Project Title: Protean Alarm Clock

Team Name: Early Bird

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Project Abstract:
This project will consist of a stand-alone alarm clock with dynamic features designed to wake the user quickly and effectively. The alarm's sound will be unpredictable, and the user will have to think and interact with the clock to turn the alarm off. The technical challenges of the project will be primarily software-related: writing the programs to allow the user to set the clock and the alarm, as well as programs to control the alarm and the routines to allow the user to shut it off. Hardware challenges will deal with the implementation of the speaker and display screen for the clock and a variety of different sensors that will be used in the disabling routines.
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**Introduction:**
This alarm clock will be helpful for people who are able to sleep through a typical alarm or disable one in their sleep when the process becomes too routine. Most alarm clocks go off each time with the same sound, the notable exceptions being clocks that use a radio, CD, or mp3 player as the alarm. This clock aims to combine the obnoxiousness of a standard alarm with the spontaneity of a radio alarm by randomly selecting an alarm from a set of unpleasant tunes stored within the clock.

The clock is also intended to ensure that the user actually wakes up, rather than simply shutting off the alarm and falling asleep. Various methods have been used in other products, including clocks that roll or fly away and must be chased, but this clock will require cognitive processes to disable the alarm. The user will be required to perform tasks such as pressing a particular button or turning a dial a specified amount, and to answer simple multiple choice questions. The disabling sequence will change each time the alarm goes off, and an incorrect answer will lock the user out of the disabling function for 30 seconds before resetting the sequence.

**Similar Products:**
Various manufacturers have alarm clocks that use CD or mp3 players as the alarm, including the Sony and iLive models shown below. These products have an element of randomization, but rely on "alarms" – that is, music – stored externally, either on CDs or mp3 players, and are therefore more less obnoxious than standard alarm clocks.

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![Figure 1. Sony ICF-CD815 AM/FM Stereo CD Clock Radio with Dual Alarm](http://www.amazon.com/Sony-ICF-CD815-Stereo-Clock-Radio/dp/B000MXYPYW/ref=sr_1_1?ie=UTF8&s=electronics&qid=1233046687&sr=8-1)

![Figure 2. iLive IC618B Clock Radio](http://www.amazon.com/iLive-IC618B-Enhanced-Docking-Station/dp/B0015AOHDK/ref=sr_1_11?ie=UTF8&s=electronics&qid=1233047025&sr=1-11)
Both the Clocky and the Flying Alarm Clock (pictured below) require the user to chase them in order to disable the alarm. While this is undoubtedly more complicated than simply pressing a button, it does not require fine motor skills or cognitive processes, and hard-core sleepers can still shut them off without waking up.

![Figure 3. Clocky](http://www.uberreview.com/2007/04/look-at-clocky-go.htm)

![Figure 4. Flying Alarm Clock](http://www.slashgear.com/flying-alarm-clock-gets-you-up-142479/)

**Features:**
The alarm clock will:
- digitally display the time as set by the user
- sound an alarm at one or more user-selected times
- "randomly" choose an alarm from among pre-stored tunes
- require that the user input data in order to disable the alarm
- have a user-controlled volume setting
- allow the user to exclude particular tunes from being played
- run on battery power

Two high-level system diagrams are below, showing a clock with one display or an alternate version with separate displays for the clock and alarm disarming:
Figure 5. High-level system diagram

Figure 6. Alternate design with two displays
Cost Objectives/Components:
The anticipated cost of production is detailed below:

<table>
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<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Atmega32</td>
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<td>2 LCDs</td>
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<td>EEPROM</td>
<td>$0.50</td>
</tr>
<tr>
<td>speaker</td>
<td>$5.00</td>
</tr>
<tr>
<td>batteries</td>
<td>$5.00</td>
</tr>
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<td>sensors</td>
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<td>buttons</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$30.50</strong></td>
</tr>
</tbody>
</table>

Table 1. Expected Cost
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Timeline:
Bibliography:

All Electronics | Electronic and Electro-Mechanical Parts and Supplies.  


<http://mil.ufl.edu/4924/>.
