Special Topics in Design I
DSL 810

Topic 6
Output Devices

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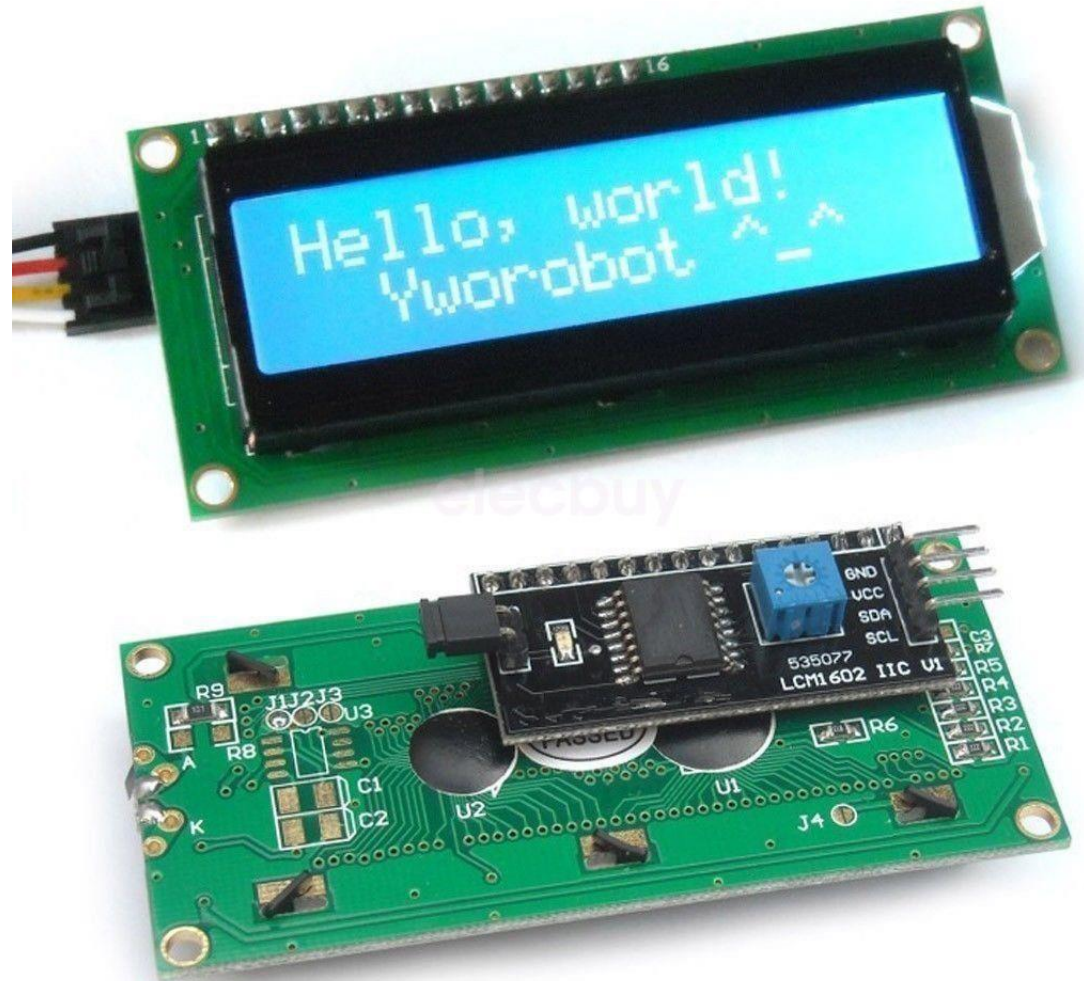IIT Delhi

4th September 2019

Project reimbursements

- Get approval for your purchases from me/Tas.
- Low cost projects without compromising quality
- Any purchase beyond 5000 ₹ can't be through cash.
- Online purchase fine with GST and credit card/debit card statement for a purchase > 5000 ₹. Use credit card/debit cards for any purchase.
- Local purchase = GST bill mentioning IITD GSTIN = 07AAATI0393L1ZI
- Team meet me for a purchase > 1500 ₹
- Save the bills. Reimbursement procedure – later.

