Automated Locker

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Purpose:

In school, students with special needs may have difficulty opening the standard lockers provided. For this reason, we are developing an automated locker for a student named Jacob Dutka at Alden high school. With this automated locker, Jacob will be able to be able to unlock and access his locker with ease.

Proposed Solution:

When fully implemented, Jacob will be able to walk up and unlock his locker by placing an RFID tag near the scanner on the locker. Once the tag is recognized, the locker will illuminate a green LED as well as opening slightly on its own, indicating the scan was successful and access has been granted to the locker. If access was not granted, a red LED will illuminate and the locker will remain dormant.

Features & Functionality:

Basic Interface: Instead of a combination dial, the lock will use an RFID scanner for authentication.
Manual Override: In case of an emergency, authorized persons can unlock the locker using a key. This is in addition to the RFID tags. Keys will be provided to parents and administration.
Automatic Door: When unlocked, the locker door will open automatically to make the locker more accessible to Jacob.
Custom Colored 3D Printed Parts: The 3D printed parts will be printed using plastics of Jacob's favorite colors, red and black.
Multiple RFID Tags: Jacob will have at least two RFID tags. Extra RFID tags will be provided to parents and staff.
Power Button: A power button will be installed on the lock interface to turn on the system, indicated by a light on the panel. The system will turn off after a set amount of time to preserve battery life.
Status LEDs: LED(s) to indicate the power status of the system and whether the locker has been unlocked or not.

Constraints:

Jacob can open the locker: The locker must be accessible such that it can be unlocked and opened by Jacob without help from another person.
DC Power: The device must use DC power.
Manual override: A physical lock and key mechanism must be implemented as a functional alternative to the automatic mechanism in case of emergencies.
Consistency with existing automated lockers: The lock panel and power delivery system must be consistent with the existing working models of automated lockers implemented by Alden HS.