

## Team 10: IdentiKey

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Many companies/institutions such as Calvin College have large collections of keys that are used for access to dozens or even hundreds of unique locks. These keys are a necessary burden because the school/organization cannot distribute master keys freely. Rather, a unique key is required for many doors and buildings. As a result, institutions end up with a substantial number of keys. This large number of keys is cumbersome to manage in an organized and efficient manner.

Team 10 proposes a solution that addresses the burden of mass key management. For this project, we aim to create a system that recognizes keys based on what doors they open, sorts them accordingly, and also allows users to store and retrieve keys easily. The goal of this system is to make mass key management quick, convenient, and secure.

In order to accomplish this, the proposed system will store keys using a modified belt and pulley system. The belt will have multiple hooks attached to it to hold rings of one or more keys. The system will allow a user to deposit a key by presenting one hook in an isolated window to the user. Once a key is hung on the hook, a door will close and lock over the isolated window to fully secure the keys and prevent unauthorized access. A touchscreen with its own GUI (Graphical User Interface) will be in place to accept user input such as passwords and key selection. In order to identify the keys, a RFID (Radio Frequency Identification) tag reader will scan a tag on the key ring when it is placed into the machine. Once the tag is read, the system will remember which hook it is placed on for future use. The pulleys will be driven by a stepper

motor, providing the ability to track the rotational distance of the motor and thus the hook and key locations with ease.

This system will reduce human error by automatically keeping track of a key ring's location, eliminating the possibility of misplacing a key ring in storage. The system is also secure, keeping unwanted intruders from accessing the keys and potentially jeopardizing the safety of others. We believe this system will also save time for the user by automating the key storage and retrieval process. Below is a basic block diagram of how our system will function, and a 3D rendering of what the final, "finished" product could look like:

