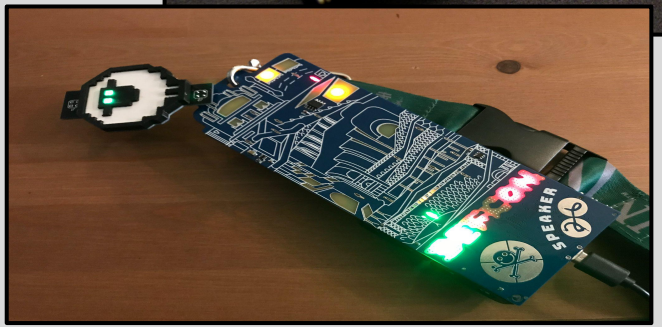
VETCON BADGE

Team 32
Derek Barbosa, John Kircher, Carlos Ortiz, Julian Padgett, Ryan Sullivan



Our Project

What are we actually doing?

Providing a detailed blueprint for an identification “badge” to be used by VETCON in the upcoming DEFCON conference that sticks with a Cybersecurity theme.

What is DefCon?

The world's longest running and largest underground hacking conference.

Deliverables

Functional Badge

Working badge that meets all design constraints

Bill of Materials

Accurate bill of materials for badge production

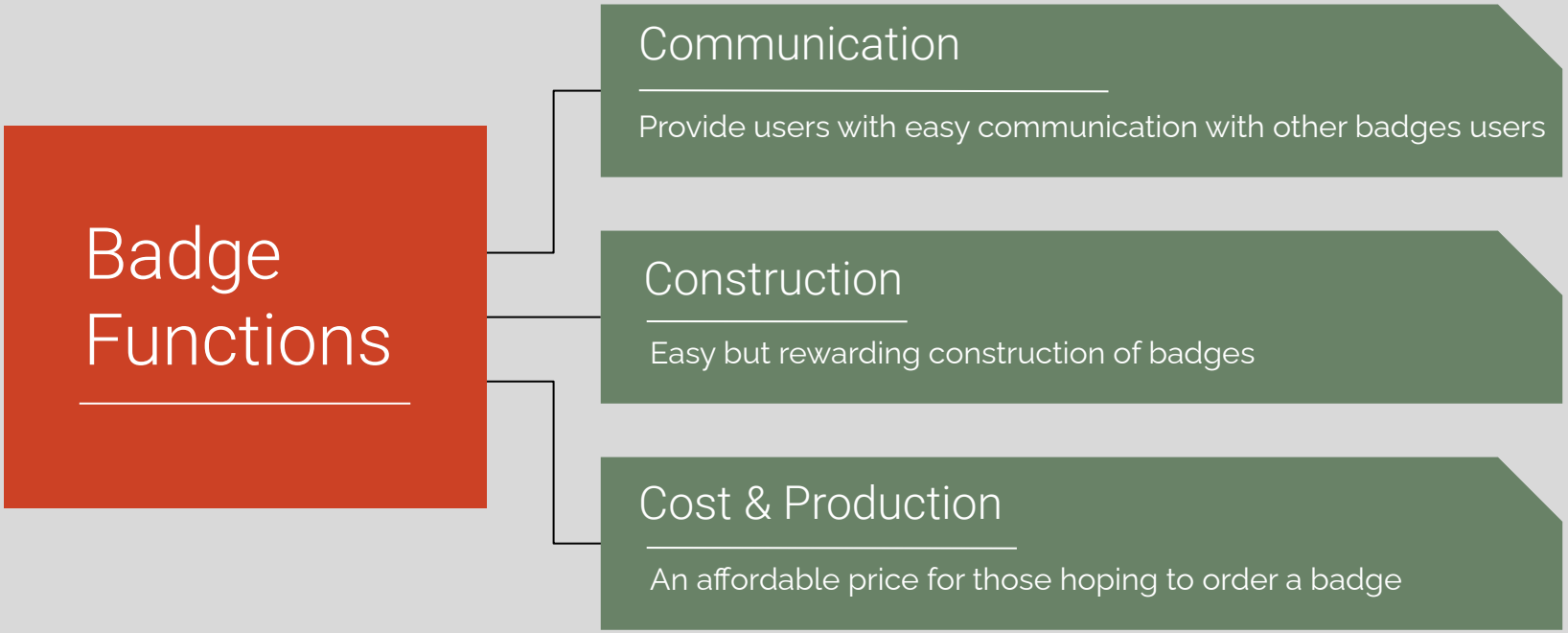
Badge Manual

Assembly & installation instructions, troubleshooting procedures, microcontroller flashing

