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%--Parking Lot Management System--%
%---Group 22---%
%--GENG8030-2-R-2020S--%
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% Use MATLAB R2017 or above and include LCD sample library from MATLAB--%
%--examples--%
%--The System uses Arduino Uno board, Micro Servo SG90, LCD 1602A, Green--%
%--and Red Led, and 2 pushbuttons using pullup method (active low)--%

% define arduino as a and include lcd and servo library
a = arduino('com3', 'uno', 'libraries', {'Servo', 'ExampleLCD/LCDAddon'}, 'ForceBuildOn', ↵
true);

%define LCD as lcd and set the pins wired from the lcd to the arduino
lcd = addon(a, 'ExampleLCD/LCDAddon', 'RegisterSelectPin', 'D7', 'EnablePin', 'D6', 'DataPins', ↵
{'D5', 'D4', 'D3', 'D2'});

% define servo as s and include relevant min and max pulse according to
% datasheet min pulse is 500us and max pulse is 2500us
s = servo(a, 'D10', 'MinPulseDuration', 500*10^-6, 'MaxPulseDuration', 2500*10^-6)

initializeLCD(lcd); % initialize lcd
h=char("Available--> "); % define h variable in characters to display in lcd
configurePin(a, 'D11', 'pullup'); % configure Exit pin button as pullup switch
configurePin(a, 'D12', 'pullup'); %configure Enter pin button as pullup switch

writePosition(s,0); % initial servo position at 0 degrees
vehicle_count=0; % counter to record no of vehicles entering the lot
avail_spots=13; % counter to keep track of availability
loop=1; % random variable to force the code to be in the while loop

% Note that the below commands are inside a while loop. This is to ensure
% that the system runs constantly.

while (loop==1)
    writeDigitalPin(a, 'D13',1); % red LED turns on
    if(vehicle_count<13) %checks for counter less than 13
        dis=int2str(avail_spots);% counter interger format converted to character string↵
    for LCD display
        u=[h dis]; % converted counter to a character string and wording is put in an↵
    array
        clearLCD(lcd);
        % prints welcome on top row and the array on second
        printLCD(lcd, 'Welcome!!!');
        printLCD(lcd,u);
        %enter pushbutton is read
        enter=readDigitalPin(a, 'D12');
        pause(0.3);

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    if(enter==0) % if enter button pressed
        vehicle_count=vehicle_count+1;
        avail_spots=13- vehicle_count;
        writeDigitalPin(a,'D13',0); % Red LED OFF
        writeDigitalPin(a,'D8',1); % Green LED ON
        writePosition(s,0.5); % servo at 90 degrees
        pause(5); % gate is open for 5 seconds can be increased as necessary
        writeDigitalPin(a,'D8',0); % Green LED OFF
        writeDigitalPin(a,'D13',1); % Red LED ON
        writePosition(s,0); % servo at 0 degrees
        continue % continues to next iteration in loop
    end
else % if counter exceeds 13 cars
    dis=int2str(avail_spots); % counter interger format converted to character string
for LCD display
    u=[h dis]; % converted counter to a character string and wording is put in an
array
    clearLCD(lcd);
    % prints come later on top row and the array on second
    printLCD(lcd,'Please Come Ltr');
    printLCD(lcd,u);
    pause(0.2);

end

if(vehicle_count>0)
    exit=readDigitalPin(a,'D11'); % reads exit button
    if(exit==0)
        vehicle_count=vehicle_count-1;
        avail_spots=13- vehicle_count;
        writeDigitalPin(a,'D13',0); % Red LED OFF
        writeDigitalPin(a,'D8',1); % Green LED ON
        writePosition(s,0.5); % servo at 90 degrees
        pause(5); % gate is open for 5 seconds can be increased as necessary
        writeDigitalPin(a,'D8',0); % Green LED OFF
        writeDigitalPin(a,'D13',1); % Red LED ON
        writePosition(s,0); % servo at 0 degrees
        continue
    end
    continue
end
end
end

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