Lab Sheet

IA 3018 – Data Acquisition Systems

Department of Instrumentation and Automation Technology
University of Colombo

Practical 05

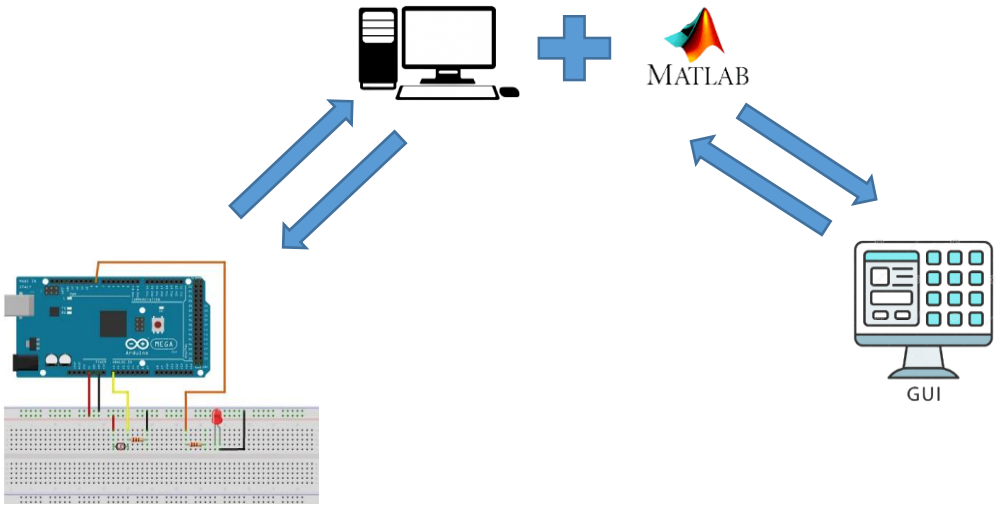

Figure 01:

<u>Part 01</u> – Read and write analog data (Real time data) using photoresistor with Arduino and MATLAB

1. Add the Arduino support package to MATLAB.
2. Connect the Arduino board to computer and record the COM port and board name.(Nano, UNO, Mega, Due)
3. Check the Arduino support package are working in MATLAB using above recorded data in part 2.

4. Create the circuit as figure 02.

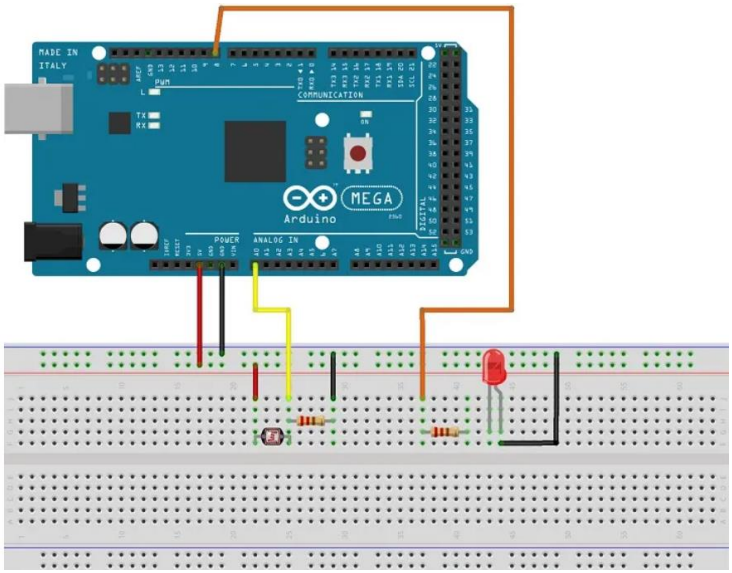

Figure 02: Circuit diagram

5. Writ a bellow MATLAB code for make a Matlab GUI with two buttons for turning on and off a led and an axis for plotting the analog input from a photocell (light-dependent resistor).

