4. INVESTIGATION

A. Idea Generation

In order to efficiently generate ideas and a working hypothesis, our group maintained a schedule and an organized list of assignments. Before our first formal meeting, we agreed to read all the files and watch all the videos regarding the project. By doing this, we were informed of the project objectives and acquired time to formulate ideas and a working hypothesis of how the reflow soldering oven should work. In our group meetings, these ideas and hypotheses were discussed and written down for reference later on. We decided that each idea and hypothesis should undergo a performance test and an analysis every time the segment in which it is used for is completed, in order to keep track of its function and operation.

During the first meeting, everyone volunteered their area of strength and interest whether it was hardware, software, organization, etc. We deliberately divided the whole project and assigned individual tasks according to these areas of strength and interest. Through this method, each team member is focused on what they are capable of doing, which is appropriately time-efficient in a time-constrained schedule. This was the most effective way to generate ideas because each person is focused on one particular task instead of stressing on the big picture. On the other hand, anyone was welcome to contribute ideas and suggestions to another member’s assigned task to keep the project open-ended.

B. Investigation Design

The design of our reflow oven controller was established through careful research of the specific component data sheets and examination of the project files and lecture slides provided in the UBC connect website. Individually, we gathered information for our own tasks and later discussed our plan with the group. Every member’s plan of action is recorded into a file that was stored in an online tool called *GitHub* (please read 2.3 for further details), which allows access to all the group members for reference. Once the group has heard and approved of the proposal, we continued to work on the design until completion. As aforementioned, each design underwent a performance test and an analysis whenever it is completed in order to keep track of the design’s function and operation. During the performance test and analysis, each member of our group was present to observe and allow individual suggestions and constructive criticism for the design to improve on. Again, these are all recorded and stored into GitHub.

The division of individual tasks definitely made information and data gathering for specific topics more effective. Specifically, Derek Chan was in charge of code organization, unification, and the state machine; Nina Dacanay was mainly in charge of the software coding for the temperature sensor, the serial port, and the timers; Jessica Hua and Aleksander Dordzijev were in charge of the software coding for the user interface; while Glyn Han and Kyujin Park were mainly in charge of the hardware assembly. However, even though we were assigned specific parts, each member of the team was exposed to both software and hardware through soldering components onto the PCB and understanding all the codes used for the main program.