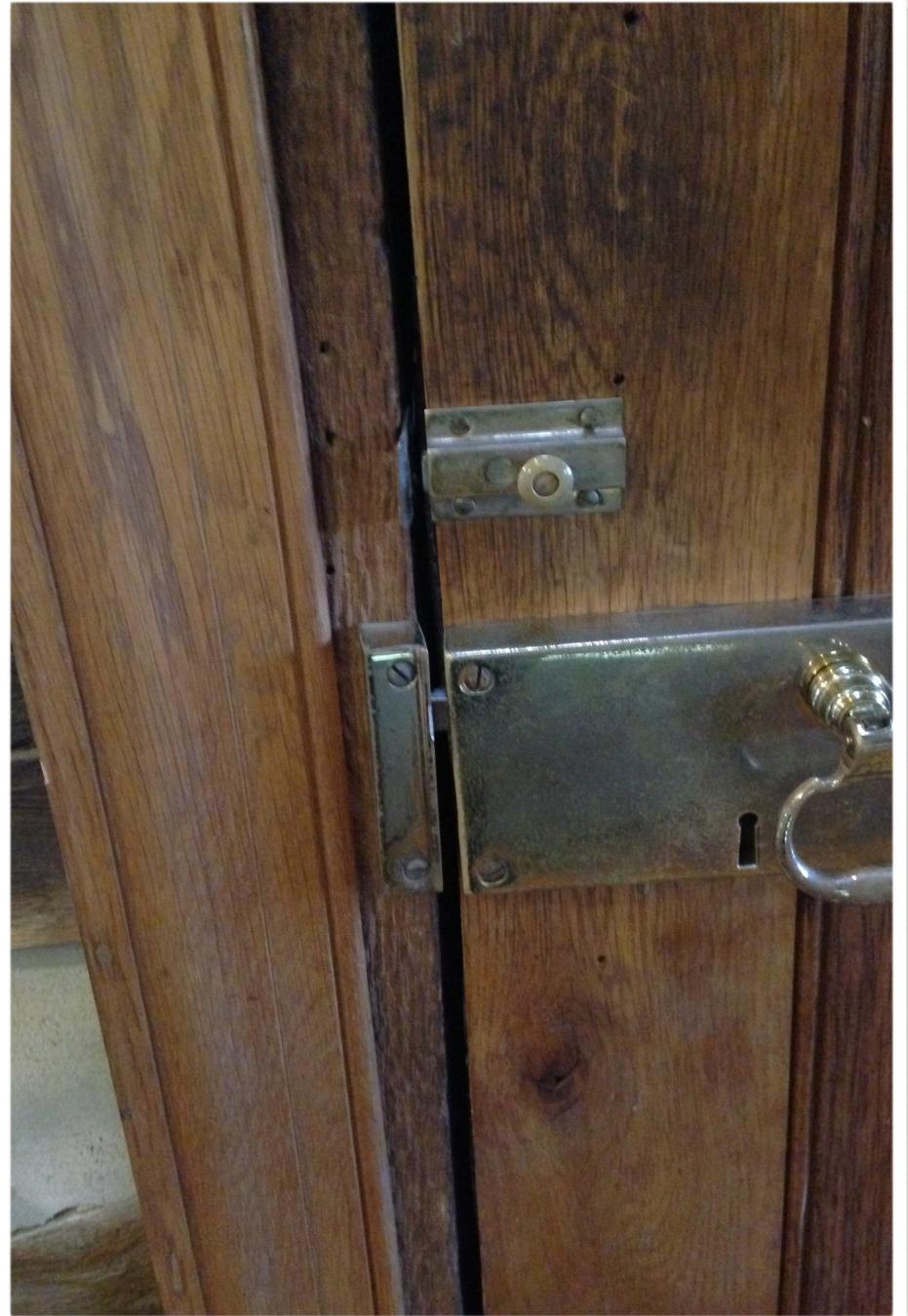


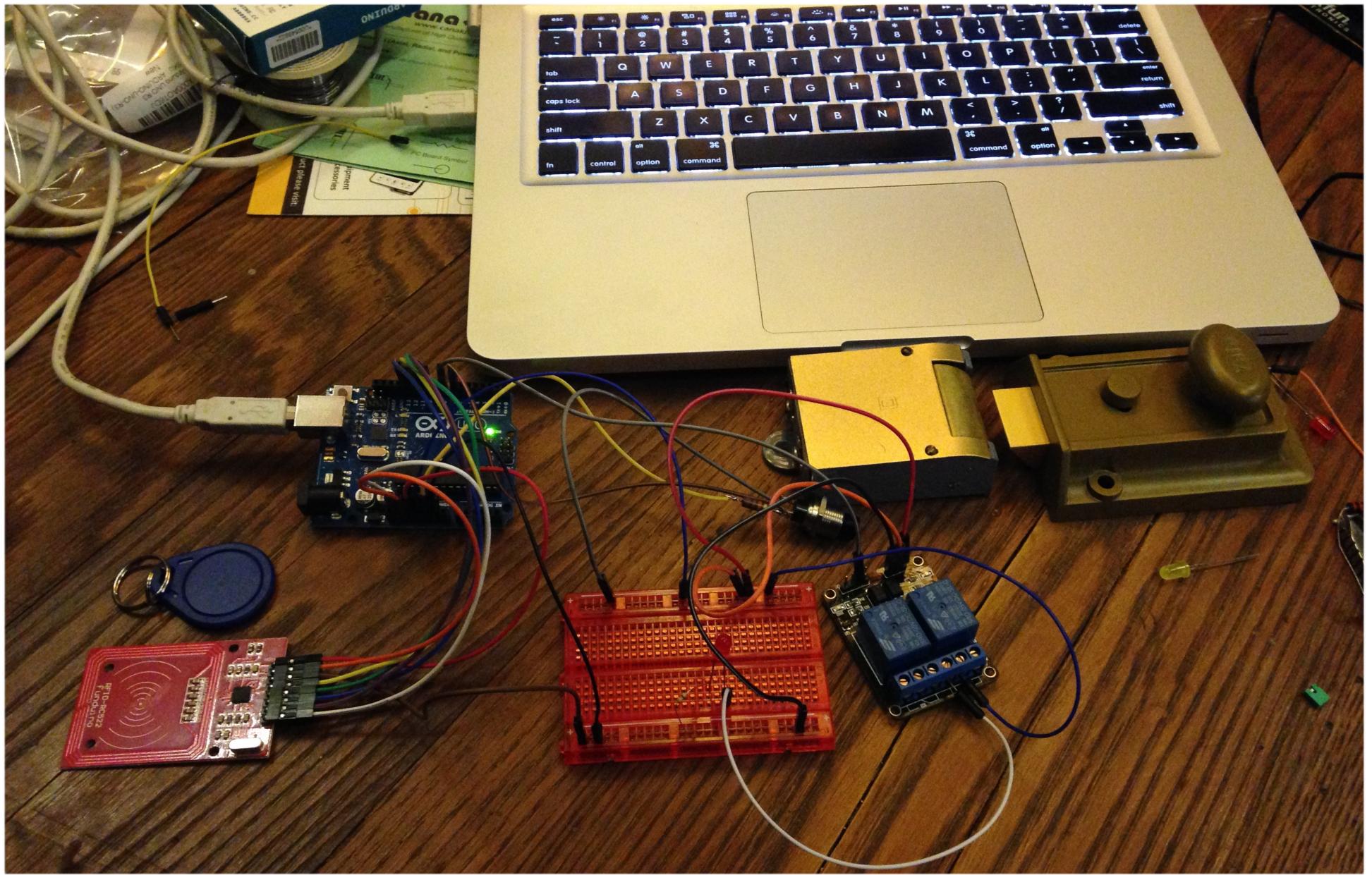
IoT Experiments Winter 2013-14

Smart Door Lock

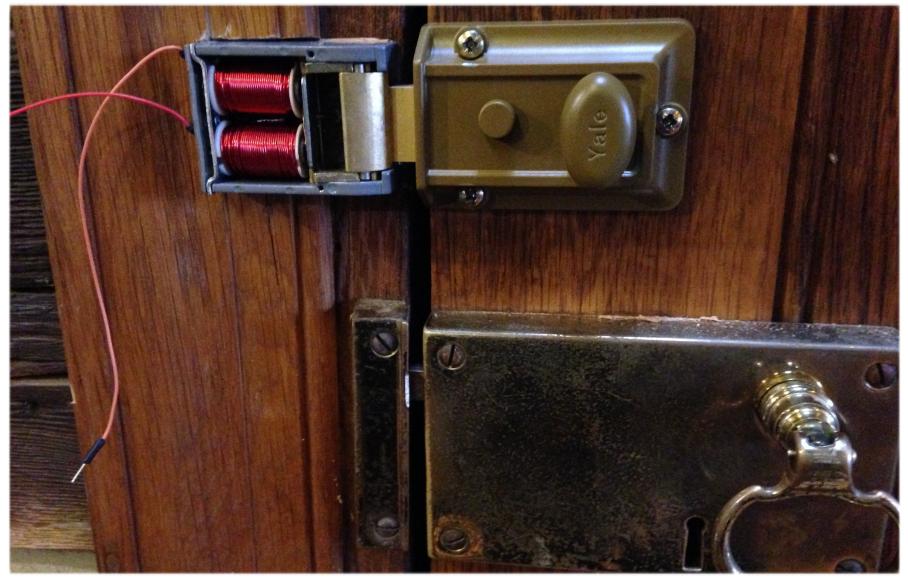
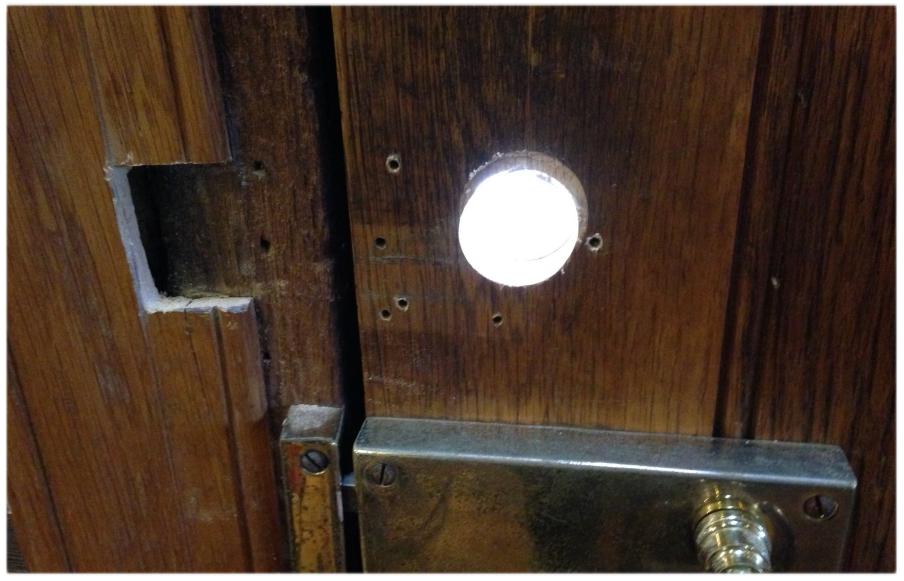
Our 200 year old cabin has a fine surface-mounted key lock. Even if we wanted to replace it with a commercial smart lock, there were no commercially-available surface-mount smart locks.

Time to make something.





Just have to integrate a surface-mount deadbolt, an electric strike plate, an Arduino with a SmartThings shield, an NFC reader and a couple of relays. No problem!

