# Deliverable F

Kole Cantor

Jake Appleby

Matthew Perry

Tomas Silva Salanova

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# Abstract

This deliverable aims to discuss the development of the first prototype, with descriptions, objectives, and feedback. This paper will then continue further, discussing prototype two, additional feedback methods, and concluding with the overall prototyping test plan.

## Prototype I Description

The first prototype design consists of a multi-layered user interface. The prototype design is centred around a main menu system, in which the user will open the software and will be provided with a menu that consists of the can, bottle, and keg lines and their current filling station speeds. From the main menu, the user will select one of the three lines, and a new page will appear, providing the user with all the data pertaining to that specific line, including all the specific systems and their respective speeds. The main function of the individual line interface is the interactive input speed option, which will allow the user to input a specific filler speed for which the corresponding system data will be output. When the user is finished using a specific line menu, they will be able to return to the main menu or switch to a different line menu via an interactive button.

Mill Street Brewery has emphasised how important it is for the software to be easy to use and relatively simple. For these reasons, the first prototype design offers a very simplistic and organized navigation system for the user to quickly switch between can, bottle, and filler lines with ease. The main menu consists of three interactive components, including can, bottle, and keg line buttons that direct the user to any one of the three menus for the respective lines.

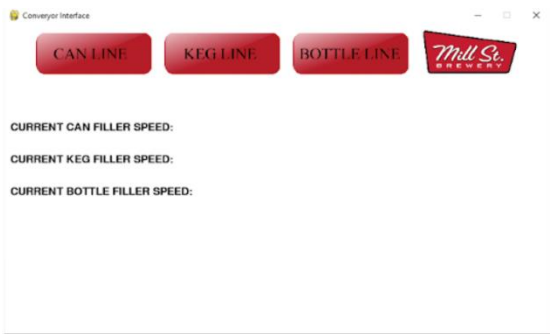


*Figure 1.1 Main Menu User Interface*

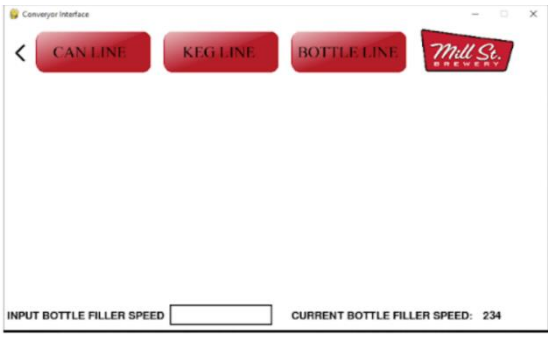


*Figure 1.2 Bottle Line Menu User Interface*

Figure 1.1 presents the main menu user interface, consisting of the can, bottle, and keg lines as well as the current filling speeds of each system.

Figure 1.2 presents the bottle line menu, consisting of the "input filler speed" button as well as buttons directing the user to the can line, keg line, or main menu. Note that the filler speed has not been inputted, and thus there are no corresponding output speeds for all other stations.

## Prototype I Testing Objectives

For prototype one, we created a simple main menu interface that displays all the different lines. Testing was done to ensure that the main menu interface did not contain any visual or technical bugs. We checked to make sure each part of the main menu worked correctly as it was

intended to by checking each button pathway multiple times. This was done to ensure they were working properly, so in the following prototypes we can begin to work more on the computational aspects of the report. These buttons that were tested include those for the keg, bottle, and can lines.

Furthermore, the visual component of the main interface was tested as well. We evaluated whether it was easy for users to read and the simplicity of the design. In addition, we assessed whether the general aesthetic of the interface was appealing to the viewer and that it matched the Mill Street design. We noted that the current buttons were not the most visually pleasing and did not match Mill Street's general aesthetic. Therefore, we designed and implemented new buttons that were more visually appealing and more closely reflected the Mill Street brand. Moving forward, we will consider these various tests and their results to produce better and more accurate prototypes.

