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FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

2021 - 2022
SPRING SEMESTER

CME 3208
PRINCIPLES OF EMBEDDED SYSTEMS

LAB 11 – 31.05.2022
MOTOR CONTROLLER

In this lab you are asked to create a motor controller using 2 push down buttons, one seven segment display, direct current motor and L293D motor controller. You will use the buttons to change the direction and speed of motor. An example setup is given below.

	DIRECT CURRENT MOTOR	
LEFT BUTTON	**SEVEN SEGMENT DISPLAY**	**RIGHT BUTTON**

The left and right button will be used to change the direction of the motor in that direction (right button for clockwise and left button for counter clockwise rotation). The seven segment display will be used to show the current speed of motor. You can arbitrarily divide the speed of motor to 4, 5 or more sections (e.g. 0 is 0% speed, 1 is 25% speed, 2 is 50% speed, 3 is 75% and 4 is %100 speed, the top speed of motor). An example operation of this project is given below.

BUTTON PRESS	**SEVEN SEGMENT DISPLAY**	**MOTOR DIRECTION**	**MOTOR SPEED**	**EXPLANATION**
	0	**STOPPED**	**0%**	**Initial conditions of the motor. No button press or rotation is happened.**
RIGHT	**1**	**CLOCK WISE**	**25%**	**We pressed the right button and motor is working in clockwise direction.**
RIGHT	**2**	**CLOCK WISE**	**50%**	**We pressed the right button and the speed of the motor is increased.**
RIGHT	**3**	**CLOCK WISE**	**75%**	**We pressed the right button and the speed of the motor is increased.**
RIGHT	**4**	**CLOCK WISE**	**100%**	**We pressed the right button and the speed of the motor is increased.**
RIGHT	**4**	**CLOCK WISE**	**100%**	**The right button press does not have any effect in this state due to reaching maximum speed.**
LEFT	**3**	**CLOCK WISE**	**75%**	**We pressed the left button and the speed of the motor is decreased.**
LEFT	**2**	**CLOCK WISE**	**50%**	**We pressed the left button and the speed of the motor is decreased.**
LEFT	**1**	**CLOCK WISE**	**25%**	**We pressed the left button and the speed of the motor is decreased.**
LEFT	**0**	**STOPPED**	**0%**	**We pressed the left button and the motor is stopped.**
LEFT	**1**	**COUNTER CLOCK WISE**	**25%**	**We pressed the left button and the speed of the motor is increased.**
LEFT	**2**	**COUNTER CLOCK WISE**	**50%**	**We pressed the left button and the speed of the motor is increased.**

LEFT	**3**	**COUNTER CLOCK WISE**	**75%**	**We pressed the left button and the speed of the motor is increased.**
LEFT	**4**	**COUNTER CLOCK WISE**	**100%**	**We pressed the left button and the speed of the motor is increased.**
LEFT	**4**	**COUNTER CLOCK WISE**	**100%**	**The left button press does not have any effect in this state due to reaching maximum speed.**

As you can see in the above table, you can use a 4 step (25% per step) speed increase model on your lab. You are **NOT** required to do this but you should try to make your code dynamic by being able to work up to 10 step (10% per step) model. This will increase your code quality and enable it to work for different scenarios. But for your lab evaluation, you should try to use a 4 or 5 step (25% or 20% per step) model for speed control. This will allow us to differentiate different speeds easier.

If you can, try to connect a piece of paper or any other object to the motor to make rotation and rotation speed more visible. Because it is usually very hard to see rotation on an empty metal shaft of the motor.

If you wish to ask questions regarding this assignment, you can send emails or write it in class forums in SAKAI.

GOOD LUCK TO YOU ALL!