ECE 212: Sprint Review, Retrospective & Planning report for Team 15

Sprint 2

Edgar Ortiz, Jesse Vazquez, Chuck Faber, Matt Wilson

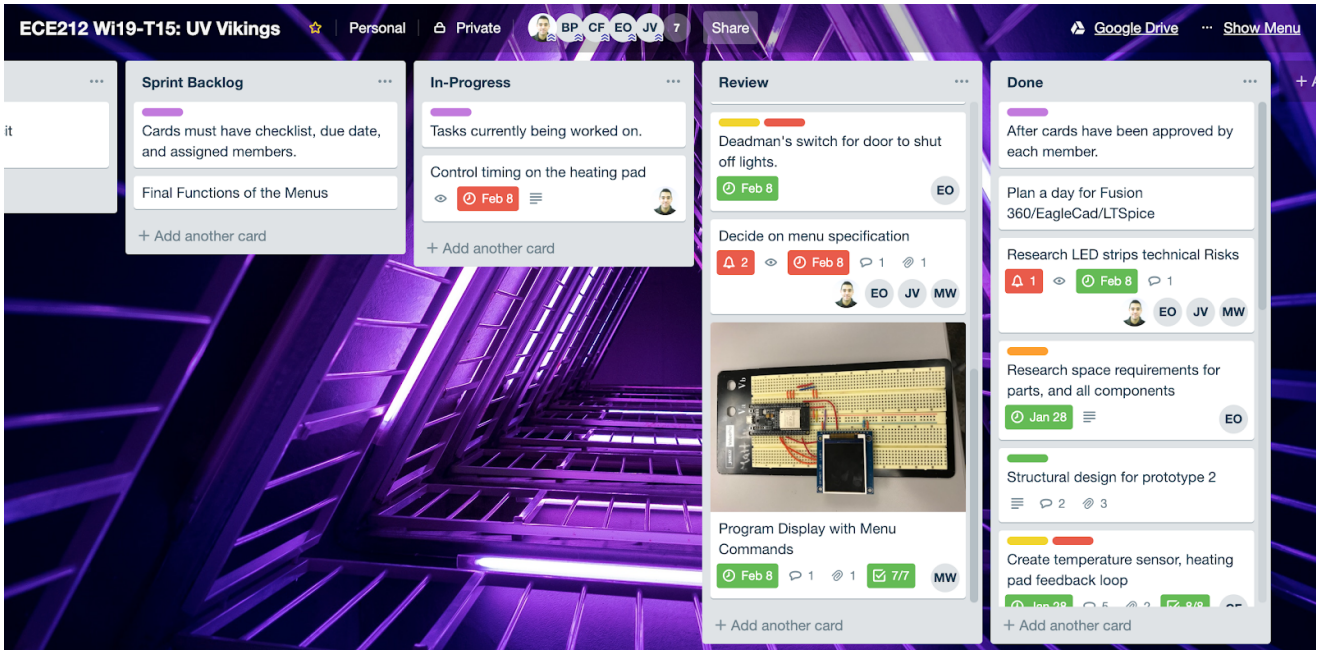
I. Sprint Review

In this sprint, we plan to program the LCD screen to have a selectable menu, integrate the UV LED strips into our current circuit design, complete the CAD model of our structure, and have a more finalized container.

Sprint Backlog Status

Sprint Backlog items DONE (bulleted list)	• *Finished menu design* • *Finished CAD Design* • *Implemented the LEDs to the new circuit diagram*

Sprint Backlog items NOT DONE	Reason for NOT DONE	Keep in backlog (Y/N); why?
Controlling Timing of the Heating Loop	*Needed to figure out how the menu code would work to build off of the variables that would be saved there.*	*Yes. This is a requirement for the design.*



Full Product Backlog Pruning

The full product backlog still stands as it was from sprint 1. In sprint 1 we focused on developing a voltage regulator for our power supply, the addition of a full power shut-off switch as well as a dead-man's switch to turn off the lights and heating elements should the door be opened for the safety of the user. We updated our overall circuit design to include the additional elements of these switches, as well as to better accommodate the typical use case and our user interface. In addition, we continued to work on the octagonal structure dimensions and cutouts for the screen and rotary encoder. One major accomplishment during this sprint was the design and programming of the screen menus and getting the rotary encoder functioning. For our next sprint, we will work on the rotating platform, the writing of the final code for control of the heaters and lights with the input from the user menu, as well as creating a new cardboard prototype to better accommodate our lighting configuration.

Based on our experiences so far, we have decided to replace our choice of the material for the outer case from MDF wood to acrylic. This is mostly a safety precaution as we have high powered electrical elements, and any kind of discharge might cause a fire hazard. We will also be dropping the web interface for users to enter in their email addresses to get notifications about their print curing. It would be too awkward of a feature and most likely one that wouldn't be used that often. Instead, we will be logging data on the usage of the curing chamber so that we might better be able to provide technical support and maintenance in the case of failures. We will also be removing the feature of a 3D printed module to hold the LCD screen and rotary encoder.

Product requirements still to be met:

- Finalized prototype chamber with clear chamber door with reflective coating
- Rotation of part on rotating platform
- Finalized code to control the lighting and heating elements
- Diagnostic functions to test light and heating elements
- Logging data usage

Technical and other difficulties

The primary technical issues that we faced in this sprint were utilizing the rotary encoder and creating the menus. Matt had to break the menu functions into modules so that he could put the procedures into code function blocks. He also had some minor issues with the rotary encoder dial. He had taken a function off of an online tutorial that only worked about half of the time. He was able to work around the issues to get a fully functional rotary encoder interface.

Matt: Something new that I learned during this sprint was how to utilize rotary encoders. I have not worked with these before, so when I got the chance to work with the one in this project, I was able to walk myself through how it worked.

Jesse: In this sprint, I had the chance to further explore the capabilities of Fusion 360. With the help from Chuck, we designs a 3D model of what our final prototype will be. I was able to do a little bit of soldering as well. We now have a completed and tested voltage regulator which has 5 and 12 volt outputs.

Chuck: In this sprint, I learned a lot about how transistors work from talking to Matt, one of our team members. Using this knowledge I was able to create some more detailed circuit diagrams of how our heating/lighting relay circuit would function, and build a prototype.

Edgar: For this sprint, something that I learned was working with magnetic reed switches and how they work with normally closed and normally open functions in the code, since the only types of switches that I have worked with before were buttons or the type that is like an actual on and off switch this was a good way to learn about a new type of switch.

II. Sprint Retrospective

The sprint planning went well for the last sprint. We decided which tasks to work on for the sprint, created Trello cards for each task, and assigned members to each task. We then set deadlines, and each member broke down their tasks into smaller tasks.

Things that went well

- Everyone made progress during this sprint
- Our team meetings were useful for communicating progress

Things that could be improved

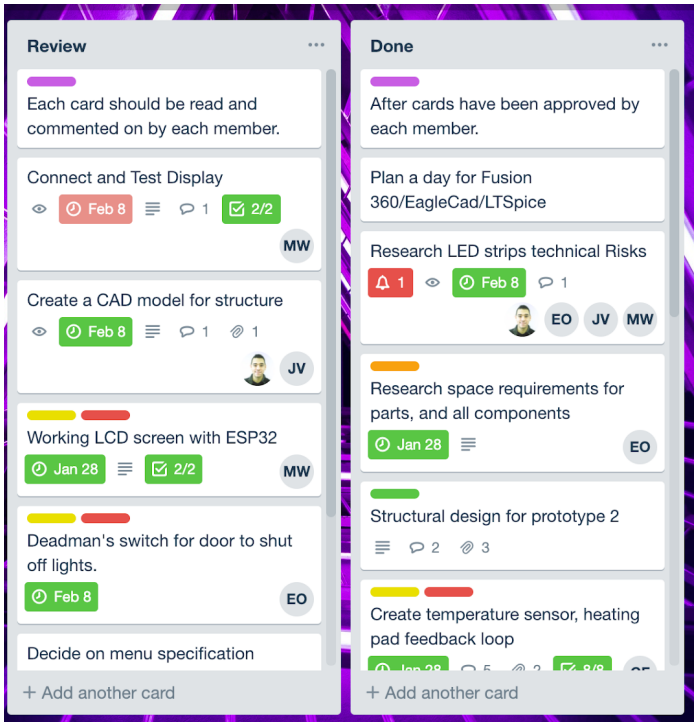
- Sometimes multiple Trello cards were being made for the same task, cluttering the board
- We need more time to work as a whole group rather than working individually and meeting later

Suggested improvements

- One person should be in charge of making the Trello cards, assigning deadlines, and members to each card.
    - Then each member adds the checklist for their task, and records progress in the card description or comments, and moves cards to new stacks as necessary.
- We meet together in small partner groups since we don't all have the same time that we are available.

Trello

One person will be in charge of creating the new cards for the sprint backlog so that multiple cards aren't being made for the same task. If a team member wants to add a new card, they should check to see that another card doesn't already exist for this same task. The Trello manager will assign the team members for each task and set the deadline, but the member assigned is responsible for breaking down the task into a checklist of items to complete. They are also responsible for logging progress in the card comments or description and adding photos or attachments as well as moving the card into other stacks upon completion of the task. All members will spend some standup meeting time to make comments on cards that need review in the Review stack.



