# EMBEDDED SYSTEMS

## Assignment 2

# 1. GPIO/INTERRUPTS

UCSD Masters Program

- Wire the HC-SR04 ultrasonic sensor to your mbed on the provided breadboard.
- Write a program to test sensor connectivity that uses polled I/O to.
  - Demonstrate your system through a video that shows the measured distance to your hand on the console (serial output). The video must demonstrate that the value changes appropriately as your hand moves closer to / farther from the sensor.
  - Commit the program to your team repository under the branch assignment2-ultrasonic-polled.
  - *There is code available online to use as a reference. If you copy this code directly you will receive a zero.*
- Rewrite the program above using interrupts instead of polled I/O.
  - Provide a demonstration video with the same setup as above.
  - Commit the program to your team repository under the branch assignment2-ultrasonic-interrupt

# 2. MOTOR

UCSD Masters Program

- Write a program that demonstrates motor functionality by taking an input from the serial port that causes the motor spin direction to change. The motor should always be rotating at a constant rate.
  - Provide a demonstration video that shows the motor rotating and you entering a command that causes motor direction to change. Show the command happening at least twice to show changing in both directions.
  - Commit the program to your team repository under the branch assignment2-motor
  - *There is code available online to use as a reference. If you copy this code directly you will receive a zero.*
- Write a program that combines the ultrasonic sensor and motor controller where the speed and direction of the motor are dependent on the distance of your hand to the ultrasonic sensor.
  - Pick a point, say 12" away from the sensor, as your 0 (zero). As your hand moves closer, the motor should rotate clockwise and at an increased speed the closer it gets. As your hand moves back, towards your zero point, the rotation slows. Once you cross the zero point the motor rotates counter-clockwise and increases in speed as your hand moves farther away.
  - Provide a demonstration video that shows the above scenario.
  - Commit the program to your team repository under the branch assignment2-system