

Project Proposal

Glove Commands: Simon Says

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Project Abstract

This project demonstrates how a glove can be used to interact with a game, in this case “Simon Says”. The glove will be outfitted with 5 flex sensors in order to detect individual finger movements. The movements will be translated into specific commands corresponding to the game. The color sequence will be displayed through a series of different colored LEDs. The idea is to have each command paired with a specific color. In order to repeat the sequence, the user will have to mimic the commands using his/her fingers. Whenever a particular colored LED lights up, a corresponding note will be played by the speaker. The object of the game is to repeat as many notes as possible in order after the computer plays a series of notes..

Strategy

Description of the overall design: Above

What platform: based on the Zilog Z16 chip and development platform.

What capabilities: Lots of GPIO, timers, analog inputs, interrupts.

What external: Outfitted Glove, 5 Flex Sensors and 5 colored LEDs or LED arrays (one corresponding to each finger), speaker

What software modules: LED manager, audio manager. Main control loop. Design goal is to make an abstraction layer for all IO devices so that new commands can easily be created based off different finger gestures. With more commands, the glove could provide input to more complex applications, like say keyboard input.

Unknowns

The major unknown at this point is how well the flex sensor can be outfitted over a glove and once in place, how well finger gestures can be read from that sensor. It might be difficult to distinguish an individual finger movement from all the noise collected by the sensors.

To overcome the above unknown, I plan to spend a considerable amount of time learning about how the Flex Sensor works, conducting numerous tests, and eventually developing a robust driver

Implementation Plan /Milestones

Use small Z16 kit, get one from system admin.

Acquire all components (LEDs, speaker, flex sensors, glove).

Write the following drivers:

1. Display driver (memory mapped to colored LED)
2. Audio output driver (takes ringtones and plays them from a buffer).
3. Text display module (scrolls messages across display, like greeting, score, etc).
4. Flex Sensor driver

Write game using drivers

Test app to verify abstraction layer for everything.

