

```

clear all
% create arduino ref-objects
[robotArduino, rawRangeIn, blinkLED] = SETUPARDUINO('COM10');

% Turn on board LED on and off to signal program has started
Blink(robotArduino, blinkLED,5);
disp('Data Collection Active');

```

Data Collection Active

```

% Configure test loop to collect n data points
nTests = input(['Enter number of range test positions, followed by enter: ']);
clc % clear command window

% create a variable to hold experimental position data
positionData = zeros(nTests,1);

r = rateControl(0.1); % create a 0.1 hz loop rate
reset(r); % reset loop time to zero

```

Run robot control loop (code that runs over and over)

```

controlFlag = 1; % create a loop control
while (controlFlag < nTests+1) % loop till ntests data captured

    % collect data from robot sensors
    rangeData = SENSE(robotArduino, rawRangeIn);
    THINK(); % compute what robot should do next
    ACT(); % command robot actuators

    % store experimental command versus actual data
    positionData(controlFlag,1) = rangeData;
    Blink(robotArduino,blinkLED,1);
    positionData(controlFlag)

    % if (0.53 <= positionData(controlFlag)) && (positionData(controlFlag)<= 0.83)
    %     disp('Target')
    % else
    %     disp('Hole')
    % end
    if (0.60 <= positionData(controlFlag)) && (positionData(controlFlag)<= 0.62)
        disp('Yellow Target')
    elseif (0.58 <= positionData(controlFlag)) && (positionData(controlFlag)<= 0.61)
        disp('Green Target')
    elseif (0.72 <= positionData(controlFlag)) && (positionData(controlFlag)<= 0.85)
        disp('Blue Target')
    elseif (0.62 <= positionData(controlFlag)) && (positionData(controlFlag)<= 0.65)
        disp('Red Target')
    else
        disp('Hole or unknown')
    end
    waitfor(r) % wait for loop cycle to complete
    controlFlag = controlFlag+1; % increment loop
end

```

```
%demo(positionData,controlFlag)
end
```

```
Sense
ans = 0.2933
Hole or unknown
ans = 0
Sense
ans = 0.5376
Hole or unknown
ans = 0
Sense
ans = 0.8113
Blue Target
ans = 0
Sense
ans = 0.7283
Blue Target
ans = 0
Sense
ans = 0.5474
Hole or unknown
ans = 0
Sense
ans = 0.5963
Green Target
ans = 0
Sense
ans = 0.5865
Green Target
ans = 0
Sense
ans = 0.5865
Green Target
ans = 0
Sense
ans = 0.4350
Hole or unknown
ans = 0
Sense
ans = 0.6061
Yellow Target
ans = 0
Sense
ans = 0.6207
Red Target
ans = 0
Sense
ans = 0.6207
Red Target
ans = 0
Sense
ans = 0.6012
Yellow Target
```

Robot Functions (store this codes local functions here)

In practice for modularity, readability and longitevity, your main robot code should be as brief as possible and the bulk of the work should be done by functions

```
function [robotArduino, rawRangeIn, blinkLED] = SETUPARDUINO(COMPORT)
% SETUPARDUINO creates and configures an arduino to be a simple robot
```

```

% controller. It requires which COM port your Arduino is attached to as its
% input and returns an Arduino object called robotArduino
% I. Munoz 2022 Rev A

% Create a global arduino object so that it can be used in functions
% a = arduino('setToYourComNumber','Uno','Libraries','Servo');
robotArduino = arduino(COMPORT,'Uno','Libraries','Servo');

%configure pin 13 as a digital-out LED
blinkLED = 'D13';
configurePin(robotArduino,blinkLED,'DigitalOutput');

% configure A0 pin as an analog input
rawRangeIn = 'A3';
configurePin(robotArduino,rawRangeIn,'AnalogInput')
end

function [] = Blink(a,LED, n)
% Blink toggles Arduino a LED on and off to indicate program running
% input n = # of blinks
% no output
% IMunoz 3/25/22

    for bIndex = 1:n
        writeDigitalPin(a, LED, 0);
        pause(0.2);
        writeDigitalPin(a, LED, 1);
        pause(0.2);
    end
end

```

Sense Function (store all Sense related local functions here)

```

function rangeData = SENSE(robotArduino, rawRangeIn)
    disp('Sense');
    rangeData = readVoltage(robotArduino,rawRangeIn);
end
% function demo(data_c)
%     avg = mean(data_c)
%     %avg = round(mean(data_c),2)
%     if (0.68 <= avg) && (avg<= 0.83)
%         disp('Target')
%     elseif (0.69 <= avg) && (avg<= 0.71)
%         disp('Red Target')
%     elseif (0.8 <= avg) && (avg<= 0.83)
%         disp('Blue Target')
%     elseif (0.63 <= avg) && (avg<= 0.7)
%         disp('Green Target')
%     else
%         disp('Hole or unknown')
%     end
%end
function THINK()
    % null function, not much thinking to do here

```

```
end
```

Act Functions (store all Act related local functions here)

```
function ACT()  
    % nul function, not much acting to do here  
end
```