Junior Design Final Project Proposal
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I will be designing a touchscreen drawing device called "DoodleBob". Users will use a stylus and draw on the LCD screen in a variety of colors and pen thicknesses. Users will be able to save up to 10 drawings onto the device. The purpose of this device is to be an alternative to paper for users who want to draw small and fun pictures. My inspiration for this device is the GoodNotes app commonly used on iPads and other note taking devices; while DoodleBob will not be suitable for taking notes due to the screen size, it will implement a similar menu function to the one found on the GoodNotes app. Similarly, to the GoodNotes app, DoodleBob is designed to be used with a stylus due to the small size of the screen. A possible advancement to this project will be the addition of a printer; the printer will connect to DoodleBob via Bluetooth, and users will be able to print their drawings in full color. The implementation of the advancement is determined by the allowed budget of the department as well as the time needed to implement the printer.

For this project I will need a Raspberry Pi, a Raspberry Pi power supply, an LCD touchscreen, and a stylus. For the advanced version, I would also need a mini-Bluetooth printer, like the KODAK Step model, and a USB to Bluetooth adaptor for the Raspberry Pi. I will be using PyQt6 and Qt creator to design my user interface, and will write the executable code in python. Qt has a very detailed online user manual, and I expect to reference this resource quickly throughout the design process. I own my own Raspberry Pi, so I do not expect to include that in my budget. For the non-advanced version, this project will cost around $35. For the advanced version with the printer, this project will cost around $115.

I want to do this project because I enjoy painting and drawing, and I want to combine my personal interests with my academic interests. I also want to get more experience using a Raspberry Pi and using python on the Pi. This design is an appropriate level of difficulty because I will have to work with software as well as GPIO. I have no reference code for the drawing software, so I will have to come up with a program for that entirely from scratch. For the advanced version of the project, I will have to figure out how to convert the active UI into a printable file, and then correctly set up the GPIO of the Pi to connect to a Bluetooth printer.

My project will have 3 or 4 major milestones depending on if the advanced version of the project is feasible. My first milestone will be writing software for the drawing program and fully implementing it on my personal computer. I hope to have this done within the first week. The second milestone is fully implementing a test UI on the LCD screen and having all touchscreen inputs working properly. I hope to have this done before the end of the third week. My third milestone will be to execute the software on the LCD screen and have full functionality by the end of the fourth week. The fourth milestone will be implementing the printer if time allows.

For my final demonstration, I will allow people to come up and draw on DoodleBob. Each person who uses DoodleBob can save their design and print it out if the printer is functional. The drawing program code can be presented individually, as well as the LCD connection to the Raspberry Pi.

A potential roadblock is that the Raspberry Pi may not integrate with the LCD. In this case, I would continue to develop the software, and then find another way to display the outputs on hardware, even if the user must execute through a laptop. Another potential roadblock could be saving the drawings to the Pi, as I do not know how Raspberry Pi's handle memory. In this case, I would just forgo the saving feature, and have each doodle be a strictly one time thing.