Overall, we would give ourselves a score of **4 out of 5** for how well this sprint went.

III. Next Sprint Planning

Overall project plan

The overall goal is to have a fully functioning prototype made from cardboard, that includes all major requirements, so that we can present to Chris Clark at the EPL and ask for funding for black acrylic.

1	**Research and Developement - FALL W10-W12**	😌	**11/19**	**12/7**	**20**	**100%**
2	**Prototype #1: Functional Design - WIN W1-W4**	😌	**1/7**	**2/1**	**24**	**59%**
2.1	**Create Rough Design from Low Level**	**Elec/Mech**	**1/7**	**1/18**	**11**	**100%**
2.1.1	▶ Create Specifications for Design	Whole Team	1/7	1/12	5	100%
2.1.2	▶ Research Components to Meet Specs	Whole Team	1/12	1/18	6	100%
2.2	Order Components and Record Receipts	Elec/Mech	1/18	1/19	1	100%
2.3	**Create an Algorithm**	**Comp/Softw**	**1/7**	**1/18**	**11**	**75%**
2.3.1	▶ Decompose Algorithm into Functions	Matt/Chuck	1/7	1/10	3	75%
2.3.2	▶ Research Peripheral Components for Functions	Matt/Chuck	1/10	1/14	4	100%
2.3.3	▶ Write Functions and Main Program	Matt/Chuck	1/14	1/18	4	50%
2.4	Order Peripherals and Record Receipts	Comp/Softw	1/18	1/19	1	100%
2.5	Design and Print Prototype PCB Board	Matt/Chuck	1/21	1/22	1	25%
2.6	Solder Wires and Connections onto PCB Board	Jesse/Edgar	1/22	1/25	3	0%
2.7	Laser Cut + 3D Print Any and All Additional Parts	Jesse/Edgar	1/25	1/28	3	0%
2.8	**SPRINT #2: Assemble Components Together**	**Whole Team**	**1/28**	**1/30**	**2**	**0%**
2.9	Test Design and Code Against the Specs	Whole Team	1/30	2/1	2	0%
3	**Prototype #2: Refining Design - WIN W5-W7**	😌	**2/4**	**2/22**	**18**	**0%**
4	**Final Product: Finishing Design - WIN W8-W10**	😌	**2/25**	**3/15**	**20**	**0%**

There are no major changes to our Gantt Chart at this time.

Requirements

Requirements:

R1) One power supply shall power the entire product.

R2) Product shall provide 360 degrees of part illumination at the appropriate wavelength.

R3) Chamber shall be kept at optimal curing temperature for the duration of the curing process.

R4) Product shall safe to use.

R5) Product shall fit printed objects of the maximum size from the Form 2 SLA printers.

R6) Product should operate reliably for at least 1 year.

Features:

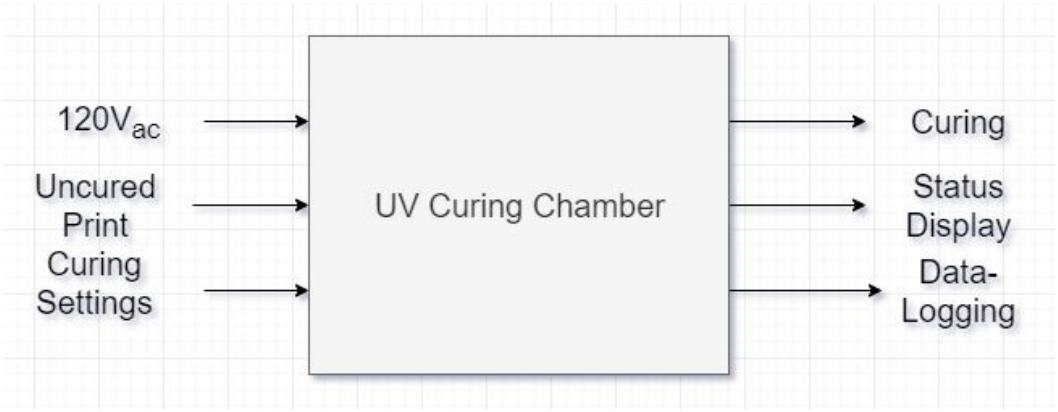
F1) Product should be simple and easy to use.

F2) Temperature and time settings should be able to be customized for advanced users.

