MEAM 5100 Final Project

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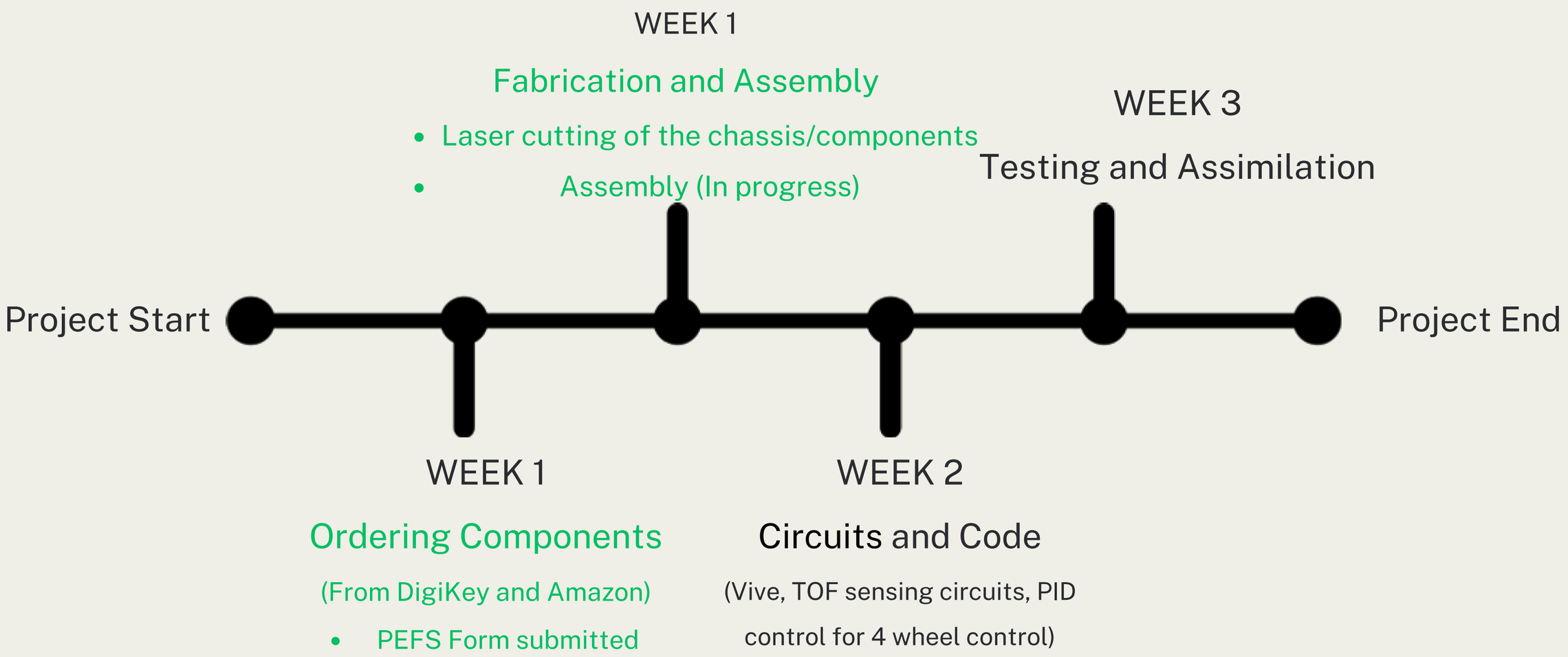
DESIGN REVIEW 2

