors forward
    - Delay until robot is past bottle
    - Set motors to turn right
    - Delay until robot is past bottle
    - Set motors to turn right
    - Delay until robot is past bottle
    - Set motors forward
    - Delay until robot is past finish line
- if S2 is pressed…
    - Delay for 2 seconds
    - Set motors forward
    - Delay until robot is past bottle
    - Set motors to turn left
    - Delay until robot is past bottle

    - Set motors to turn left
    - Delay until robot is past bottle
    - Set motors forward
    - Delay until robot is past finish line

Part B: Extra Credit

The goal of Part B was to create a C code to make a robot run forward from the finish line, make a full loop around a bottle, then come back to a stop after the finish line.

In order to do this, I modified my code from Part A to use a loop. My strategy here was to beeline straight forward, make a slow and wide loop, then straight back.
My code implements the following pseudocode:

- Define Delay and MCLK_Frequency
- Hold WDT
- Initialize S1 and S2
- Initialize the motors
- Configure Port2 for PWM
- Configure Timer_A0 for left and right motors
- Main: if S1 is pressed…
    - Delay for 3 seconds
    - Set motors forward
    - Delay until robot is past bottle
    - Set motors to turn curve right
    - Delay until robot has completely looped around bottle
    - Set motors forward
    - Delay until robot is past finish line
- if S2 is pressed…
    - Delay for 2 seconds
    - Set motors forward
    - Delay until robot is past bottle
    - Set motors to turn curve left
    - Delay until robot has completely looped around bottle
    - Set motors forward
    - Delay until robot is past finish line

Conclusion

I was able to successfully clear the course clockwise, counter-clockwise, clockwise with a loop, and counter-clockwise with a loop and also document it.

Challenges

One challenge that I had to overcome was to bypass the “SDC1101 USB Debug Probe Error”. My first approach was to download TI Uniflash, but it did not work. I was able to fix this by checking the correct ARM compiler function that was not allowing me to connect the Launchpad.

Another major challenge was the nature of the track. The wood that makes the track is thin, which caused the track to concave, especially with the weight of a bottle in the middle. To overcome this, I first made code with delays that I was confident would run, and then ran trials several times to pinpoint the correct starting position of the robot. The concave track was also uneven at times, so I also accounted for this by changing up some delays on the affected side of the track.