
BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Final
Duration: 2 Hours (120 minutes actual) + 30
minutes extra for uploading the document +
other issues.

Semester: Summer 2020
Full Marks: 40

CSE 360: Computer Interfacing

Your actual time for answering these 4 questions is 2 Hours (120 minutes) + Extra 30 minutes is for internet, load-shedding issue, and the most important is converting your answer sheet to pdf, renaming it by your Section_ID (for example- 02_160217) and uploading it on buX. Any request of “can’t upload the document because the time is over, I was writing till the end of 2 hours and can’t upload the document” **will NOT be accepted**. There will be no backup final. Hope for the best.

Questions (Set 1)

- Q1.** In this pandemic, to help mass people, BRAC settled down some COVID testing Booths all over the country. They are facing some scenarios depending on this pandemic situation. Write the answer of the following scenario-based questions according to the marks. **[Total 10]** Mark
- a) **Scenario1:** COVID testing booths are recently trying to establish fingerprint mechanism for each patient to register their name directly on register book of COVID Patient (except under 18). Can you suggest them how they can establish a secured fingerprint sensor by explaining them the working of that sensor and connect it with Arduino or Raspberry Pi to anyone of the BRAC Software and Development team? You must explain the data flow of the Sensor, GPIO (if used) and a processing unit (Arduino / Raspberry Pi)? Describe shortly. 4
- b) **Scenario2:** For COVID test, the patients are having long queue in front of every testing booth. When they start from home, they don’t know how many patients will be tested on that time. They are sick people and don’t like to stay long in a queue. It will be really helpful, if they can know the queue size in advance from home. (for example: You can use any sensors or device or counter that will count the number of patients, record the data on cloud and send the user via mobile sms). Can you establish a system for them by using any Sensor, GPIO devices and a processing unit (Arduino / Raspberry Pi)? Describe shortly. 4
- c) **Scenario3:** The recently established COVID testing booths of BRAC are now targeting to increase **security system**. Can you suggest how they can do it by Raspberry Pi? 2

NB: Answer can be different for each student. You can use any sensor, GPIO or processing device from your knowledge, but the answer must be logical.

- Q2.** Let's assume a scenario, A Matrix Keyboard is connected to 8255. Suppose, **rows** are connected to port A and **columns** are connected to port B of 8255. User wants to see the pressed key in a seven-segment display [no handshaking is needed]. (For example: If the user press 5 in matrix keyboard, it will be displayed on the seven-segment display). [Total 10]

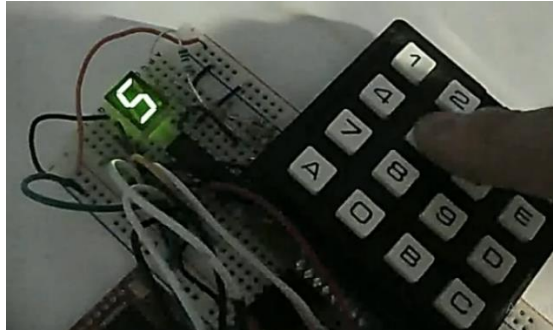


Figure: Matrix Keyboard and Seven-Segment Display Interfacing with 8255.

- a) How can you connect a matrix keyboard and a seven-segment display in 8255 in which ports and in pins? 1.5
 - b) What is the value of the control word register? [mention the reason] 1.5
 - c) Suppose the user pressed the button 5 in matrix keyboard and 5 is displayed on Seven-segment display. Explain the input and output mechanism of 8255 and the devices. You must mention the port and pin number, signals, type of data passing through ports. 3.5
 - d) You know that, in matrix keyboard the buttons are usually push-buttons. Moreover, we face key-debouncing when we use push buttons in keyboard. Explain key-debouncing and key-debouncing technique (Software or Hardware). 3.5
- Q3.**
- a) Suppose, we would like to make an artificial smart gardening system in UB2 of BRAC University, we know to make a smart and suitable garden for plants, we need to measure temperature and humidity from environment. **Explain** the sensors and working mechanism of those sensors which can serve the above purposes. [Total 10] 4
 - b) While using those sensors, to display reading from those sensors, we want to use LCD Display. On the display, cursor will move from **left to right**. 2

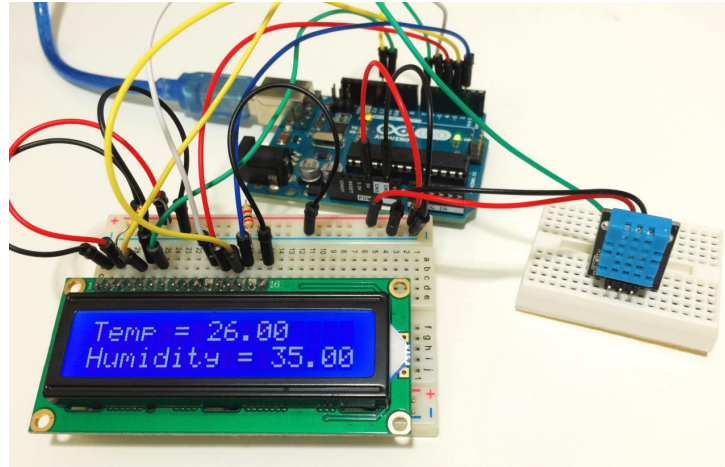


Figure: Humidity and temperature measurement using Arduino and displaying data on LCD

From the above scenario, **Explain** In which case Data register will perform, and in which case command register will perform. **Explain** the reasons also.

- c) How IC will send data to LCD. Explain them in both cases of half byte and full byte mode. What are the differences between them? 2
- d) There is a RAM inside LCD. What values will be stored there if the humidity is 35. You can just show the values stored in LCD RAM for 35 only. 2

Q4. Suppose, to design an interfacing project, you have to use two Arduino as Master devices for multitasking. You can connect several slave devices easily with these master devices. Now answer the following questions. **[Total 10]**

- a) **Identify** the protocol and **explain** the working mechanism of the protocol 4
- b) If there arises a scenario, where two masters have to transfer data at the same time, then how will the protocol solve this conflicting issue? 2
- c) Can you **identify** another protocol with the same synchronous property but a little bit faster than it and has no byte transfer limitation? List the differences of these two protocols. 4