Project Proposal:

Arduino Snooze-Proof Alarm Clock

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MECH307
Mechatronics
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Overview

I designed my project to fix my deep-sleeping friend's bad habits. He never gets up after his phone alarm goes off and he just hits 'snooze'. That is why I have designed this perfect alarm clock to make sure he wakes up every morning. As shown in Figure 1, the device will have an LED for light noise, a buzzer for normal noise, and 2 DC motors on the side to cause chaotic motion and noise to force him to get out of bed to stop the alarm. The clock will also have a photoresistor to be able to wake him up when the sun comes up so he can have a productive day for once.

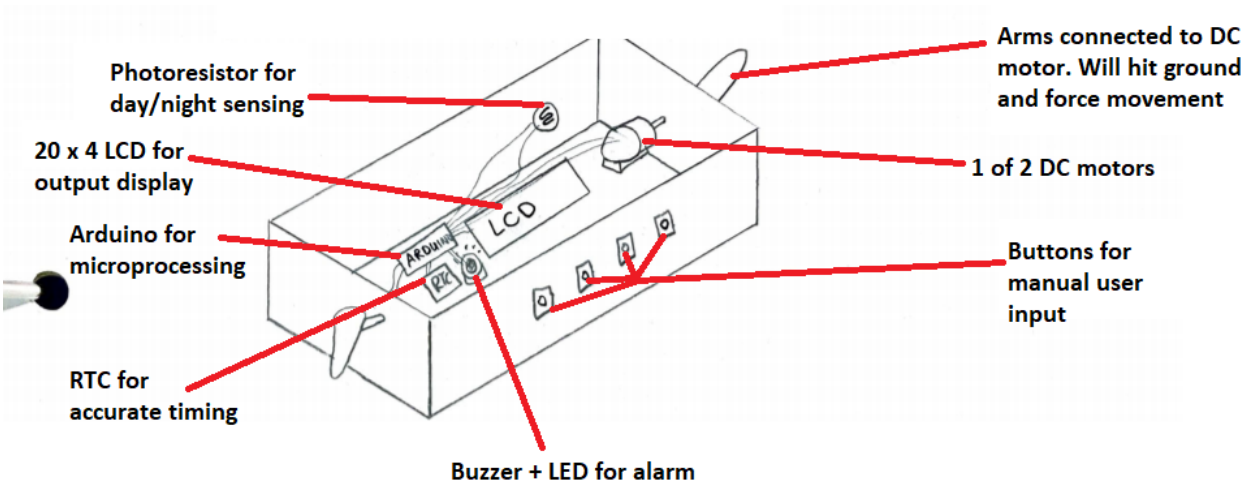

Figure 1: Entire Assembly Sectioned Labeled Isographic View

The motors and connecting arms can be better visualized as shown in Figure 2, below.