## Prototype II and Test Plan

For prototype two, the team plans to make some visual changes first. This means that we will change the current interface to be more aesthetically pleasing by changing the look of the buttons as well as the background. Learning from prototype one, we have decided to link the programme to an Excel spread sheet with all the different conveyor and station speeds. This format will be much more time-efficient and easier since we won't have to write code for all the logic and have to hard-code all the different values there are. Prototype 2 will allow the user to input speeds, which will change those values in the excel sheet, and using Excel to calculate optimal speeds, it will then return those optimal speeds to the interface. If there is time, we will also add a lock screen that will require a password to access the interface. If the user is inactive for more than 5 minutes, the interface will lock itself. This feedback was provided to us during our lab time.

Prototype two will follow the same testing that we have been doing for all our prototypes. We will use our interface in every scenario to try and find any bugs in the code. The math behind calculating optimal speeds will be tested as well to make sure the interface is providing the correct values.

The overall functionality of our programme is good, but it could use some work. The code itself is a little bit messy, but for the next prototype, it will be cleaned up and organized. Most of the code from the current prototype will be carried over to the next.

## Receiving Feedback

Since the client pitch meeting is upcoming, the team has little feedback on the current prototypes and test plans; however, the team is prepared to gather and receive advice. The current feedback from the team has been gathered from the TAs during the designated project lab period, where the team received feedback involving the implementation of a security

password login system. The team has decided to take this advice, and the password system will be integrated into the interface as part of the next upcoming prototype.

In terms of future feedback, the team prepares to gather information from the upcoming client pitch meeting. The team will present the most up-to-date version of the interface as the chosen prototype and will display how the current functionality of the system works. The team will then discuss the future prototypes and how they will all connect to our final system. At the end of the meeting, the client will either provide his own feedback or the team will ask questions to extract feedback.

## Prototyping Test Plan

Table 2 below displays the current prototype test plan. As noted, the team has already completed a simple main menu and interface to hold and input data. The next prototype for testing is to create a graphical programme that outputs the data displayed from V-curve theory. In addition, the team will also be adding the password security feature, as provided by the feedback received.

| Test ID | Test Objective | Description of Prototype used and of Basic Test Method | Description of Results to be Recorded and how these results will be used | Estimated Test duration and planned start date |
|---|---|---|---|---|
| 1 | Create a simple main menu with all the different lines | To test the interface, we will make sure all the menus are working, and seeing if there are any errors in the code | Checking any errors and comparing test results to theoretical results to determine whether it is good enough to be used | Testing already complete |
| 2 | Create an interface with no main menu and instead have always one of the lines showing, and being able to | Testing will be very similar for all prototypes. It will involve using the interface and testing all possible scenarios to try | Depending on how the interface performs relative to the other prototypes, the best aspects of it will be recorded | Test already complete |

| | | | | |
|---|---|---|---|---|
| | change between them | and find bugs in the code. | (in terms of code). | |
| 3 | Create a graphical program than can plot system speeds according to V-curve theory | Prototype will be made using excel, test will have user unput filler speed, with a resulting output of all ideal system speeds plotted on a dot chart | Result will be recorded when test successfully outputs desired values. These results will then be recoded for python and used in the final product | Test duration: 1 hour<br>Planned start date: March 6th |
| 4 | Create a comprehensive prototype the encompasses all aspects of the final product | Prototype will be made using python and tested for errors in code and calculations | Results will be used to make any final adjustments to the final product | Test duration: 1 hour<br>Planned start date: March 15th |

*Table 2: Prototyping Test Plan and Objectives*

The team's prototyping test plan contains many overall key objectives, with criteria for when a test stops and is successful. The overall goal of the prototypes and their corresponding tests is to create subsystems that correlate to portions of the final product while obtaining important feedback along the way. Since the user interface would be the first thing the user or client sees visually, it was selected in the first prototype. The objective of selecting the interface first is to get user feedback from the client about the visual aspect of the project, which is important as it may be the only visual display the team has to present on design day.

For specifics on stopping criteria and measures of success, the team deems a prototype successful if it completes its objectives. If the team creates a subsystem that will be useful, then the prototype can be deemed successful. Another measurement of success is how much feedback the team receives from the prototype, as that information is important and crucial to the future development of the product. For stopping criteria, the team concludes a prototype when it obtains the desired functionality and the team unanimously agrees that the prototype has finished its testing. However, upon receiving feedback for a specific prototype, the team can reopen testing to obtain further and different information, as outlined by the advice of users.