Entrance Music Device
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Motivation: Everyone wants to have entrance music playing when they enter a room. When mounted on a wall next to a door, this device will allow that dream to become a reality. This device could also be used to play sound to notify homeowners when someone opens the front door. There's no sneaking into my home when there's an entrance music device at the front door.

Project Description: This system will play a stored sound when an object is within a threshold for the proximity sensor. The microcontroller will remain asleep until the sensor threshold is met, upon which one of the sounds will be sent to the speaker dependent on the proximity sensor value. An internal timer will be used to dictate the sample rate of the audio sample. This will fulfill the topic requirements by using timers, hardware interrupts, and DAC/ADC.

Milestones:
1. Part Selection (Comparator, Proximity Sensor, Linear Regulator, Batteries/Battery Pack, Speaker Power Amp, Speakers).
2. External circuitry set up on breadboard and tested. Sound file generation and loading it onto the microcontroller
3. Setup and configure all peripherals in code. Implement sound generator state machine
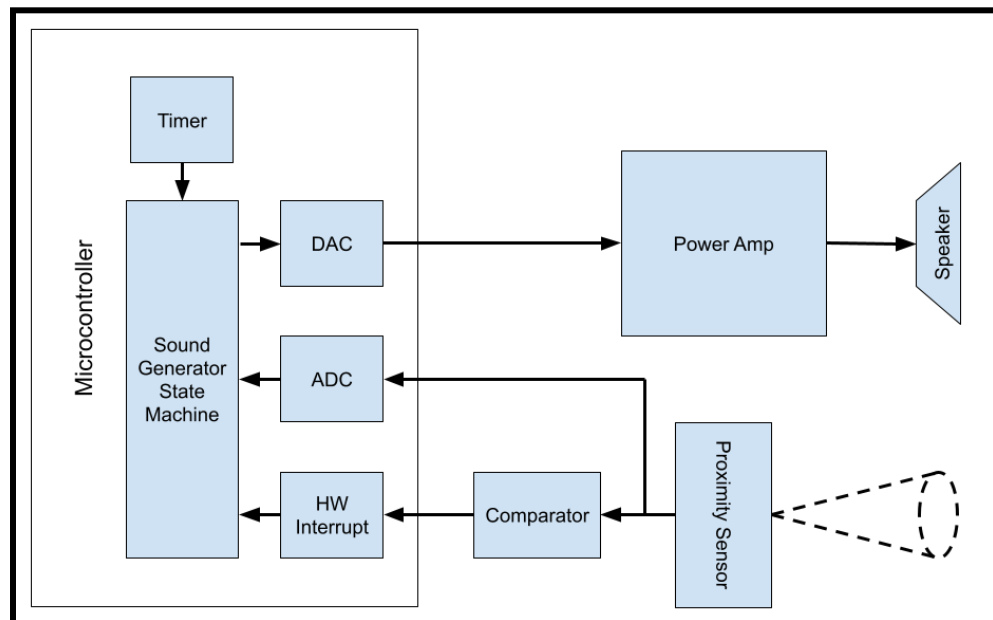4. Debug/test system.

Figure 1: Entrance Music Device Block Diagram