A G E N D A

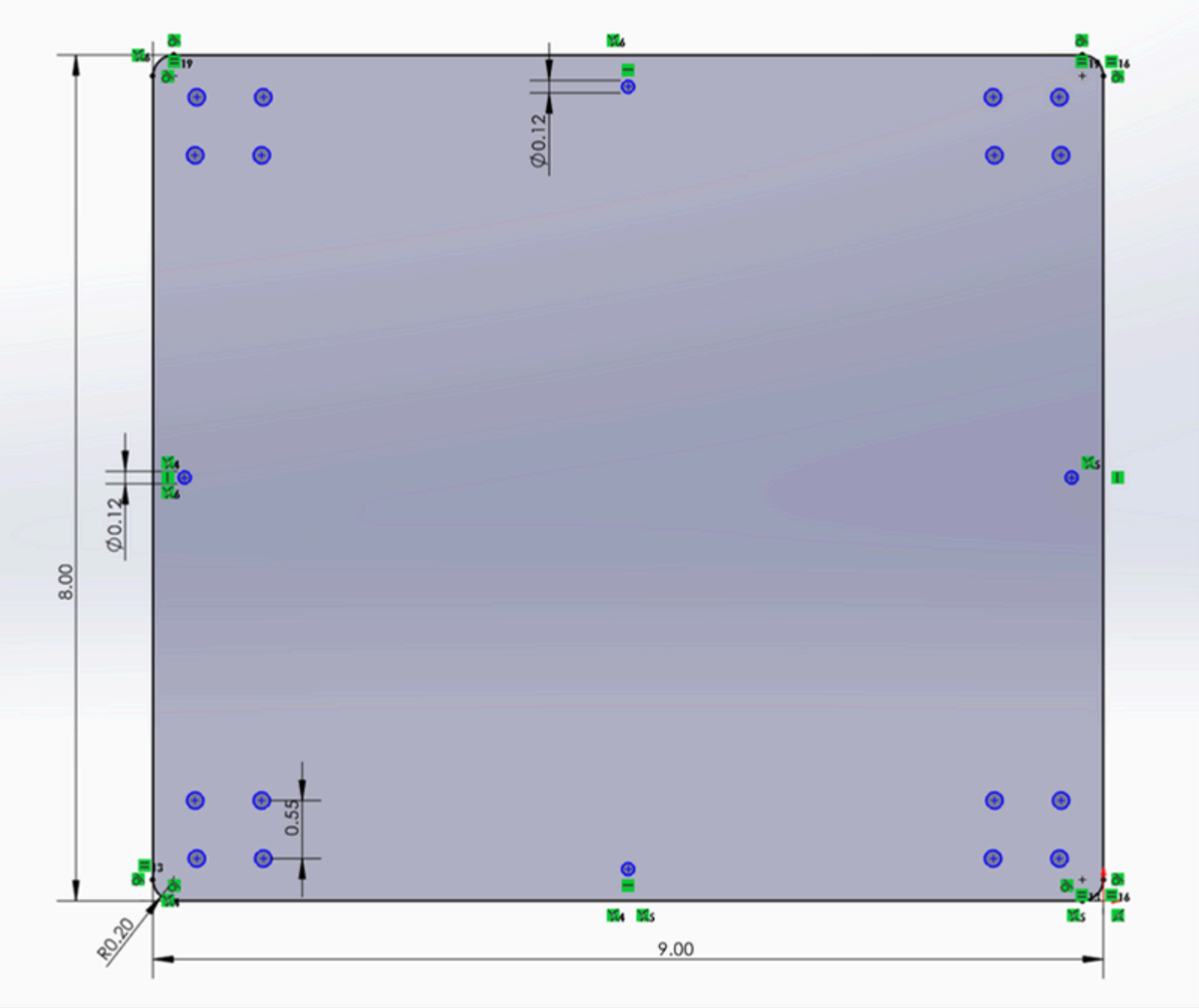
To discuss the progress on.....

