# EC5.204: Communication and Controls in IoT
# Monsoon 2020

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## Assignment – 2

Released: 31st Aug 2020 Deadline: 08 Sept 2020, 2355 hrs

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Submission Format:

1. This assignment is based on Tinkercad simulations. Visit Tinkercad here.
2. You are supposed to submit your assignment in a video format (.mp4). Screen record the demonstration of your simulation along with narration. You need to clearly explain the code that you wrote, the circuit design and connections and live simulation of the functionality implemented.
3. It is mandatory that you record your demonstration using a method that captures your video as well, displayed in a small frame at some convenient corner of the screen. There are many ways and platforms to do this. One such recommended way is by using the Zoom recording feature [Refer].
4. Host your video at some convenient cloud location (OneDrive/GoogleDrive) and share the access link as part of the assignment submission. Do not forget to keep the link setting as *"Anyone with the link can view"* without explicit permission.
5. This assignment must be done individually. No group work is allowed. Discuss but do not copy!
6. A single video with explanation of all the questions needs to be submitted.

Questions:

1. [Interrupt] Design a circuit in Tinkercad which can switch an LED ON when a push-button is pressed. The circuit should switch off the LED when the push button is released. Make sure you use interrupts (refer to discussion done during class) while writing code for this.

2. [Level Alert] Waste management is a tedious task. We usually see overflowing garbage bins at the street corners. Under Swachh Bharath Abhiyan, state municipal corporation has decided to clean the garbage bins as and when they are full. Design a system that can help them in their initiative.
   [Hint: A system which indicates that the garbage bin is brimming. You may use some LED or Buzzer as an indicator for prototyping as part of this assignment].

3. [Greenhouse LED display] Natasha owns a greenhouse, where she grows lemons. Temperature plays a crucial role in the growth of the plant. Too low or too high temperatures can damage the plant or affect its growth. She wants to monitor the temperature inside the greenhouse. Design a simulation prototype to help her in maintaining the temperature. All that she needs is the display of current temperature along with a color-coded LED grid for her information about the greenhouse condition. You can use the following as the reference temperature limits.

| S.No. | Temperature Limits | Display | LED Color |
|---|---|---|---|
| 01. | < 22 °C | Too Cold: <Temp. value> | Blue |
| 02. | 22 °C to 32 °C | Ideal Temp: <Temp value> | Green |
| 03. | 32 °C to 38 °C | Moderately High: <Temp value> | Orange |
| 04. | > 38 °C | Too high: <Temp value> | Red |

4. [Ozone LCD display] You are part of a team responsible for detecting the level of ozone in the atmosphere. The prototype circuit you design will be fitted to an airplane to measure the level of ozone. In an ideal scenario, you would use an MQ131 sensor to detect ozone but Tinkercad does not have such a sensor. However, you can use the basic gas sensor available for prototyping. Display on an LCD, whether the level of ozone is safe or not. If the level of ozone is dangerously low, sound an alarm and switch on a red LED. If it is safe, do not sound any alarm and switch on a green LED. Find out the safe levels of Ozone for humans on internet.