Our final project ideas were primarily inspired by inconveniences found in day to day life. Our ideas were also subject to a number of constraints. We are also frugal individuals, so we wanted to be able to solve whichever problem we chose with resources on hand. Additionally our group’s areas of expertise are limited to coding and rudimentary electrical engineering skills. Finally, we are busy people, our project scope needed to adhere to reasonable time constraints, this makes familiar technologies/implementations ideal.  
  
Our system for selecting a design followed this pattern:   
  
 Designate a problem  
 Determine if we have the expertise required to solve the problem   
 Can we implement our solution at low cost, preferably with materials on-hand

The initial idea was to create a timed food safe to help prevent night eating. We quickly passed on this idea as it would require investing in new hardware, and would likely require greater electrical engineering skills than we possess.

Our second idea was a dog location system. The initial idea involved using multiple stationary Arduino boards equipped with transceivers to message another board attached to a dog. We could then measure differences in response times to gauge where the animal was located. It turns out radio waves go super-fast, like, speed of light fast. We determined that with the Arduinos slow clock speed it would likely be impossible to measure any appreciable difference in transmission times.   
There was also a slew of other potential problems…   
  
 Relating to the behavior of radio waves:   
 H*ow would our device function with obstacles obstructing paths, and how far off would these obstructions throw our measurements?*  
 Relating to transceiver functionality:  
 *From our understanding, the transceiver sends multiple duplicate transmissions to increase probability of delivery, how would this impact our project?   
 How does the transceiver handle receiving two transmissions arriving nanoseconds apart?*

Relating to Microcontrollers:  
 *What are the chances our Microcontrollers have slightly varying clock speeds?*Another potential solution involved using a stationary Arduino/transceiver/thermometer combo to communicate with an Arduino/transceiver/thermometer combo on the dog. Variations in temperature could be used to deduce the dog’s location, specifically inside vs outside. However, failure would occur if both thermometers read the same temperature while the dog was outside. This could happen as a result of internal temperature fluctuations, the dog’s body heat, and the dog’s location.   
  
There is also the additional problem of keeping the animal mounted microcontroller intact. Dogs do stupid things, a dog mounted microcontroller would have to be nigh indestructible.  
  
We ultimately decided to construct a wireless master switch. Wanting to turn things off or on without wanting to get up or out of bed is a common life experience. Something that could be used with any appliance would also be ideal. We deduced that we could use two Arduino boards, a push button, two transceivers, an extension cord, and a 5v relay to make this happen.   
  
Getting one Arduino to toggle something attached to the other did not seem like it would be a problem, the code used in laboratory assignment four could be modified in order to achieve push button functionality. The problem lied in how exactly we were to connect the 5v relay to an extension cord. Being the novices at electrical work that we are, this appeared to be a daunting, if not dangerous task. After consulting some more experienced individuals we learned that our particular 5v relay should allow us to simply connect the cord to the relay without any additional circuitry. The completion of our project lied upon how exactly to hook up the extension cord to the relay. What we lacked in expertise, we made up for with courage. We took our best guess as to what-wire-goes-where and gave it a whirl. Our first attempt exploded, the wiring we used for relay/cord interfacing was too thin of a gauge. Our second attempt miraculously worked, with no further explosions, and zero injuries total.