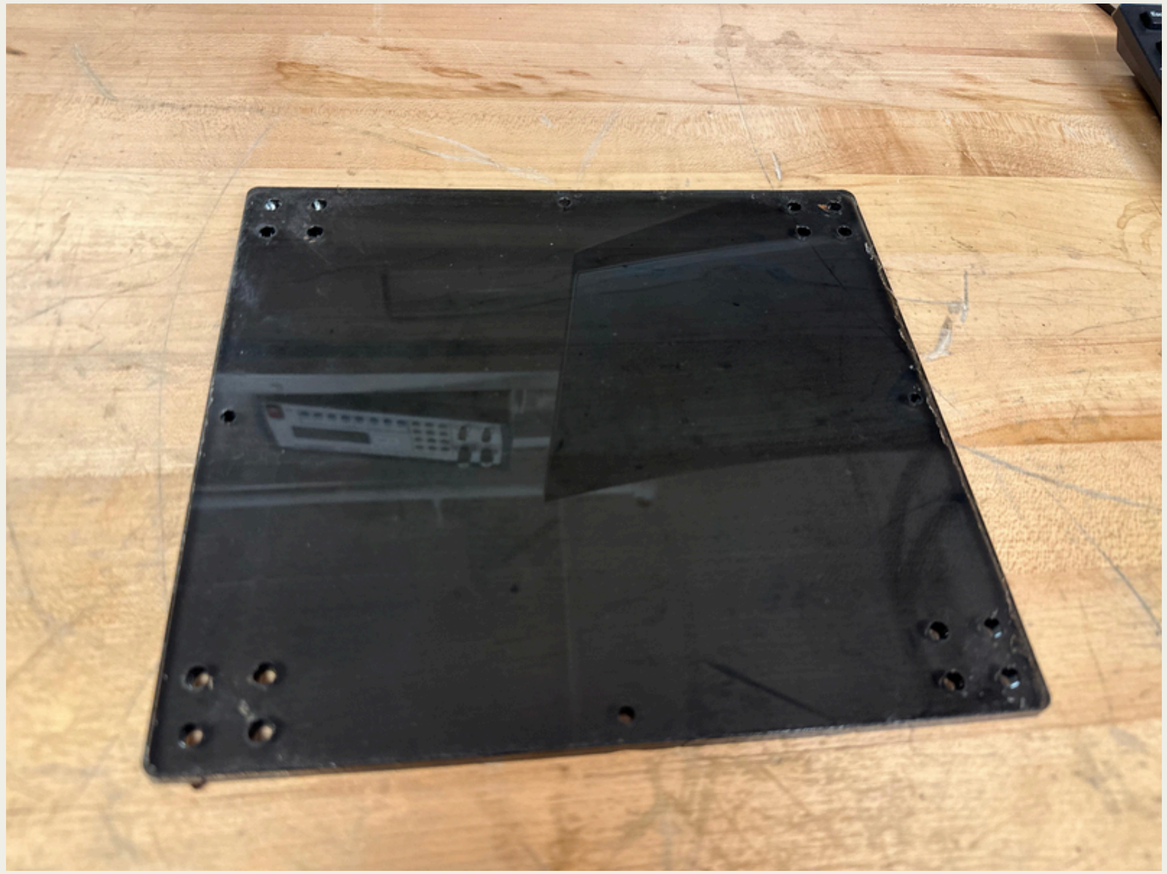
- Mobile Robot Architecture
  - CAD
  - Components for Assembly
  - List of Materials Required
- Sensors & Circuits
- Software Plan
  - Input/Output Flow
  - Gameplay
  - Task Prioritization
  - Recovery

PROPOSED SCHEDULE VS PROGRESS



MOBILE ROBOT ARCHITECTURE - BASE PLATE





PENDING WORK

- Laser cutting of the Remaining CAD Model
- Supports
- Attach mechanism CAD and manufacturing
- Complete and solder Vive circuit

PLAN FOR MECHANICAL WORK

- Complete manufacturing and assembly of the chassis in the next 2 days
- Finalise CAD and manufacture attack mechanism and supports by this weekend

MOBILE ROBOT ARCHITECTURE

Key Components of Mechanical Design:-

Major Upgrades

LAB 4	Final Project
Differential Drive	Holonomic Drive
2 Motors	4 Motors
3 Wheels	4 Wheels
NA	Introduction of servo for Robotic Arm

MOBILE ROBOT ARCHITECTURE

We decided to shift from **Differential Drive** to **Holonomic Drive** based on the following issues we faced in Lab 4 :-

- Steering inconsistencies
- Absence of Diagonal/Omnidirectional movements

BILL OF MATERIALS

Serial No.	Description	Material/Component	Quantity
1	Motors	Metal	4
2	Wheels	Plastic + Rubber	4
3	Chassis	Acrylic	1
4	Battery	LiPo	2
5	ToF Sensors	VL53L1X	3
6	RGB Sensors	VEML3328	3
7	Vive Photosensors	PD70-01C/TR7	3
8	Flex Sensor	Adafruit 182	2
9	Whisker Switch	ME-8169	1
10	Servo-Motor	SG90	1
11	Microcontroller	ESP32-S3	2