Badge Production

Process for mass badge production

Requirements: Functions



Requirements: Objectives

1

Operating System

System software to manage our microcontroller(s) and ROMs

2

Point-Point Networking

Communication between two endpoints

3

Battery Life

Ability to operate for 21 hours; σ = 2.1

4

USB-C

Charging, data transfer, software flashing

5

Interface Switch

On/Off/Data Transfer Switch

Requirements: “Stretch Goals”

6

LEDs

Configurable and addressable indicator lights

7

SMDs

Any other surface mount device

8

Wireless Mesh

Communications network made of radio nodes

9

Puzzle Game

Interactive game that unlocks achievements

10

Color Display

320 x 240 pixel display

Requirements: Constraints

Size

4” wide, 4” long, 1” deep

Weight

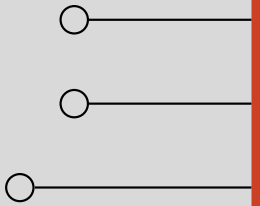
150 grams

Lanyard

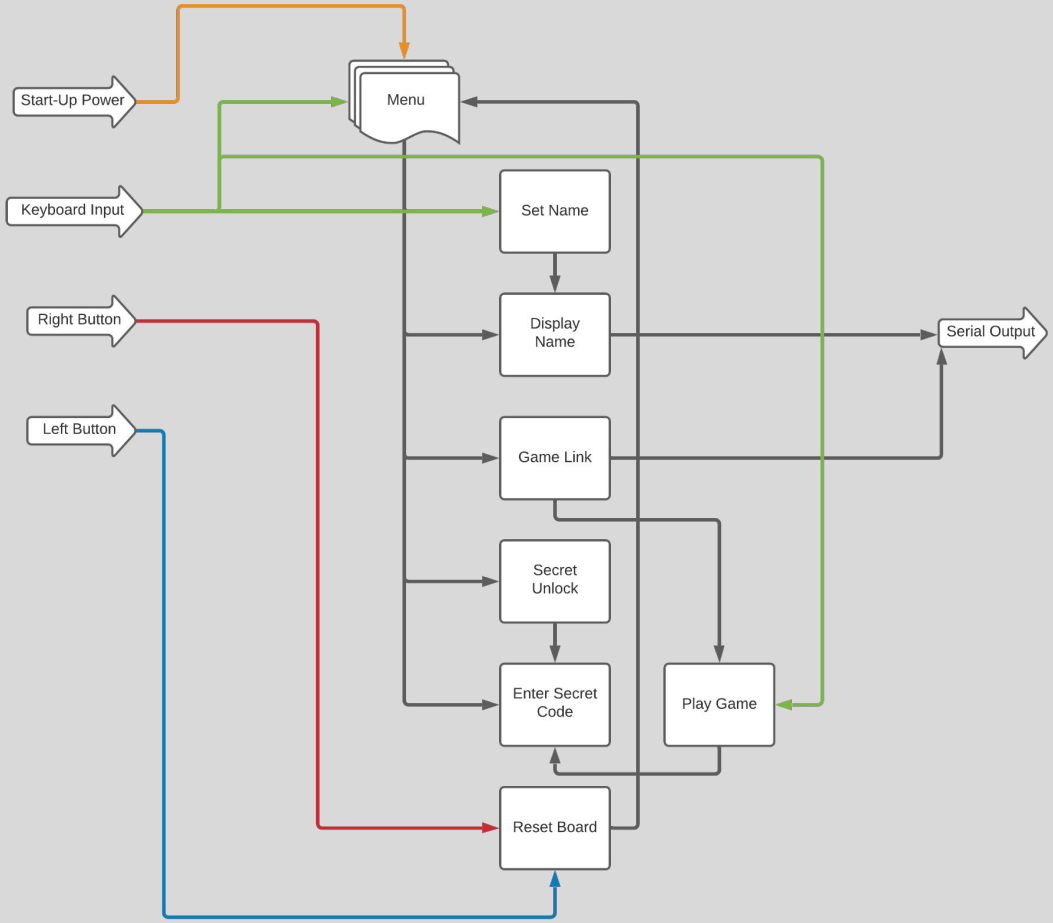
Attachment points for wearing

UP

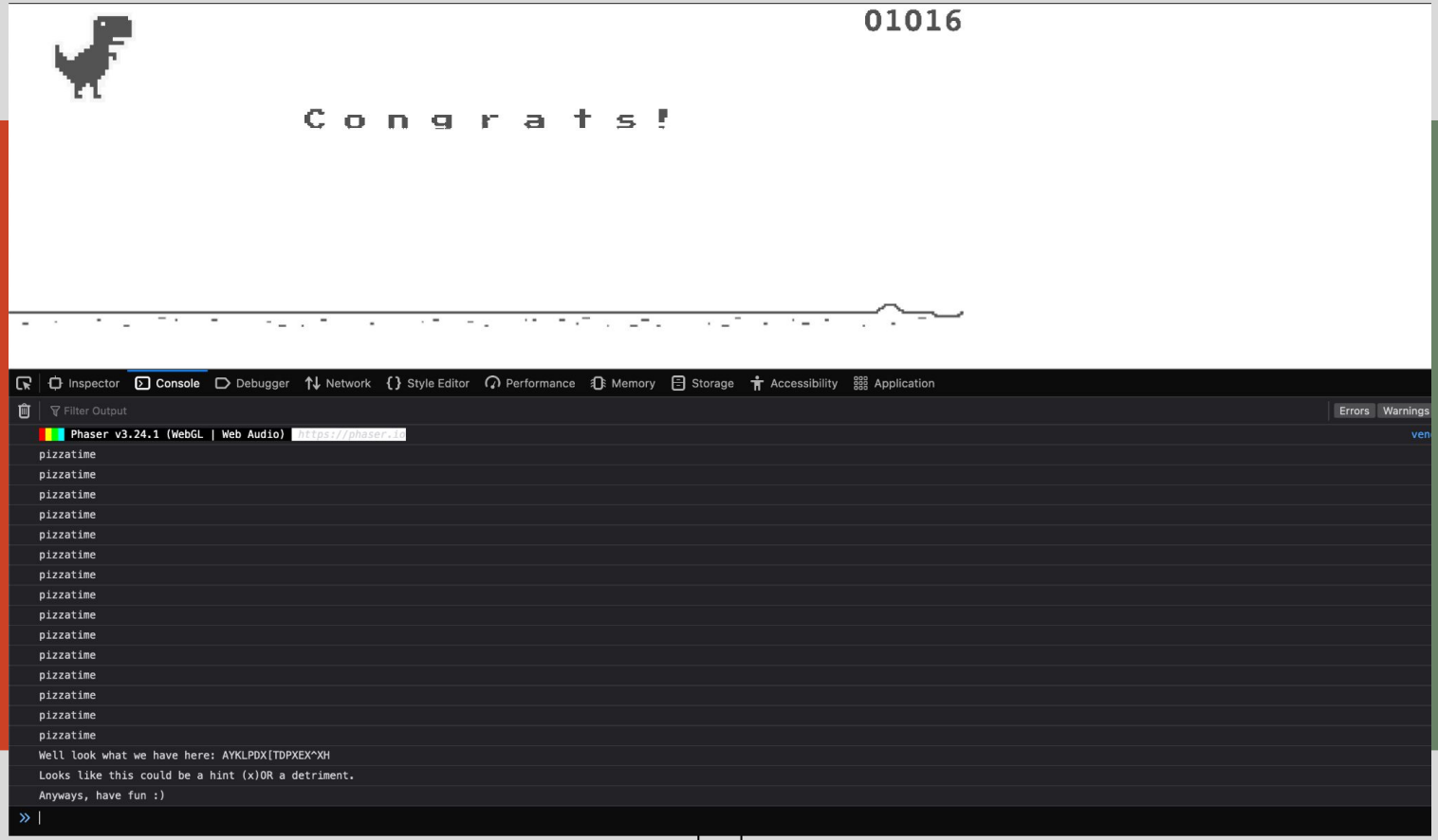