Output Devices

- LEDs, Displays, Speakers, DC/Servo/Stepper Motors, Relays, Dataloggers
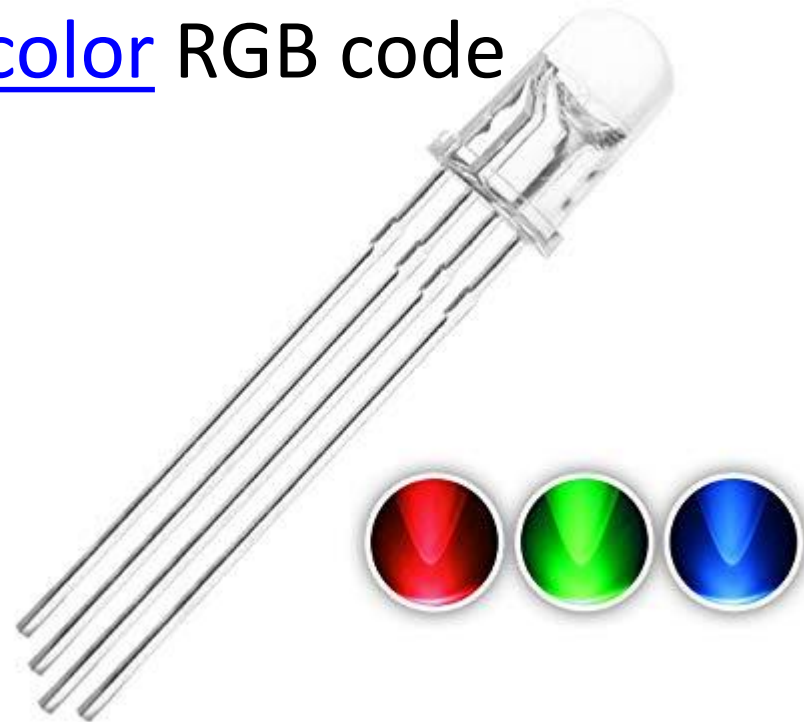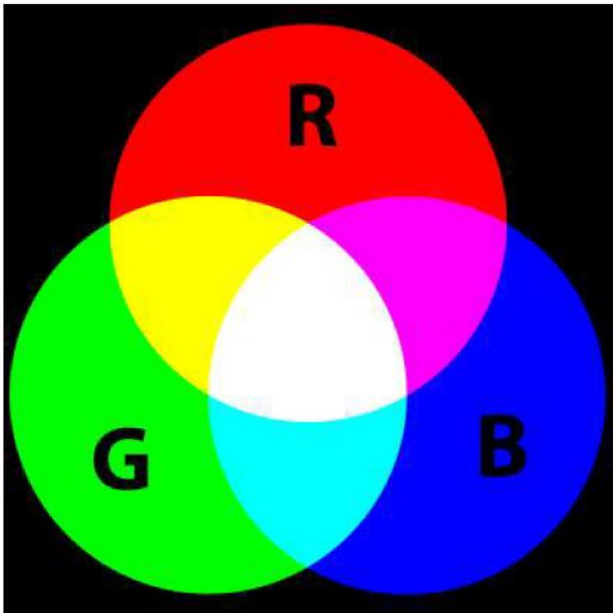- Sensor vs Actuator

LCD display

- Lesson 22
- Adjusting Contrast with a screwdriver.
Connections:
SDA pin to A4 (Uno)
SCL pin to A5 (Uno)
[Arduino code](#)
Other examples

RGB LED

- PWM with RGB LED with common anode (Lesson 4). NOTE: Longest leg of RGB LED goes to 5V pin.

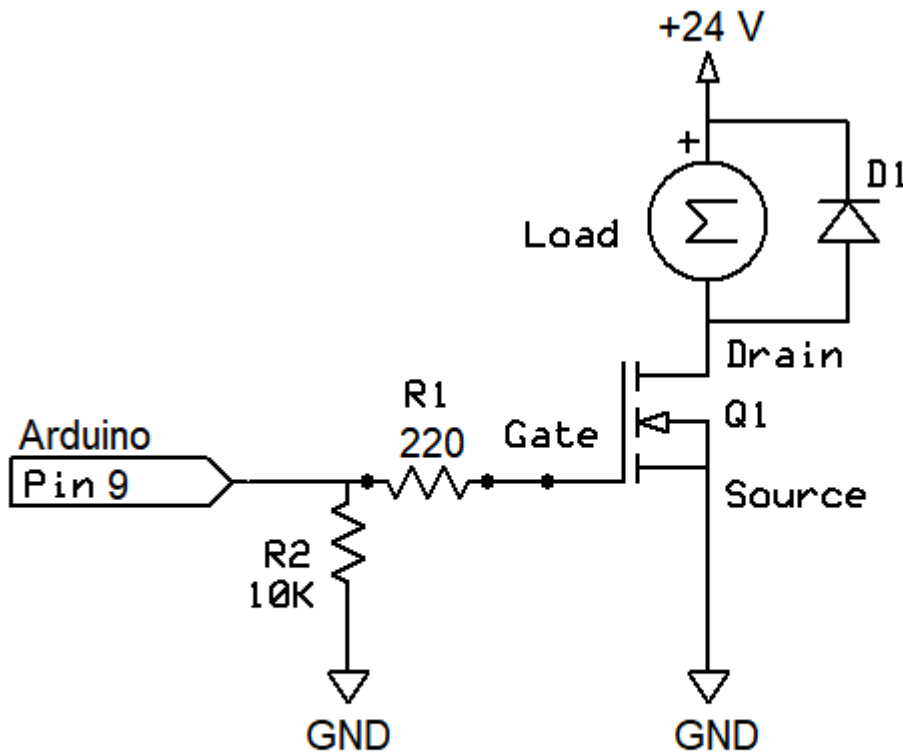- [RGB_basic](#) [RGB_favorite_color](#) RGB code

Stepper Motor

- Stepper motor rotates in steps, Torque
- Basis for many machines
- 28BYJ-48 stepper motor
- ULN2003 Driver Board
- Lesson 31
- Applications: XY plotter

nema 17 motor with a4988 driver

High Power Electronics

R1 limits gate current
R2 is pull-down in case pin hi-impedance
D1 is flyback protection (Schottky)
Q1 is N-channel logic-level MOSFET

Assignment 6

- A. Add an output device to a microcontroller board and program it to do something
- B. Combine an input and output device together and collect data for an activity connected to you. Analyze that data and make sense of it. E.g. – finding the thermal comfort in your room.

Examples

- Developing a heat stress index [Formula](#) (If hot then LED is RED, If cool LED is BLUE.)

- Dustbin – full vs. half vs. empty, LED is RED, YELLOW, GREEN.

- Display the sensor value on the LCD display.

Summary

- Output devices

- Examples: LCD display, RGB LED, Stepper Motor

- Fab Academy [webpage](#) [video](#)

- Think of applications as a designer

- Explore other input and output devices