Brandon Lim

5. Post-Lab Exercises
1. List five or more Arduino functions that you think will be helpful in programming your robot and describe what they would do for your robot.

- pinMode() - specify what the pin is and use it as an output or input so we can code things to the pin like sending voltage to a sensor.
- digitalWrite() - choosing a pin that a sensor or light is attached to and turning it off or on with a high or low command.
- Serial.print() - printing information to our serial monitor on information that is being read by sensors on the robot for calibration, coding, and troubleshooting.
- Serial.available() - reading wireless communication between the arduino uno and the mega so we can make if statements based on bytes being received or knowing that there is wireless communication happening.
- analogWrite() - choosing a specific voltage or value to be sent to pins that control things like LEDs and motors.

2. Based on this semester's competition, discuss how you could use Xbee wireless communication. What commands/information you would send from the Arduino Uno, and at what point during the system's operations? How would your system store this information and/or what actions would it take based on it?

- We can use the Xbee wireless as a tool to communicate with our robot without having to physically connect to it before the start of the competition. The types of commands that we could send are when to start, which loader to go to, and what the initial block color is. This could be sent before the competition starts and also while the blocks are being put into the desired location. The system could store the information being sent to it as variables that could then be used in other coding operations that perform functions/movement. For example, sending a start signal could be recognized by the mega board on the robot as a variable in an if loop as a flag to begin motion.

3. Imagine you need to transmit three pieces of data from an Arduino Uno (being used as a remote control) to an Arduino Mega (which is operating an RC car that you built). The three pieces of information are: a servo angle of 120, a motor power value of 0, and an LED color value of 'r'.
   a. Provide code, or pseudocode, for the Uno of how you would package this data to send it.

      Initialize variable and value for servo angle
      Initialize variable and value for motor power
      Initialize variable and value for LED color

      Call the function my myServo.write() and input the flag variable of 255 as the input to the function

Call the function myServo.write() three more times and input the variable name for each function as the input.

b. Provide code, or pseudocode, for the Mega of how you would receive this data packet and store the correct values in the correct variables.

Call Serial1.Available() in an if loop with a condition of more than 2 bytes to check for incoming wireless information.
Inside the if loop, start another if loop checking for a flag variable of 255 being sent.
Inside the if loop, create variables to receive the servo angle, motor power, and LED color and set them equal to the function Servo.read().
End the if loops.

Call analogWrite() for the servo angle and input the associated pin as the first input and the corresponding servo angle variable received as the second input.
Call analogWrite() for the motor power and input the associated pin as the first input and the corresponding motor power variable received as the second input.
Call analogWrite() for the LED color and input the associated pin as the first input and the corresponding LED variable received as the second input.