ENGR 131 In-Class Activity: TI KIT – Early Warning System Part 1

Instruction

This in-class activity guides you through programming buzzer on the MSP430-Grove board pack and Includes three (3) deliverables.

Purpose of this project: This activity is to introduce you to using the TI MSP430 LaunchPad, Grove board, buzzer, to design a simple alert system. You will practice writing and modifying selection structures (if/else logic) to control how the buzzer responds to different conditions. This will help you understand how decision-making in code can be used to build real-world warning systems.

Your Task: Your task is to demonstrate that you can control the microcontroller, as well as its add-ons() and analyze the results of your prototype.
You must accomplish the following:

1. Draw a block diagram for a microcontroller set up.
2. Draw a flowchart that represents the selection structure for a given scenario.
3. Modify the selection structure in the given code such that the buzzer beeps as desired.

Organizing Your Work
Pay attention to how you format and organize your work in your Excel file and Word document. Below are some general instructions:

- Insert your diagram, pseudocode, final code, and picture of your board into your Word file.

Submission Instructions:

- Complete this assignment as **a team**. One team member of your team must submit your work on Brightspace, listing each member of your team in the submission process. All team members should review and approve the submission.

Deliverables

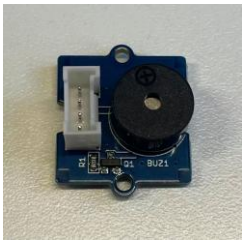
- **Word file (with diagram, pseudocode, final code, and picture of your board).**
  Name your Word file: ENGR131_ICA_TaumSauk_TeamNumber.docx

Submit your work through the designated **Brightspace > In-Class Activities Drop Box**.

Deliverables:

1. A simple block diagram that demonstrates the information flow (microcontroller → buzzer).
2. A flowchart that demonstrates the logics described in the scenario.
3. A copy of the final Energia code your team developed.
4. A picture of the physical prototype.

Background/Technical Content:



A buzzer is a small device that produces sound when electricity is applied. Early buzzers, developed in the 19th century, were mainly used for signaling in offices, factories, and homes, much like an electric doorbell (Galang, 2025). Over time, buzzers became common in alarms, appliances, and game shows, where a quick sound could capture attention or signal an important event. Today, buzzers are found in everyday devices such as microwaves, cars, and warning systems, serving

as simple but reliable alerts. In our activity, the buzzer will act as an alarm that warns us when the "water level" gets too high, just like in real-world safety systems.

To build this system, we need more than just hardware—we also need logic. In programming, selection structures are used to depict alternative courses of action based on decisions. This structure allows programmers to apply a computer's decision-making capabilities (Gobil, 2009). In our case, the decision is simple: *if the water level rises above a safe threshold, the buzzer turns on; if it remains below, the buzzer stays silent.* By combining a sensor with a buzzer and a selection structure, we transform abstract code into a hands-on warning system that mirrors the kind of technology engineers design to keep people safe.

References

Galang, A. M. (2025, April 14). History of buzzers: Evolution from signaling system to wireless buzzers. Trebisky Buzzers. https://www.trebisky.com/post/history-of-wireless-buzzers?srsltid=AfmBOopR9WxRg-nyWE-w_PB1VLtLWzTkxEYU4n_Gjpl0-f4VsQlyFP4p

Gobil, A. R., Shukor, Z., & Mohtar, I. A. (2009). Novice difficulties in selection structure. *2009 International Conference on Electrical Engineering and Informatics*, 351–356. https://doi.org/10.1109/iceei.2009.5254715

Learning Objectives Your work will be graded on demonstration of proficiency of the following learning objectives:	**Did you address this?**
UC02 – Describe systems or processes using schematic diagrams with inputs, outputs, and accumulations	
IF03 – Generate testable prototypes for a set of potential solutions.	
DV01 – Efficient use of engineering tools for basic statistics (Excel functions)	
PC05 - Fully address all parts of assignment by following instructions and completing all work.	
TW02 - Document all contributions to the team performance with evidence that these contributions are significant.	