Describing Our Technical Approach



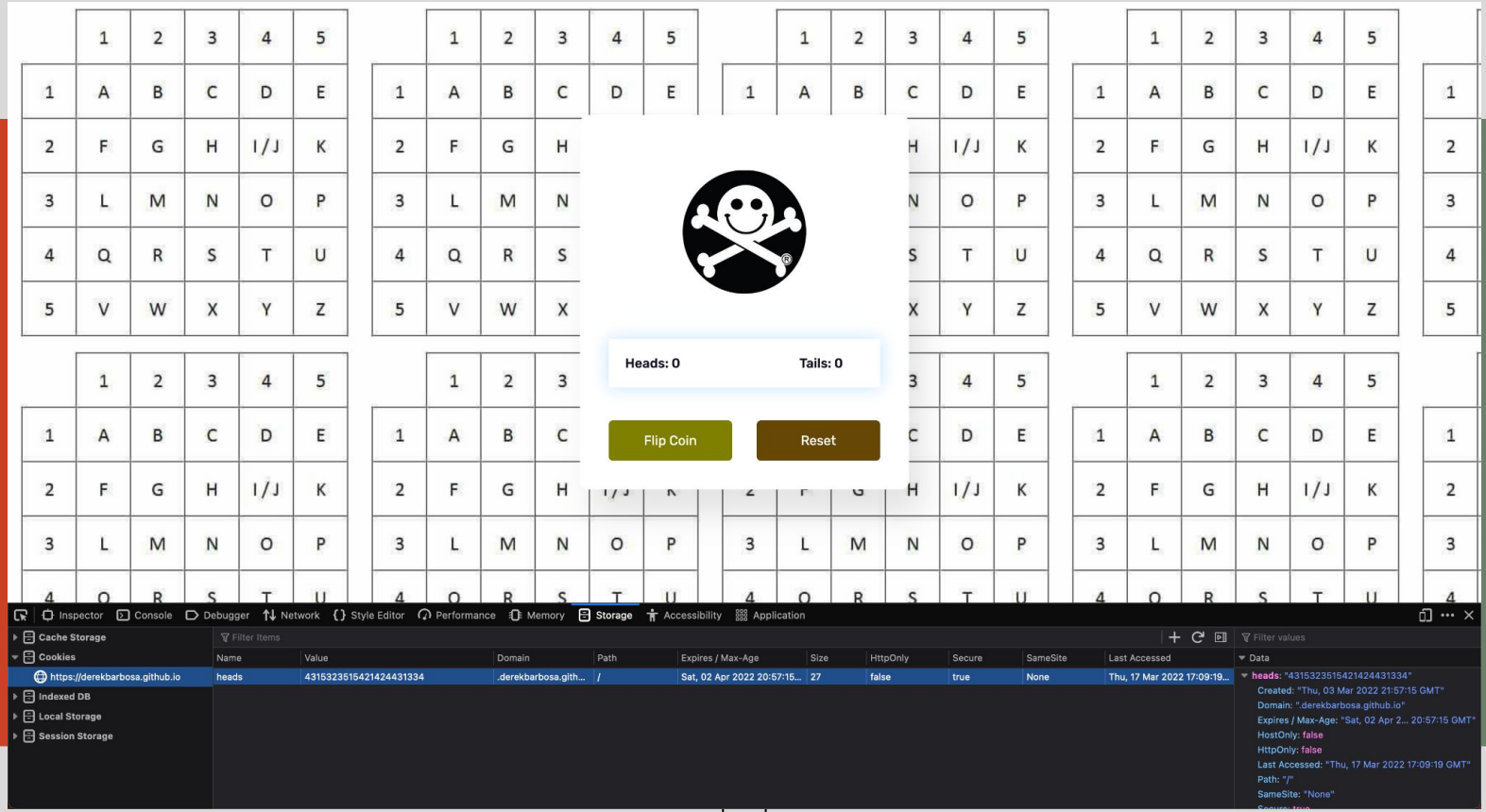
System Block Diagram



Game 1 Screenshot



Game 2 Screenshot



Game 3 Screenshot

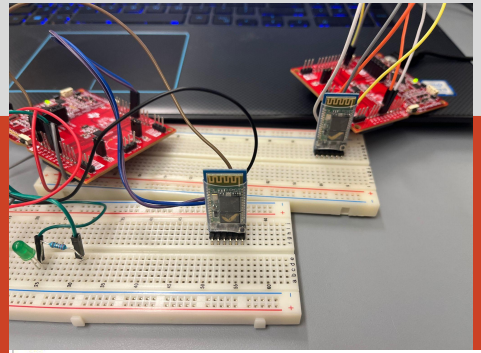
Persistent State

```
void wipeBoard(){
  SYSCFG0 = FRWPPW | DFWP;
  startFlag = 0;
  secretFlag = 0;
  nameToggle = 0;
  secretFlag2 = 0;
  secretFlag3 = 0;
  wrongFlag = 0;
  clearStr(name);
  SYSCFG0 = FRWPPW | PFWP | DFWP;

  return;
}
```

```
18
19    int startFlag PLACE_IN_FRAM;
20    int secretFlag PLACE_IN_FRAM;
21    int nameToggle PLACE_IN_FRAM;
22    int secretFlag2 PLACE_IN_FRAM;
23    int secretFlag3 PLACE_IN_FRAM;
24    int wrongFlag PLACE_IN_FRAM;
25
26    char name[NAMELEN] PLACE_IN_FRAM;
27    char secret_word[NAMELEN] PLACE_IN_FRAM;
```

Bluetooth



COM8 - PuTTY

```
*|         MENU         |*
*|                      |*
*| 1: Set Name Tag      |*
*| 2: Display Name Tag  |*
*| 3: Game Link         |*
*| 5: Game Link 2       |*
*| 8: Start Bluetooth   |*
*| 0: Reset Badge       |*
*|                      |*
************************
Please enter input
Input: 8

Bluetooth Entered
Exit Bluetooth Menu to Return


Welcome to Bluetooth
Your Device Should Automatically Connect to the Closest VETCON BADGE
Type 1 to Start Communication:
Type 0 to Exit:
You entered 1

Are you at vetcon?
```

COM5 - PuTTY

```
*|         MENU         |*
*|                      |*
*| 1: Set Name Tag      |*
*| 2: Display Name Tag  |*
*| 3: Game Link         |*
*| 5: Game Link 2       |*
*| 8: Start Bluetooth   |*
*| 0: Reset Badge       |*
*|                      |*
************************
Please enter input
Input: 8

Bluetooth Entered
Exit Bluetooth Menu to Return


Welcome to Bluetooth
Your Device Should Automatically Connect to the Closest VETCON BADGE
Type 1 to Start Communication:
Type 0 to Exit:
You entered 1

Yes I am
```