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Example1.m

```
46
47      % --- Executes just before Example1 is made visible.
48      function Example1_OpeningFcn(hObject, eventdata, handles, varargin)
49      % This function has no output args, see OutputFcn.
50      % hObject    handle to figure
51      % eventdata  reserved - to be defined in a future version of MATLAB
52      % handles    structure with handles and user data (see GUIDATA)
53      % varargin   command line arguments to Example1 (see VARARGIN)
54
55      % Choose default command line output for Example1
56      handles.output = hObject;
57
58      % Update handles structure
59      guidata(hObject, handles);
60
61      % UIWAIT makes Example1 wait for user response (see UIRESUME)
62      % uiwait(handles.figure1);
63      delete(instrfind({'Port'},{'COM4'}))
64      clear a;
65      global a;
66      a = arduino('COM4');
67      a.pinMode(8, 'output');
68
```

Figure 03: MATLAB code part 01

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Example1.m

```
69
70      % --- Outputs from this function are returned to the command line.
71      function varargout = Example1_OutputFcn(hObject, eventdata, handles)
72      % varargout  cell array for returning output args (see VARARGOUT);
73      % hObject    handle to figure
74      % eventdata  reserved - to be defined in a future version of MATLAB
75      % handles    structure with handles and user data (see GUIDATA)
76
77      % Get default command line output from handles structure
78      varargout{1} = handles.output;
79
80
81      % --- Executes on button press in turn_on_button.
82      function turn_on_button_Callback(hObject, eventdata, handles)
83      % hObject    handle to turn_on_button (see GCBO)
84      % eventdata  reserved - to be defined in a future version of MATLAB
85      % handles    structure with handles and user data (see GUIDATA)
86      global a;
87      a.digitalWrite(8,1);
88
```

Figure 04: MATLAB code part 02

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Example1.m

```
89
90      % --- Executes on button press in turn_off_button.
91      function turn_off_button_Callback(hObject, eventdata, handles)
92      % hObject    handle to turn_off_button (see GCBO)
93      % eventdata  reserved - to be defined in a future version of MATLAB
94      % handles    structure with handles and user data (see GUIDATA)
95      global a;
96      a.digitalWrite(8,0);
97
98
99      % --- Executes on button press in read_button.
100     function read_button_Callback(hObject, eventdata, handles)
101     % hObject    handle to read_button (see GCBO)
102     % eventdata  reserved - to be defined in a future version of MATLAB
103     % handles    structure with handles and user data (see GUIDATA)
104     global k a
105     x=0;
106
107     for k=1:1:handles.xSamples
108         b=a.analogRead(0);
109         x=[x,b];
110         plot(x,'LineWidth',2); grid on;
111         axis([0 handles.xSamples 0 500]);
112         pause(0.01);
113     end
114
```

Figure 05: MATLAB code part 03

```
114
115
116     function edit_text_samples_Callback(hObject, eventdata, handles)
117     % hObject    handle to edit_text_samples (see GCBO)
118     % eventdata  reserved - to be defined in a future version of MATLAB
119     % handles    structure with handles and user data (see GUIDATA)
120
121     % Hints: get(hObject,'String') returns contents of edit_text_samples as text
122     %        str2double(get(hObject,'String')) returns contents of edit_text_samples as a double
123 -   handles.data1=get(hObject,'String');
124 -   handles.xSamples=str2double(handles.data1);
125 -   guidata(hObject,handles);
126
127     % --- Executes during object creation, after setting all properties.
128     function edit_text_samples_CreateFcn(hObject, eventdata, handles)
129     % hObject    handle to edit_text_samples (see GCBO)
130     % eventdata  reserved - to be defined in a future version of MATLAB
131     % handles    empty - handles not created until after all CreateFcns called
132
133     % Hint: edit controls usually have a white background on Windows.
134     %       See ISPC and COMPUTER.
135 -   if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))
136 -       set(hObject,'BackgroundColor','white');
137 -   end
138
```

Figure 06: MATLAB code part 04

6. Then run the script and check the output.

Figure 07: MATLAB GUI