

Peripheral Pin Select App

--PIC32 Development

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Relevant PIC32 Info

- A powerful microcontroller designed by Microchip
- being used in ECE 4760 (Microcontroller Lab)
- has 28 pins in total, including those for power, ground, and etc
- supports more than 40 peripherals (43 configurable peripherals as in the reference table)
- Has a feature called Peripheral Pin Select (PPS), which maps groups of pins to groups of peripherals. Configurations are done by writing different values into four least significant bits of certain registers

Motivation

- With so many peripherals, memorizing all the codes for configuration is impossible
- Referring to the manual or even a printed table each time a configuration is needed is slow
- If many peripherals are needed, hard to see how to assign pins
- Planning takes time; conflicts found in the wiring process takes even more time because of rewiring
- An app can help to do memorization, save time, and eliminate conflicts beforehand

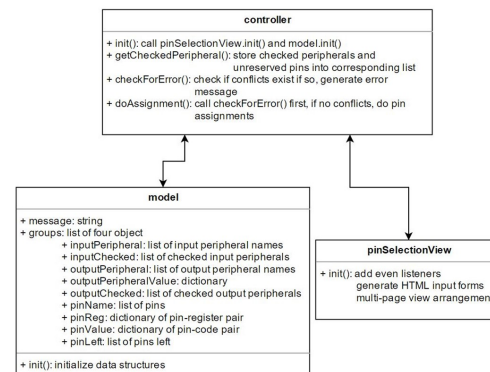
Goal

- Write a web app that can quickly assign pins to a group of user-selected peripherals and generate pin configuration code (in C language) with comment; if there are conflicts, tell users the conflicts and give them suggestions.

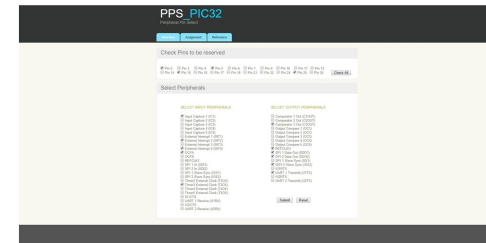
Implementation

- The project consists of three files, an HTML file, a JavaScript file, and a CSS file.
- The HTML file consists of all the checkboxes for gathering input, buttons, multi-view pages
- The CSS file is for styling, and all styling are done in this external CSS file
- The JavaScript file do even handling, stores necessary information, does pin assignments, orders input forms alphabetically and so on. JQuery is used
- MVC design pattern is used for the JavaScript file: model is where all data is stored; view manages when each view shows and hides, manages even handlers; controller is the bridge for model-view communication. Model and View never talks to each other directly. In next section, a UML-like diagram is shown for the JavaScript file
- Besides assigning pins to a group of peripherals, with the *select all* button, user can use this app to assign a specific pin (A) to a specific peripheral (B) quickly. It is done by pressing *select all* button, unchecking pin A, checking peripheral B, and pressing submit button.

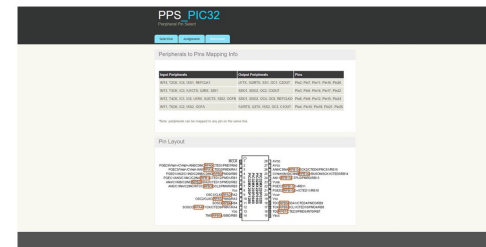
JS file Design Pattern



UI and Results



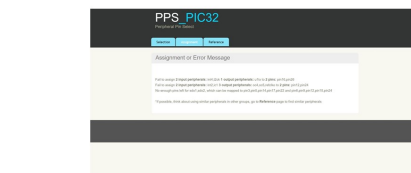
interface, where user reserves pins and selects peripherals



Reference page containing pin-peripheral mapping info and a pin layout diagram



Example pin assignment output



Example error message

Acknowledgements

- Thanks to my advisor Bruce Land for guiding me through the process, answering my questions.
- Thanks to people who wrote the tutorials for HTML, JavaScript, CSS, JQuery on www.w3schools.com.