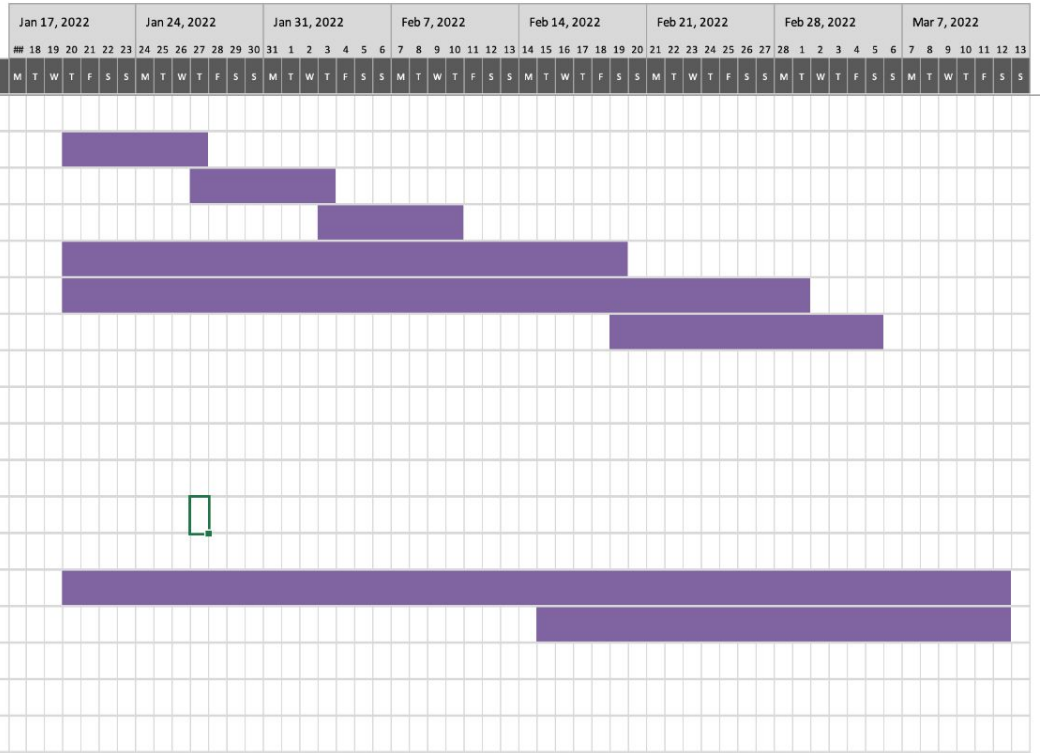
Gantt Chart (predicted)