COMPONENTS

- Localization:-
  - HTC Vive
  - PD70-01C/TR7 IR Photodiode

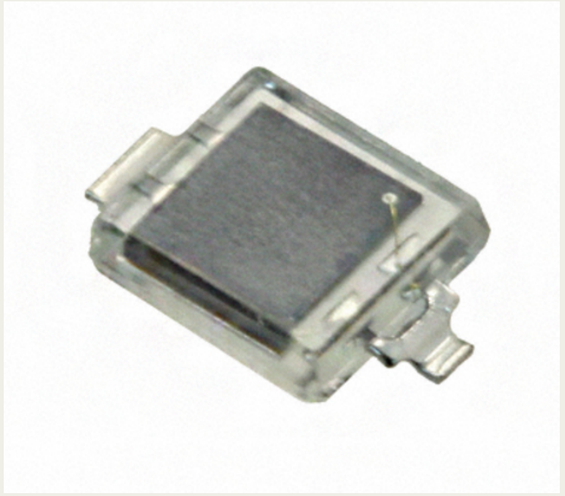


Fig: PD70-01C/TR7 from DigiKey

- Wall sensing:-
  - VL53L1X Time of Flight (ToF) sensor
  - 4m range

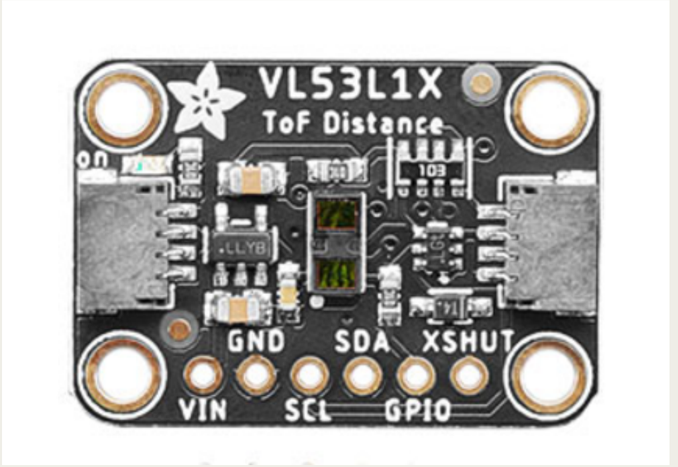


Fig: VL53L1X from DigiKey