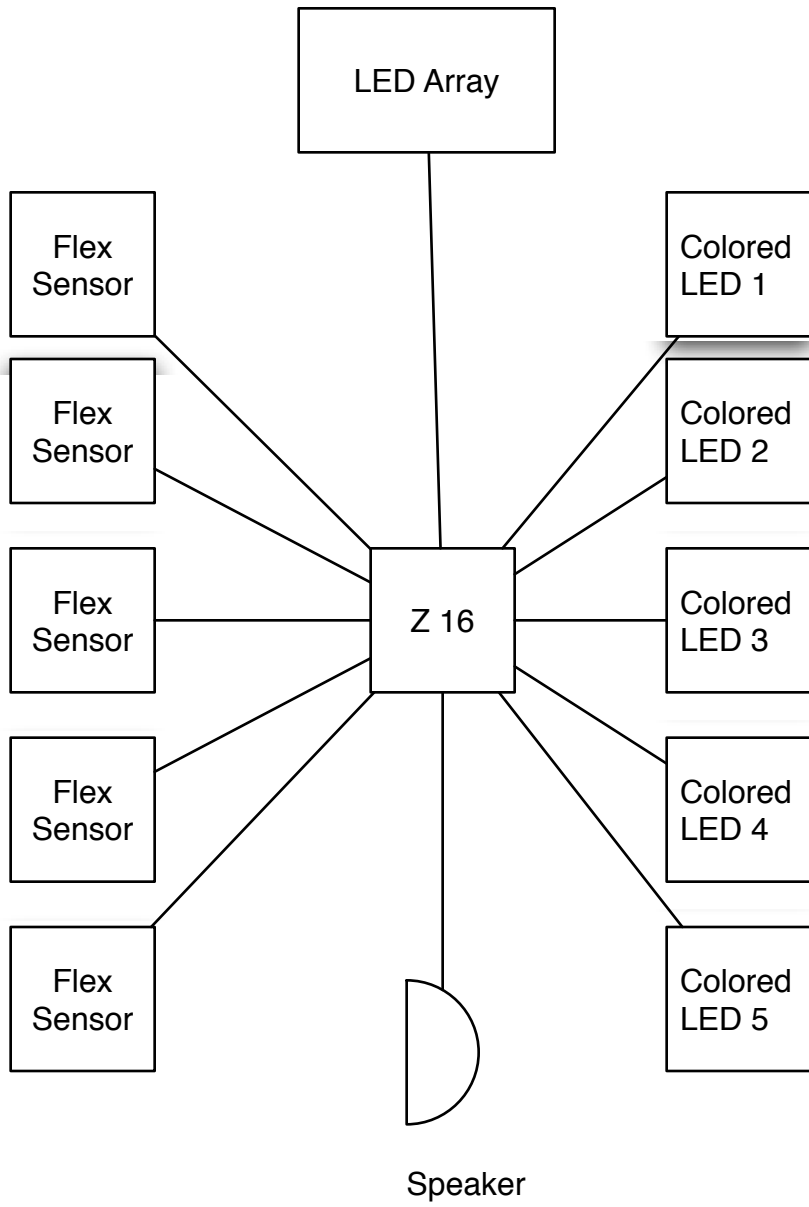
Test Game – Simon Says

Resources

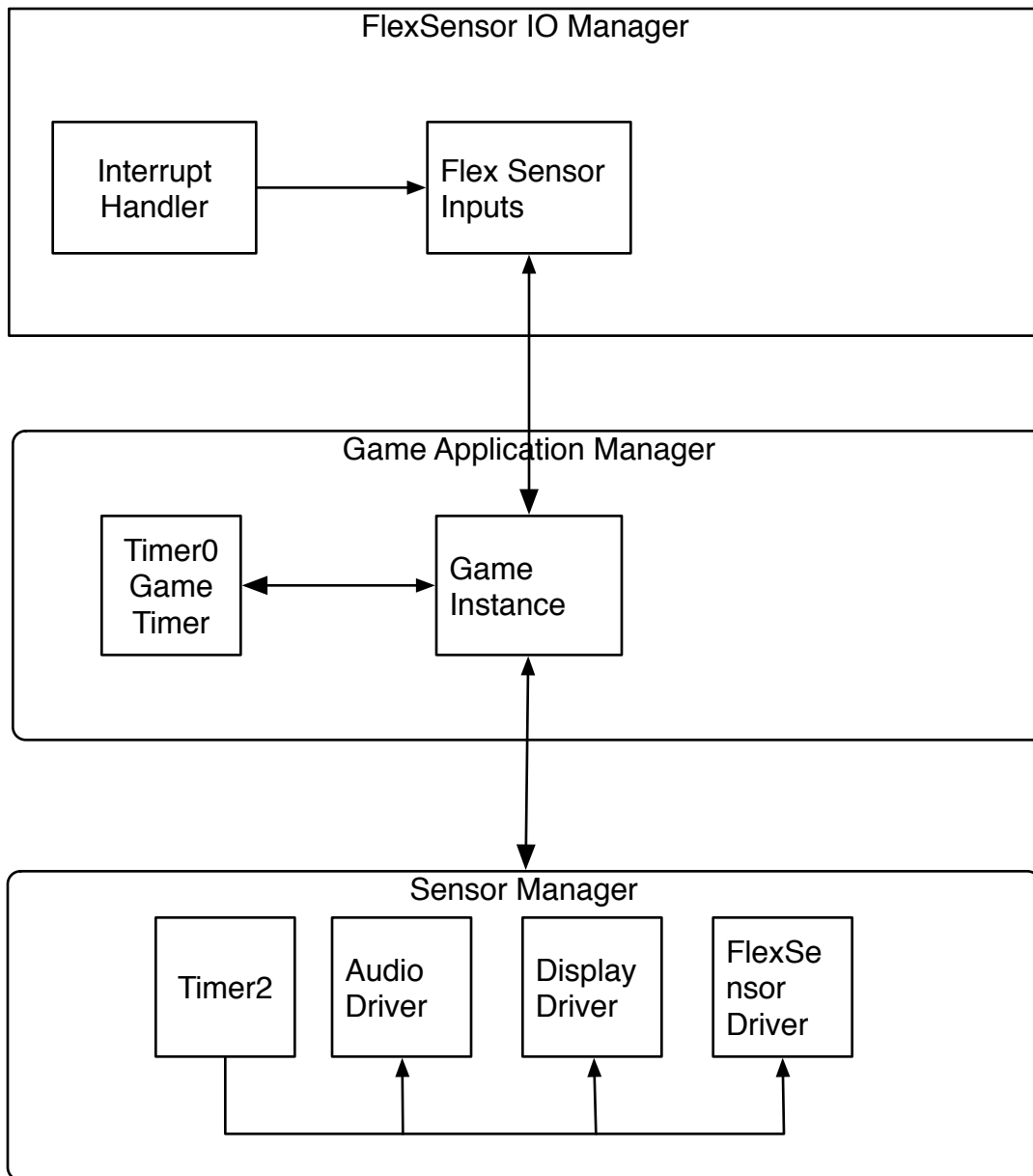
Unspecified flex sensor (I have yet to determine which make/model)

Zilog contest kit

Large Colored LEDs or LED arrays (I have yet to determine which make/model)



Preliminary Hardware block diagram



Preliminary Software block diagram