VETCON BADGE

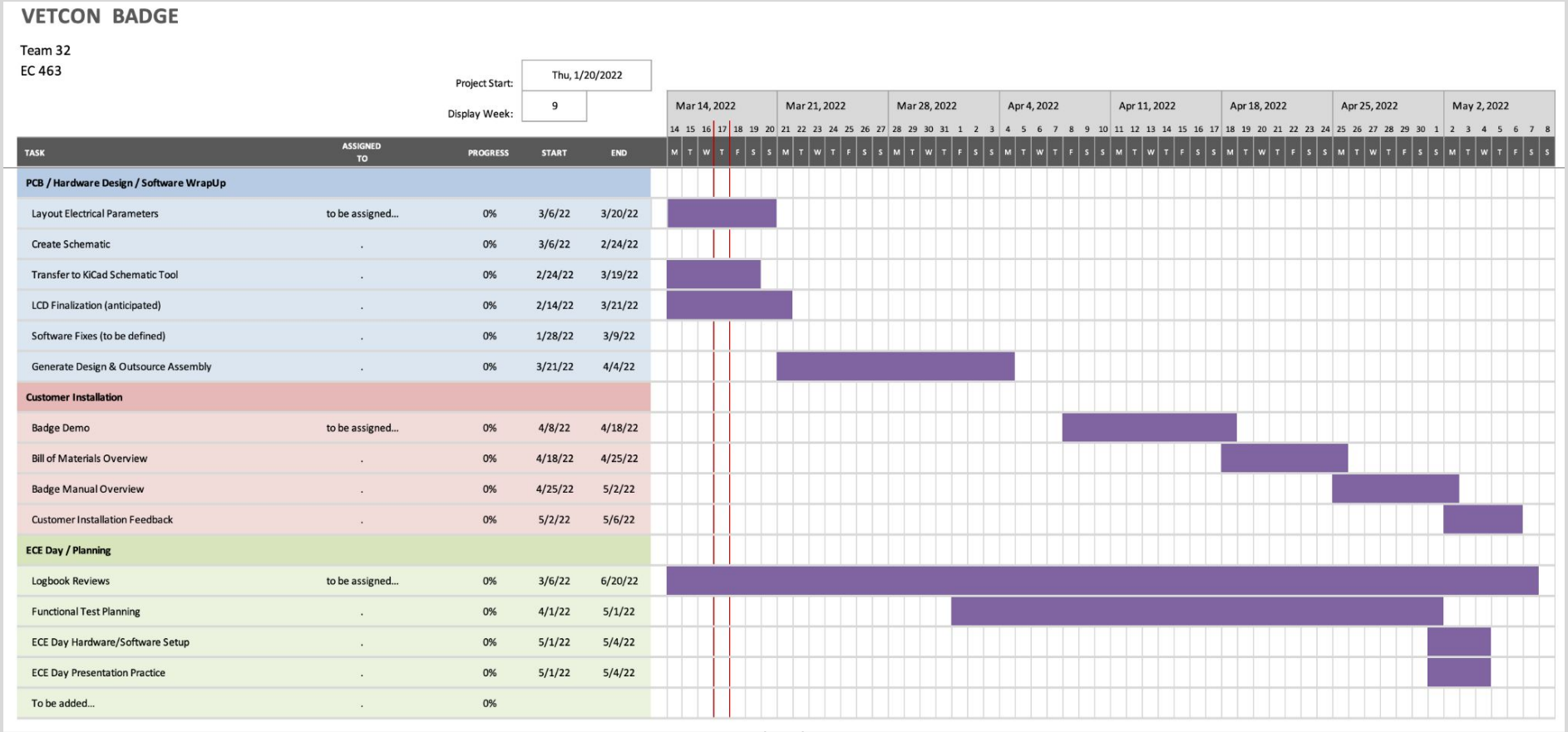
Team 32
EC 463

Project Start: Thu, 1/20/2022
Display Week: 1

TASK	ASSIGNED TO	PROGRESS	START	END
PCB / Hardware Design / Software WrapUp				
Layout Electrical Parameters	to be assigned...	0%	1/20/22	1/27/22
Create Schematic	.	0%	1/27/22	2/3/22
Transfer to KiCad Schematic Tool	.	0%	2/3/22	2/10/22
LCD Finalization (anticipated)	.	0%	1/20/22	2/19/22
Software Fixes (to be defined)	.	0%	1/20/22	3/1/22
Generate Design & Outsource Assembly	.	0%	2/19/22	3/5/22
Customer Installation				
Badge Demo	to be assigned...	0%	3/31/22	4/10/22
Bill of Materials Overview	.	0%	4/10/22	4/17/22
Badge Manual Overview	.	0%	4/17/22	4/24/22
Customer Installation Feedback	.	0%	4/24/22	4/28/22
ECE Day / Planning				
Logbook Reviews	to be assigned...	0%	1/20/22	5/6/22
Functional Test Planning	.	0%	2/15/22	3/28/22
ECE Day Hardware/Software Setup	.	0%	3/28/22	5/6/22
ECE Day Presentation Practice	.	0%	3/28/22	5/6/22
To be added...	.	0%		



Gantt Chart (actual)



VETCON BADGE

Team 32
EC 463

Project Start: Thu, 1/20/2022
Display Week: 9

