Goals: To experiment with the sensor pins on the MiniQ robot using the MATLAB command window.

Standards Covered: (f), (i)

Sequence:

1. Present variables and basic math using the \MATLAB command window (addition, subtraction, multiplication and creating variables) *(10 min)*
2. Define arduino object

a = arduino('/dev/tty.usbmodem1421','Uno')

1. Guided explanation for controlling motor direction and speed using the template w/ Arduino object “a”). Followed by discussion on the structuring of this these functions *(15 min):*

writePWMDutyCycle(a, 'pin', (enter a value ranging from 0.0 to 1.0);

writeDigitalPin(a, 'pin', (1 or 0 to control direction));

1. Write/or open the “pureforward” script. Have students experiment with a different k values and observe the results*(15 min)*
2. Explain the structure of MATLAB functions: “function k = pureforward(a)” and each part relative to inputs and outputs given by the function *(15 min)*
3. Activity: create functions for moving forward, backward, left and right; once complete compare the similarities and differences between these functions. *(15 min)*
4. Create motorcommandwindow.m script. Run this so it is used as an interface to control motor directions. Discussion about the usefulness of functions in programming for simplifying code.*(30 min)*

*\*Time buffer = 20 min*

Evaluation:

1. Students have created a control interface for their MinQ robot using the MATLAB command window. Specifically, by sending a keypress, “char,” a different type of movement occurs on the robot (forward,backward,left,right).
2. Students can explain the structure of a function relative to inputs and outputs on the miniQ robot.

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