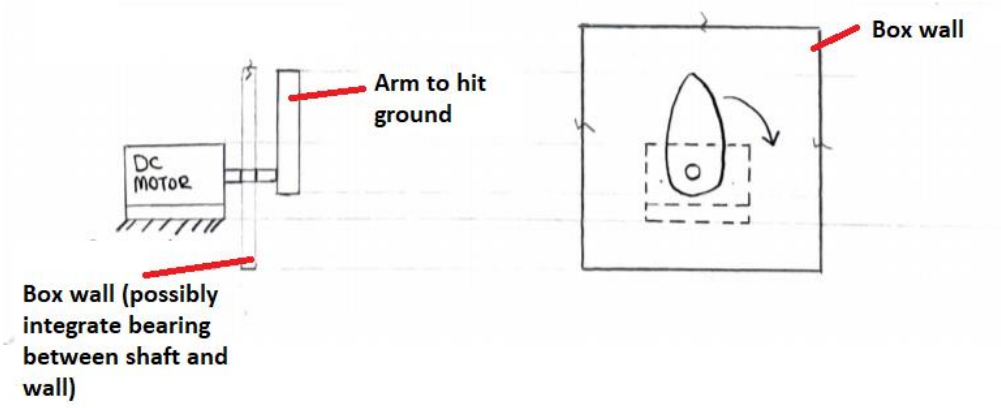

Figure 2: Mechanism Labeled Orthographic View

Functional Diagram

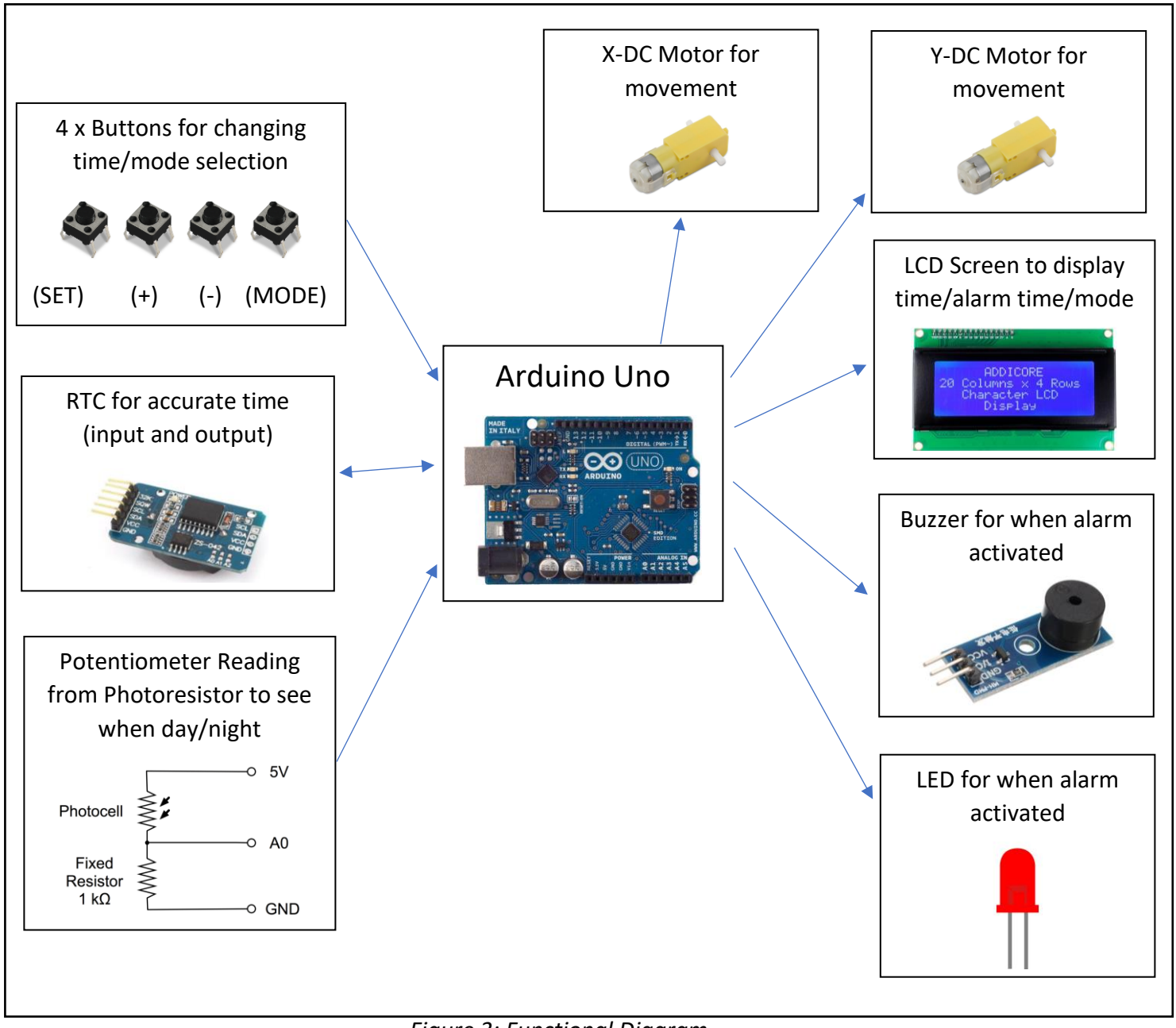

Figure 3: Functional Diagram

Proposed Elements

Elements proposed to be used are highlighted within the list below.

A. **Output Display (Required)**
   - LED
   - 7-segment digit display
   - LCD (20x4 IIC)
   - display screen

B. **Audio Output Device (Optional)**
   - buzzer
   - speaker with digitally pre-recorded music or voice
   - speaker with software-generated sound effects
   - speaker with software-controlled synthesized music or voice
   - any of the above with higher volume (e.g., through a transistor or amplifier circuit)

C. **Manual User Input** (for interaction with the user) **(Required)**
   - switch or button (x4)
   - potentiometer
   - joystick
   - keypad
   - keyboard
   - touch screen

D. **Automatic Sensor** (for response without user input) **(Required)**
   - limit or proximity switch
   - photo-optic pair
   - potentiometer
   - photocell (photoresistor)
   - temperature sensor
   - accelerometer
   - encoder

E. **Actuators, Mechanisms & Hardware (Required)**
   - actuators:
     - RC servo motor
     - solenoid
     - on-off dc motor
     - reversible dc motor
     - stepper motor (unipolar, bipolar)
     - PWM speed-controlled motor (x2)
   - mechanisms and hardware:
     - solid and reliable mechanical design, manufacturing, and assembly
     - interesting and effective use of linkages, cams, screws, levers, gears, etc.

- appropriate and effective use of 3D-printed and machined parts (3D Printed clock enclosure and 2x arms)

F. **Logic, Processing, and Control; AND Miscellaneous (functional elements not covered in the categories above) (Optional)**
    - open-loop control
    - programmed logic (button response, multiple modes)
    - menu-driven software (alarm setting/time changing)
    - calculations and data storage/retrieval (from RTC)
    - advanced and/or multiple interfaced microcontrollers
    - closed-loop feedback control
    - components not included in other categories
        - Real Time Clock (RTC)
        - PN2222A transistor
        - 2 x 1N4007 diodes
        - 3 x 220 ohm resistors