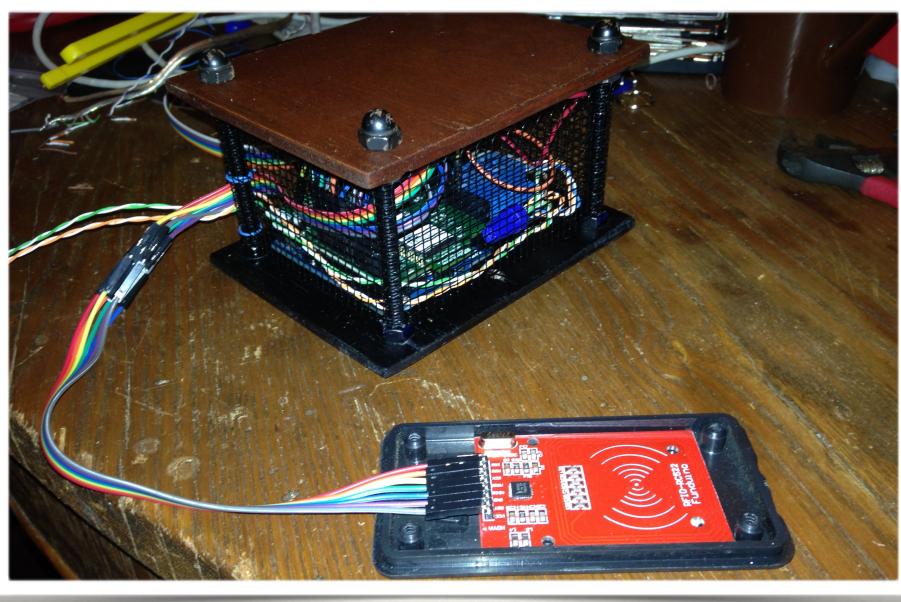


The deadbolt required new tools: a large hole saw and a 1/2" drill to power through 2 inches of old oak door.

Installation is simply a matter of drilling per the template.

The electric strike took a bit of thinking and some careful fitting, but worked in well.

The only snag was that I used a level to set up the lock and strike plate, and the original lock is not square to the ground, so they're not parallel.



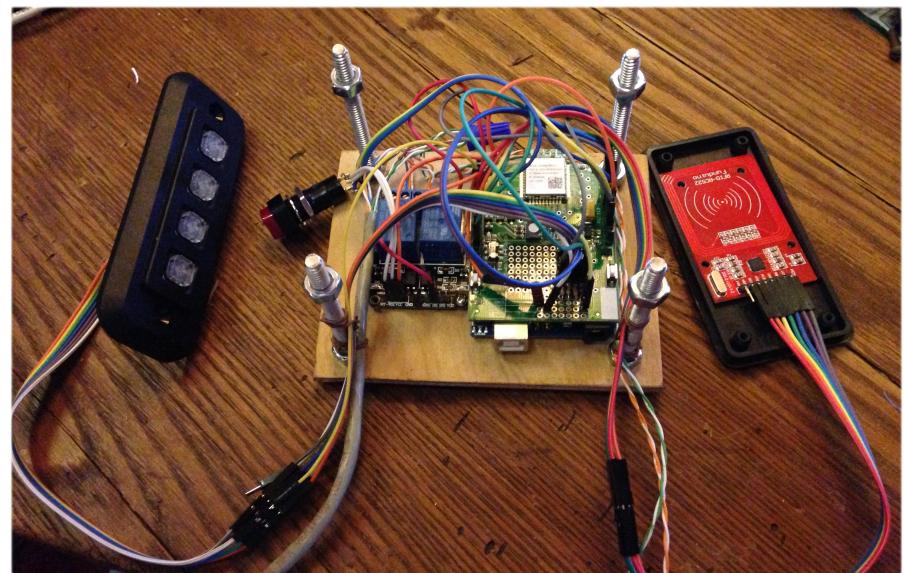
That 1/2" drill came in handy when it was time to mount the NFC reader and had to run a cable through 10 inches of ancient hardwood. There wasn't a good way to make the ribbon cable small enough to go through any reasonable hole, so I used Cat-5.

One can't put a modern box on the wall of this old house, so I built what I figured a 1920s electronics enthusiast might have made. The built-in Arduino LED puts out a nice, tube-y shade of blue to match.

Coding this up wasn't too tough. The SmartThings library is simple to work with. The NFC reader card software is pretty straightforward, which is good since the very liberal commenting is in Chinese.

Pretty sweet once it's all in place! Swipe an NFC-tagged car key, purse, or wallet past the reader and the door unlocks to let you in the house. The SmartThings shield puts the lock on their IoT platform, so it's also controllable from our smartphones.

Usability Issues and Lessons Learned



As with any prototype, using something in everyday life exposes issues that might not have seemed to be so when planning.

- Leaving the house required two hands, one for each lock. The kids proposed a button, which was easy to add in and tested successfully. Used constantly now.
- I was the first person to lock myself out: no NFC, no phone, no deadbolt key. While waiting for the family to get home I planned out how to add a keypad. Once that arrived, I added some new code to poll and read the keys and reworked the outside installation to incorporate the keypad and the NFC reader below it.
- Most important lesson: in the end, we use the keypad almost exclusively. It's faster to key in 4 digits than to pull out your phone, wallet, or keys. The SmartThings remote is useful to let others in and could be extended to provide guest access.

Results: The family grumbled a bit when it was installed, but I heard much more grumbling when it wasn't working for one reason or another. Success!