

# Senior Design Project Proposal for Year 2023

## ***Forget Me Not***

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### **1. Introduction**

Describe the background and motivation of your topic/project, and address the following questions.

- Why you want to choose this topic? What are the benefits?
  - Many people forget important items when they leave home, which can cost time and money. As one of those people, I wanted to make a device that will prevent you from leaving home without an item or items of your choosing, as well as help you locate said items when lost.
- What major functions does this topic require?
  - Certain functions: these functions will almost certainly be in the final design.
    - You attach device A to an item. It should be small enough to be taped to a keycard, preferably small enough to be taped to a house key. If you try and go through a door without device A on your person, device B prevents the door from closing and calls or texts your phone.
    - You can use a button on device B to cause device A to make a loud beeping noise, in order to locate it.
  - Possible functions: more research needs to be done to decide if these functions will make it into the final design. The first step would be to make an appointment with my faculty advisor.
    - Device B will keep track of the dates and times it is activated, and for what purpose.
    - Device B will allow the door to close if the user does not come back through it within a reasonable time period. This would almost certainly require an additional device to force the door closed.
    - A keypad or other device can be attached to the door to open it in the event the user is locked out. This would require a motorized lock to be placed inside the door if it doesn't already have one. If the door already has a motorized lock, the wiring would need to be redone by a technician.

- What industrial/academic standards does it require?
  - The project should be able to avoid PCB and IC fabrication by using microcontrollers and other general purpose circuit boards. Some data might be stored on the cloud, but a connection to the user's phone will be required.
- Any existing products in the market? If so, pros and cons? Do they follow the standards aforementioned?
  - 'Tile' is the most popular product similar to this design. Virtually all other existing products are not substantially different from Tile. [2][3]
    - It is \$20. [1]
    - Devices A and B are combined into a mobile package, which means it cannot prevent a door from closing. It is also too small to have functional buttons, so it is instead controlled from your phone. This means you cannot use it to locate your phone. [1]
    - Alerts you if you leave something behind. [1]
    - Helps you locate the item within 76 meters. [1]
    - Is arguably too large to be taped to a keycard, but certainly too large to be taped to a house key. To get around this, it is designed to be attached to a keychain. [1]
- What is your project's major advantage in comparison to others?
  - It can help you find your phone.
  - It can prevent your door from closing, which is useful for autolocking doors, the obstacle that gave me the idea for this project in the first place.
  - Ideally it would be smaller.
  - It keeps track of when you use it, and for what purpose.

## 2. Proposed Design

### Function description and breakdown

Fully describe the functionalities of your project and what you want to accomplish at the end of senior design.

- Certain functions: these functions will almost certainly be in the final design.
  - You attach device A to an item. It should be small enough to be taped to a keycard, preferably small enough to be taped to a house key. If you try and go through a door without device A on your person, device B prevents the door from closing and calls or texts your phone.
  - You can use a button on device B to cause device A to make a loud beeping noise, in order to locate it.
- Possible functions: more research needs to be done to decide if these functions will make it into the final design. The first step would be to make an appointment with my faculty advisor.
  - Device B will keep track of the dates and times it is activated, and for what purpose.
  - Device B will allow the door to close if the user does not come back through it within a reasonable time period. This would almost certainly require an additional device to force the door closed.
  - A keypad or other device can be attached to the door to open it in the event the user is locked out. This would require a motorized lock to be placed inside the door if it doesn't already have one. If the door already has a motorized lock, the wiring would need to be redone by a technician.
- By the end of senior design, I want to have made an affordable product that can help users avoid forgetting things in a way not fully explored by other products, without requiring undue effort, technician installation, or security problems.

Breakdown the entire project to feasible modules. Draw the schematic/diagram for data flow and each functional module.

- Device A
- Device B

Skills needed for the project.

- Wireless communications
- Robotics (barely any)
- Embedded systems

### Specification and design constraints

Describe the specification of the entire project and each module in details, including (if applicable) but not limited to the following:

- Inputs and outputs of the entire project and each module
  - Inputs of project
    - Keypad
  - Outputs of project
    - Door close apparatus
    - Phone communication
    - Beeping
  - Inputs of Modules
    - Device A
      - Wireless communication
      - Keypad
    - Device B
      - Wireless communication
  - Outputs of Modules
    - Device A
      - Wireless communication
      - Phone communication
    - Device B
      - Wireless communication
      - Beeping
- Power/voltage/current requirements of each module
  - This proposal is too long already

- Mechanical power/workload (if applicable) requirements
  - Basically none
- Data transmission protocol/standard among each module
  - Bluetooth is the current plan
- Responding time/delay, data throughput, etc.
  - Negligible on human timescale, though phone communication might take a few seconds.
- Measurement range, sensitivities, etc.
- Physical dimensions, weight, etc.
  - Ideally device A is small enough to tape to a house key and device B is small enough to mount on a door without permanently altering the door.

### 3. Major Components/Parts

part description	function	amount needed / unit price	subtotal	purchase link	datasheet link
Device A	Tracker	1			
Device B	Brain/User Input	1			

### 4. Responsibilities of Team Members

Byron: Do the work you say you will on time, like every partner for any final project you've had for the past 3 years has failed to do.

## 5. Timeline and Milestones

The timeline should be planned for every 2 weeks or by month for both EE 497 and EE 498, and should be followed and checked to ensure the project completeness. It should be reasonable and certain flexibility is allowed. Yet too much delay will result in lower grades.

Weeks (xx/xx - xx/xx)	Team member 1's tasks	Team member 2's tasks	Team member 3's tasks
02/12-02/25	Meet with academic advisor to figure out what functions to include and what general parts to buy. Create full proposal.		
02/26-04/22	Complete all software design.		

## 6. References

- [1] Tile, "Black Mate + Premium," *tile.com*. [Online]. Available: <https://www.tile.com/product/black-mate-premium>. [Accessed: Feb. 10, 2023].
- [2] E. Alt, "Apps, Gadgets, And Services To Help You Stop Forgetting And Losing Stuff," *everplans.com*. Available: <https://www.everplans.com/articles/apps-gadgets-and-services-to-help-you-stop-forgetting-and-losing-stuff>. [Accessed: Feb. 10, 2023].
- [3] L. Campbell, "The Best Products For People Who Keep Losing Things," *rd.com*, Aug. 15, 2021. [Online]. Available: <https://www.rd.com/list/products-for-people-who-lose-things/>. [Accessed: Feb. 10, 2023].