**ECE411: Industry Design Processes: HW # 3**

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**REV 3**

**Must**

• Have a box

• Have a switch

• Have a servo

• Have a battery

**Can**

• Have a second, hidden, switch for power turning the lid switch into a signal

• Have Motors and hidden wheels to create an interactive experience

• Have a second servo to make movements more distinct (one lifts lid, second flips switch)

• Have a Gyroscope to sense direction and speed for greater control on interaction.

• Have a proximity sensor to stay on the table

**May**

• Add LED/LCD/OLED display programmed to express emotion

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| **Marketing Requirements** | **Engineering Requirements** | **Justification** |
| 2-4 | 1. System should run on a 9V Battery | Increases the runtime of the device, and keeps the device portable. |
| 2, 3 | 1. The box dimensions should not exceed 6”x5”x3” | The small size keeps the product portable. This means it can be used as a small entertainment device such as a "Newton's cradle" or "infinite slinky" |
| 1, 2 | 1. Microcontroller should have a minimum of 1 PWM. Should have a minimum of 10 programmable I/O lines. Maximum of 9V. Minimum of 512 bytes of internal SRAM. Should be operated at milspec temperatures. | Ensures that the useless box can operate at room temperature, low power, and still run the necessary components. |
| 1, 2 | 1. Should have one motorized arm, one moveable door, and two switches. | The low number of actuators and inputs reduces the overall cost and complexity of the design. |
| 2 | 1. Production cost should not exceed $40. | This is based on competitive market and the non-commercialized nature of the device. |

**Marketing Requirements**

1. The system should be robust enough to withstand being dropped repeatedly as well as being water resistant. The switches must not break and be able to withstand constant use.
2. The system should be low cost for ease of Marketing.
3. The system should be portable. The device should be able to fit into a backpack pocket or briefcase compartment.

4. The system should be easy to use. The device will have at most two

switches.