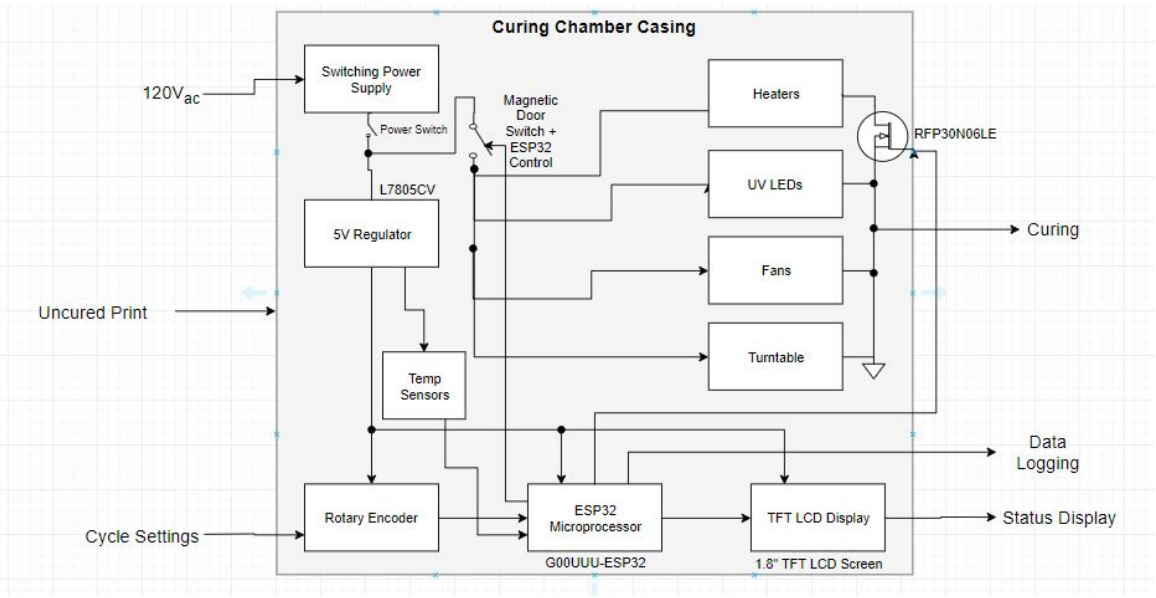
~~F3) Users should have the option to be notified via cloud once curing is complete.~~

F4) Product should be attractive and fit on a desktop.

Functional decomposition



Functional Decomposition: Level 0

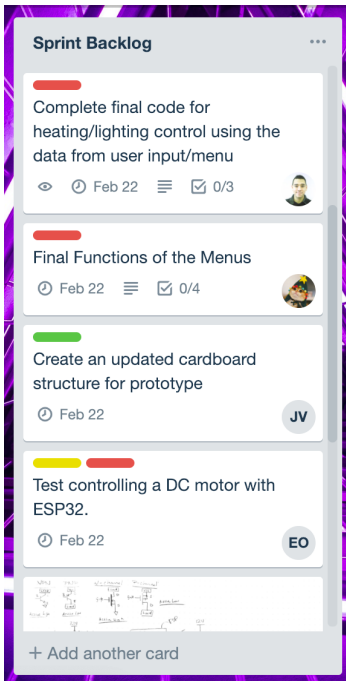


Functional Decomposition: Level 1

The functional decomposition inputs and outputs changed so that there would be no input contact information and no output notifications. The output will be changed so that we can data-log the product so that we can get life-cycle data.

Sprint details

The goal for this sprint is to finish off any items that were not yet finished in the past sprint, such as being able to save data to ROM for presets and finalizing the code to run the curing process and control the lights and heating pad using the new code from the user menu. In addition, our major goal is to get everything assembled into a fully functional prototype that can be shown to Chris Clark from the EPL for notes as well as to request funding for materials for a more finalized shell.



- Complete final code for heating/lighting control
- Complete final menu scripting for saving of data to ROM
- Create updated physical structure prototype with new dimensions
- Test controlling a DC motor with ESP32
- Create Eagle board for PCB
- Construct first full prototype

The highest priority items are to complete the full coding for the heating/lighting control and the script to save user presets to ROM. These are highest priority as they are integral to the function of the product. Chuck and Matt will be working on those.

Other priorities would be to test the DC motor with the ESP32 and developing a new physical structure. The reason for these being lower in priority is we have a

solution for a rotating platform, that while it isn't ideal, does function. Edgar will be working on this. And the new prototype for structure is lower priority because Jesse has already made two great physical prototypes that we can get to work if we really need to. The change in dimensions would just help everything fit a little better together.

Tests will need to be conducted of the finalized code with the breadboard prototypes of the heating/lighting circuit. The function to save and recall presets after the ESP has been reinitialized will also need to be tested. The full prototype with all elements included as a whole will need to be tested as well to see if it functions as required.

Our team T15 (the UV Vikings) met with our Scrum Master Shahad on 2/8/19. We discussed Sprint Planning. All team members have read this report and agree that it accurately describes our discussion.