TASK	ASSIGNED TO	PROGRESS	START	END
PCB / Hardware Design / Software WrapUp				
Layout Electrical Parameters	to be assigned...	0%	3/6/22	3/20/22
Create Schematic	.	0%	3/6/22	2/24/22
Transfer to KiCad Schematic Tool	.	0%	2/24/22	3/19/22
LCD Finalization (anticipated)	.	0%	2/14/22	3/21/22
Software Fixes (to be defined)	.	0%	1/28/22	3/9/22
Generate Design & Outsource Assembly	.	0%	3/21/22	4/4/22
Customer Installation				
Badge Demo	to be assigned...	0%	4/8/22	4/18/22
Bill of Materials Overview	.	0%	4/18/22	4/25/22
Badge Manual Overview	.	0%	4/25/22	5/2/22
Customer Installation Feedback	.	0%	5/2/22	5/6/22
ECE Day / Planning				
Logbook Reviews	to be assigned...	0%	3/6/22	6/20/22
Functional Test Planning	.	0%	4/1/22	5/1/22
ECE Day Hardware/Software Setup	.	0%	5/1/22	5/4/22
ECE Day Presentation Practice	.	0%	5/1/22	5/4/22
To be added...	.	0%		

What still needs to be done?

Requirements

- Have a finished KiCad schematic
- BT “friending” feature
- 10 prototypes ready for ECE day
- Full bill of materials
- Board user manual

Stretch Goals

- Alphanumeric LCD operational

Thank You