DESIGN EXPERIENCE WITH DEVICES (DEWD)

EE - 2800, Sec. 01, FALL 2018, ASSIGNMENT – 4, Total Points: 40

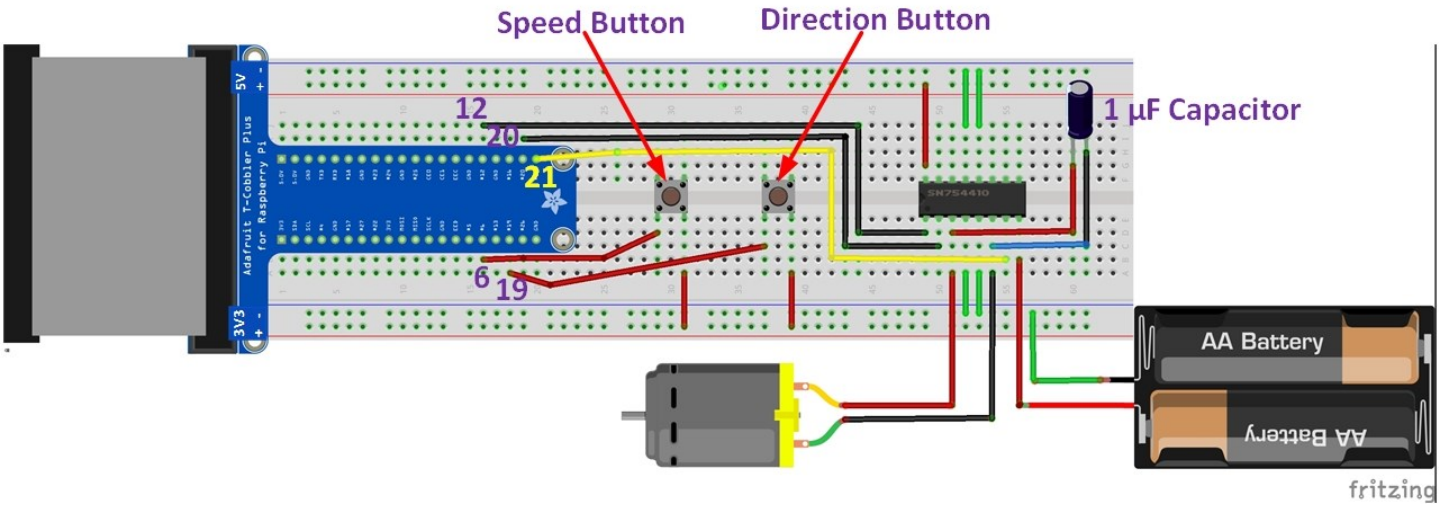
Due on 11/04/2018 by 4:00 PM

Note:

- **Assignment 4 has to be solved by a team of two members.**
- **The team members will be the same as the final project team members.**
- **The team members have to work together to implement the circuit, code, report and videos.**

Prob. 1: **Points: 20**

A DC Motor controller should be developed using two tactile pushbutton switches as shown in the circuit diagram below:



A template file titled "Assign4Template.py" is provided. The template file contains the complete code to instantiate an object of type DC Motor. The template file also contains partial class code to instantiate object of type push button.

Implemented Motor Operations:

- On instantiating a Motor object, the motor will be setup to rotate in the forward direction with a speed corresponding to 10% of the full speed using PWM.
- On enabling the H-Bridge the motor will start to spin at 10% of the full speed in the forward direction.

Desired Push Button Operations:

- The Speed Button will increase the rotational speed of the motor by 10% each time the button is pressed. If the push button is pressed after reaching 100% of the full speed, the speed will reset to 10%
- The Direction Button will toggle the rotational direction of the motor each time the button is pressed. The speed of the motor will not change with changing direction of rotation.

The push buttons operations have to be implemented by completing the code in the Class PushButton and in the main section of the script in the template file. **The pressing of the push buttons should be handled as hardware interrupts or events. You should not write any loops in the code and also should not change the code of the Class DCMotor.**

Prob. 2 **Points: 10**

Add two LEDs (Red and Green) to the above DC Motor control circuit for visual indication. The visual indications are:

- **The Red LED should be turned on indicating full motor speed.**
- **The Green LED should be turned off indicating the motor is rotating in the reverse direction.**

Assignment Submission (Submit in the folder of one of the team members): Points: 10

1. Commented code files. You have to submit two separate Python files for Problems 1 and 2.
2. The team should submit a report (word document only with names of the team members) discussing the implementation. The length of the report is single page with single line spacing, default margins, and 12-point font. The report should discuss the operation, any issues faced and drawbacks of the implementation.
3. The team should submit a screen shot depicting the increase of speed from 10% to 100% and back to 10% in both directions.
4. The team should submit a video depicting the change in speed of the motor, change in rotational direction and LED operations.