

## 9. INTRUDER ALARM

Do you have a nosy brother or sister that will not stay out of your room? Maybe you have a special diary or keepsake in a drawer that you want to protect from prying eyes. Did you know you can program your `Node` to alert you to intruders?

Create your own personalized program. Create instructions on how to build your program and seek feedback from team members to ensure it is user friendly and easy to replicate.

### Objectives

- Decompose problems to facilitate the design, implementation, and review of programs.
- Seek and incorporate feedback from team members and users to refine a solution that meets user needs.
- Systematically test and refine programs.

### Materials and Equipment

- Data collection system
- `Node`

### Safety

Follow your normal classroom safety procedures.

### Procedure

#### ***Part 1 – Choosing an Input***

You have several inputs to choose from to create your intruder alarm. A couple such examples include using the change in brightness or amplitude of light or motion detected by the acceleration sensor. Think about various scenarios and replicate those conditions.

1. Think about where and how you are going to place the `Node` as well as what you are protecting. These variables will affect the input you choose.
2. Once you have decided on the input, write down your choice and why you picked it in Table 1 under Data Collection.

#### ***Part 2 - Choosing an Output***

1. Now it is time to choose your output. How are you going to be alerted to the intruder?
2. Once you have decided on the output, write down your choice and why you picked it in Table 1.

#### ***Part 3 – Build the Program and Submit for Initial Feedback***

1. Select Sensor Data in SPARKvue and connect your `Node` to your device.
2. Click on the Code icon and begin the initial design of your program.
3. Once you have decided on the first trial of your program, save according to your teacher's directions. Make sure you use a title you can easily identify as your own.

4. Write up your algorithm (set of directions) and submit to a partner for replication. It will be your partner's responsibility to write feedback on your initial program and to also submit any information regarding bugs (parts of the program that didn't work) that are identified. Write in these comments in Table 2 and use to modify your program.

**Part 4 - Modify your Program and Finalize Product**

1. Based on user feedback, make any necessary changes to your program and/or algorithm. Save the file according to your teacher's instructions. Make sure to identify as Version 2.
2. Once complete, submit to your partner for final product review.
3. Take the second round of feedback and write in their comments in Table 3. You will use these to make the final changes to your program and/or algorithm.
4. Your final task is to submit your final algorithm and include a detailed description of how your intruder alarm will help the user. Save your final files according to your teacher's directions. Make sure to identify as Final Version.

**Data Collection**

Table 1: Input and output choices and reasoning

Sensor Picks	Reasoning
Input:	
Output:	

Table 2: Initial feedback from user

Feedback from User: First Round

Table 3: Second round of feedback from user

Feedback from User: Second Round

### Questions and Analysis

1. Did you follow a process to plan for your initial program? If so, how did you decompose the problem?
2. What scenario did you replicate to design your program?
3. Were there any bugs, or issues with your initial program that were identified? If so, how did you modify your program to correct?
4. What was the greatest challenge you faced in this process and how did you work through it?