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Yourself Alkhelaifi, Robert Fogg, Leo Garcia, Regan Garner

Mark Faust, Andrew Greenberg

ECE411 Industry Design Processes

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Team 10

Practicum HW #2 - Practicum Project Ideas

Electronic Hot/Cold Game #1

This is a 2 part design consisting of an emitter "tag" that can be placed somewhere and 1 or more "trackers" that have an RGB LED or audio output that denotes how close to the tag the tracker is. Far away Dark Blue or slow clicks, low tone. As the tracker is moved closer to the tag, the light changes to "warmer" colors purple, red, orange, yellow, white. Or clicks become faster, higher pitch tone. The goal is to find the tag first. In effect, this would work like the childhood game hot/cold but adds a competitive element in that a single tag could be searched for by multiple trackers.

Sensor	Antenna
Actuator	RGB LED, speaker/buzzer
Processor	ATMega328

Can Counter #2

You're only allowed to recycle 140 cans a day. It would be easy to create a can counter. The user drops the cans down a hole; the hole is only large enough for one can at a time. Each can is narrower than its body at each end. A laser at the end of the hole will shine through to the other side when a new can is inserted, and then be obstructed when the fat part of the can passes by the laser. This yields two sensor readings per can. The number of cans counted will be output to three 7-segment displays.

Sensor	Photoresistor
Actuator	7-segment display
Processor	ATMega328

Janky Simon Says #3

This project idea is essentially an interactive Simon-says toy. The toy will generate a pseudo-random sequence. Initially, it will output the first step in the sequence, represented by a combination of a colored LED and sound. The user is to mime the step. For each correct repetition from the user, the toy will add a step to the pseudo-random sequence. This repeats until the user correctly repeats the entire sequence, or until they make a mistake. The toy should react and indicate if the user has made a mistake. If the user correctly repeats the entire sequence, then the toy can indicate the player's success by playing a victory sound and LED light combination. The toy itself can be fixed in a 3D printed frame.

Sensor	Some determined number of pushbuttons
Actuator	Some determined number of LEDs, speaker
Processor	ATMega328

Pet Composer #4

A device that constantly plays some-what randomly generated, pleasant-sounding music that shifts the mood, tone, and tempo, based on the time-of-day, sensor data, user interaction, etc…(endless possibilities). If done right it could make a personalized soundtrack for any given day... a kind of Pet Composer!

The toughest part of this project would be writing code that can procedurally generate appealing random music with a generous range of variability to convey different moods, tones, tempos, while quickly transitioning according to feedback from the sensor data. Some clues on how to make this code work can be found in video games, as open-world games often implement a dynamic ambient soundtrack that functions similarly to this device, but with less randomness and in the digital world rather than a real one.

Sensor	The more the merrier
Actuator	Speaker
Processor	ATMega328

The Consensus:

As a team, we did a ranked choice vote, where each member ranked the other members' project proposals. The Hot/Cold game was deemed the winner, with the Can Counter, and Janky Simon Says tied at #2. We have begun research and development to further develop the Hot/Cold game to ensure that the idea is viable in the given development time.