Phases ending with numbers are intended to be completed by the end of the project. Phases ending in letters are optional, in no particular order

Phase 0:

Get pumps working with common microcontroller, prototype a cap with a tube for drawing syrup up into the dispenser system. Also prototype a dispenser cap for holding four flavors and one water line.

Phase 1:

Set up a Pi 7” touchscreen to have at least six options, four the flavors, one for just water, and one as an extra to keep it even for now.

Phase 2:

Get the syrup volumes dialed in, so that the amount of syrup each time is relatively consistent. At this point, the touchscreen should be controlling when the pumps are active, so that when a selection is made and confirmed the pumps activate, resulting in water and flavor being added to a cup.

Phase 3:

Get a water dispenser working, such that 12 fl oz of water are dispensed each use. Initially, using a peristaltic pump(?) similar to the flavorings. The water should start pumping, then syrup is added while water is pumping, then water finishes pumping, such that the water is being used to mix the syrup in the cup.

Phase 4:

Design our own PCB, armed with the knowledge of previous phases using a generic microcontroller. Need this designed by week 14, so there’s a chance to get the finished board before the end of the semester. Board will need a microcontroller, I/O pins for the pumps, etc…

Phase 5:

Develop the software for the microcontroller on the custom PCB. The code from the demo microcontrollers should have been written with the intent to copy it into the custom board, so that most of the programming is there, it just needs to be updated to match the new board. Will need communication between the microcontroller and the Pi being used with the touchscreen.

Phase 5:

Get the system to fit inside an enclosure, likely using an old cooler for the enclosure. Screen should be mountable into the side, water and flavor and carbonation tanks should all fit inside. Opening in the front for a cup to be inserted and the ingredients pumped into the cup from the dispenser.

Phase 6:

Create a safety/cleaning manual for the machine. Should include disassembly, flushing, and changing of all syrup/water lines, cleaning of the dispenser area, swapping the dispenser head, etc… Also include cleaning the inside of the enclosure while all holding tanks are removed.

Phase A:

Consider adding an ice mechanism to the machine that makes ice and can dump a precise amount into the cup each use. Alternatively, use an existing ice machine with a simple opening in the enclosure for the user to scoop their own ice into the machine. If automated, there needs to be a sub-menu before confirmation that allows the choice of ice or not.

Phase B:

Get a carbonator working, whether that is a tank, or carbonation in line is yet undecided. Should be measurable to dispense 12 fl oz of carbonated water into the cup each use. This phase has priority over the other optional phases, unless it proves to be unsafe or unrealistic compared to alternative options.

Phase C:

Add a CIP process (Cleaning in place). Would require peristaltic pumps to work in both directions. An easier solution could be adding a purge system to make changing out syrup and water lines easier, this could be programmed into an operators menu on the touchscreen. This may be necessary for the cleaning process anyway, even if it isn't a CIP procedure.

Phase D:

Add syrup mixing, may require expanding flavor options. Could add cherry / vanilla flavors as options on top of the base flavors.