

The Dorm Room Genie

We propose to implement a dorm room automation system which we call The Dorm Room Genie. Through a system of keyboard inputs, push buttons, sensors, and displays, the Dorm Room Genie provides a student with a customizable way to manage their dorm room with the ultimate goal of making the student's life easier. We currently plan to provide the following functionality to the dorm room genie: a door lock, a burglar alarm system, lighting control, an alarm clock, and a display and messaging feature. The advantage of this implementation is that it is highly modular, and if we do not have time to implement all of the planned features, we will still have some functionality.

The Door Lock

Students are issued keys by which to access their rooms, but far too often a key is forgotten inside the room leaving someone locked out. After a lockout, a student must go to the front desk and obtain the spare key. If the spare key was locked inside as well, the student must call someone to come over and open their door. Needless to say, if you locked yourself out during a late-night bathroom run, this is a little inconvenient.

The door lock allows the student to set an alphanumeric access code which will release the door latch and let the student enter. The student will be able to set their own access code, and change it whenever they choose. The lock can also be set to "unlock" mode. This will allow a student to leave the door unlocked if they will be frequently leaving or entering, or if they wish to allow anyone to come in while they are inside. The lock will also have an "inactive" mode. This mode will allow the user to disable the keypad entry while they are inside. This will provide an extra layer of security as the only way to gain entry at that point would be to obtain the spare key. This feature could only be turned on while the student is inside via the inside user interface and would be automatically disabled if the student opens the door. This will prevent the student from accidentally disabling the keypad and locking themselves out.

Additional Parts Required: Electronic Latch (but recognizing that this is an expensive item, often not useful to 6.111 students, we'll use an LED to indicate the status "locked" or "unlocked" of the latch.)

The Burglar Alarm System

The Dorm Room Genie also implements a burglar alarm. The alarm provides additional security by sounding an alarm when the door is opened. This can be useful both when the student is home, and away from their room. While at home, a sleeping student will be awoken, and able to intercept the intruder. If away, friends nearby could respond. Additionally, when the student returns home, the system will inform him of any intrusions, and when they occurred. The user would be able to customize this feature as well as have the ability to disable it.

Additional Parts Required: magnetic sensor switch, alarm buzzer

The Lighting Control

The lighting dimming control circuitry can be set to “off”, “manual”, “automatic”, and “sleep” mode. When in “off” mode, the lights will remain off. In “manual” mode, the user can manually adjust the brightness of the lights. In “automatic” mode, the lights will automatically adjust their brightness based upon input from a photo-electric sensor. As the sun sets, or lighting is otherwise reduced, they will turn themselves on. The lighting module also interfaces with other modules. When the student returns home, the lights will switch from “off” to “automatic” mode. The lighting module also interfaces with the burglar alarm, flashing the lights when an unauthorized entry is detected. Finally, the lighting module can be put in “sleep” mode. During “sleep” mode, the lights remain off, even if the student returns home during while it is dark – an important feature for middle-of-the-night bathroom visits. While in “sleep” mode, the lighting control circuitry also interacts with the alarm clock as described below.

Additional Parts Required: photo-electric sensor, digitally controlled dimming module for a lamp.

The Alarm Clock

The alarm clock allows the student to be gently awoken by light, even if their curtains are closed. The lights will gradually brighten, reaching their brightest level at the pre-programmed time. If the system is not deactivated, the lights will begin to flash, and eventually, the burglar alarm will sound in shorts bursts if the student fails to acknowledge the wake-up sequence.

The Display & Messaging Feature

Many students have a whiteboard or some other way of receiving messages while they are away. The display and messaging feature will provide this functionality, in addition to providing a display for the user interface with the other modules.

The display for the user interface will show the current status of the door lock, burglar alarm, lighting control, and alarm clock features. This will allow a user to verify if their settings are correct, and make changes as needed.

The messaging feature will allow users on the outside to leave messages while the student is away. The system will record the messages typed in by other students and display them to the student upon their return.