COMPONENTS

- Contact sensing:-
  - 4.4in Flex Sensor

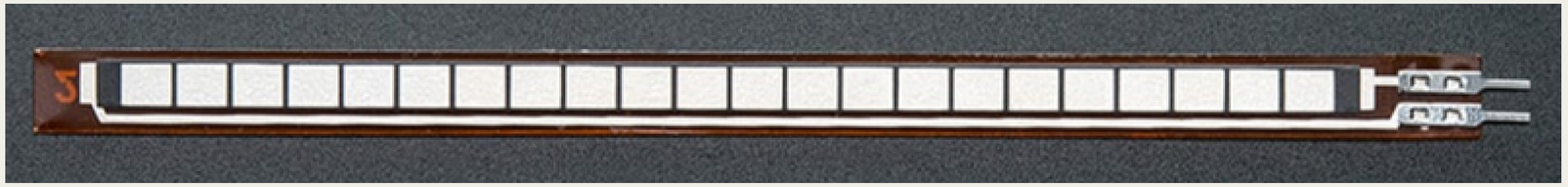


Fig: Flex sensor from Adafruit

- Colour sensing:-
  - VEML3328 RGB sensor

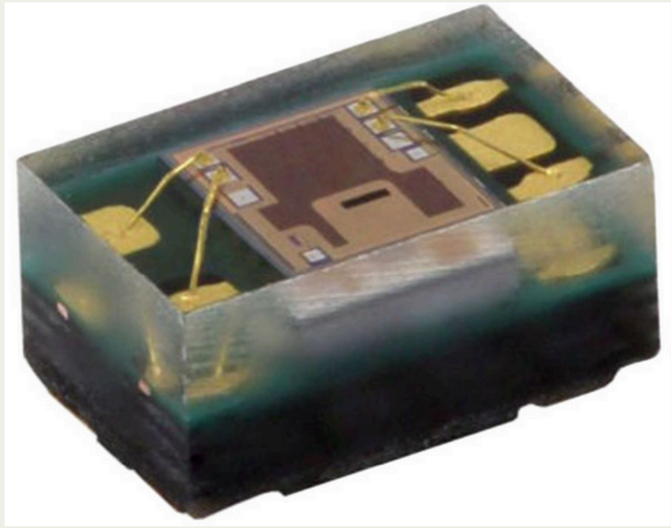
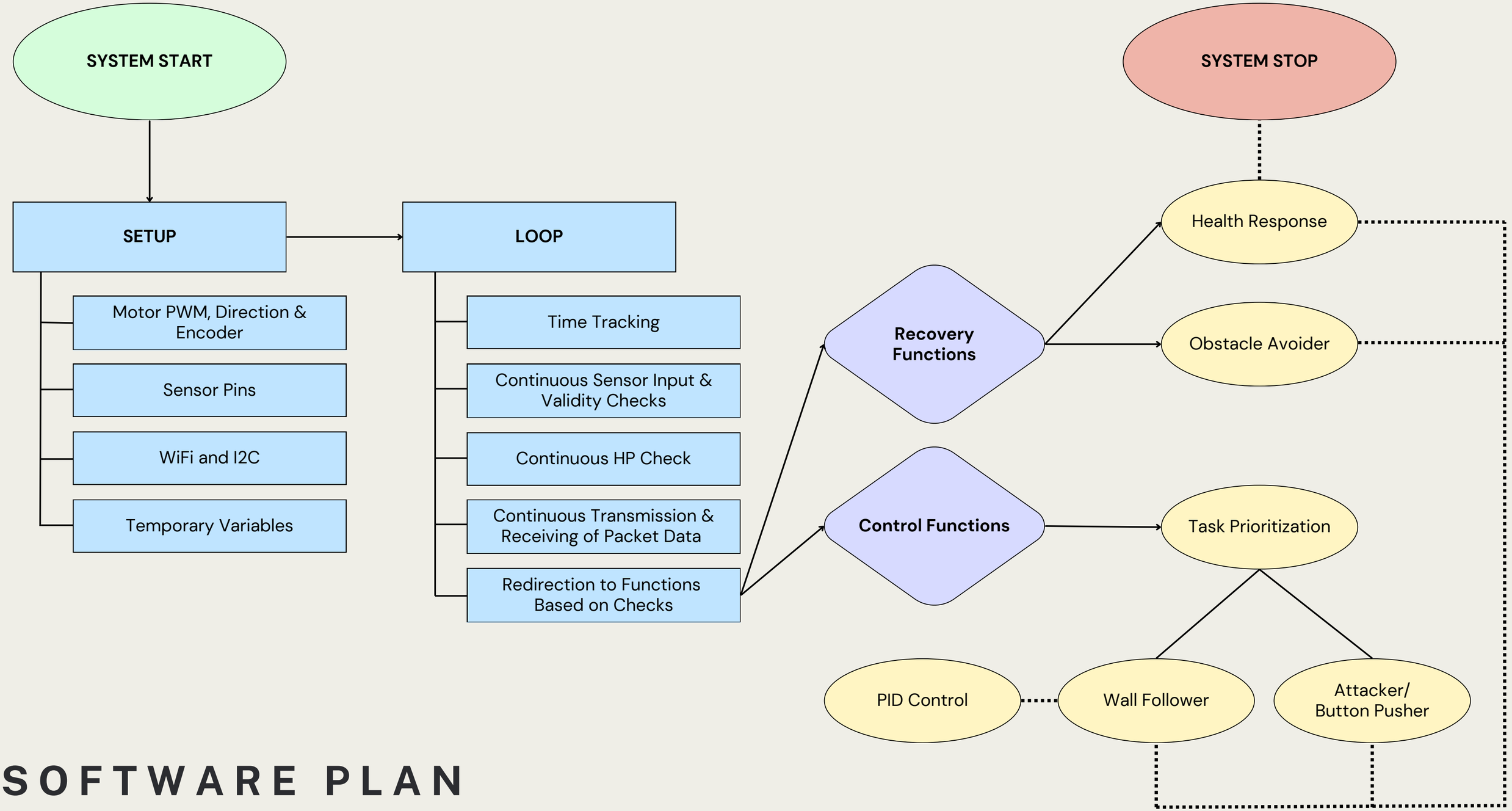


Fig: VEML3328 from DigiKey

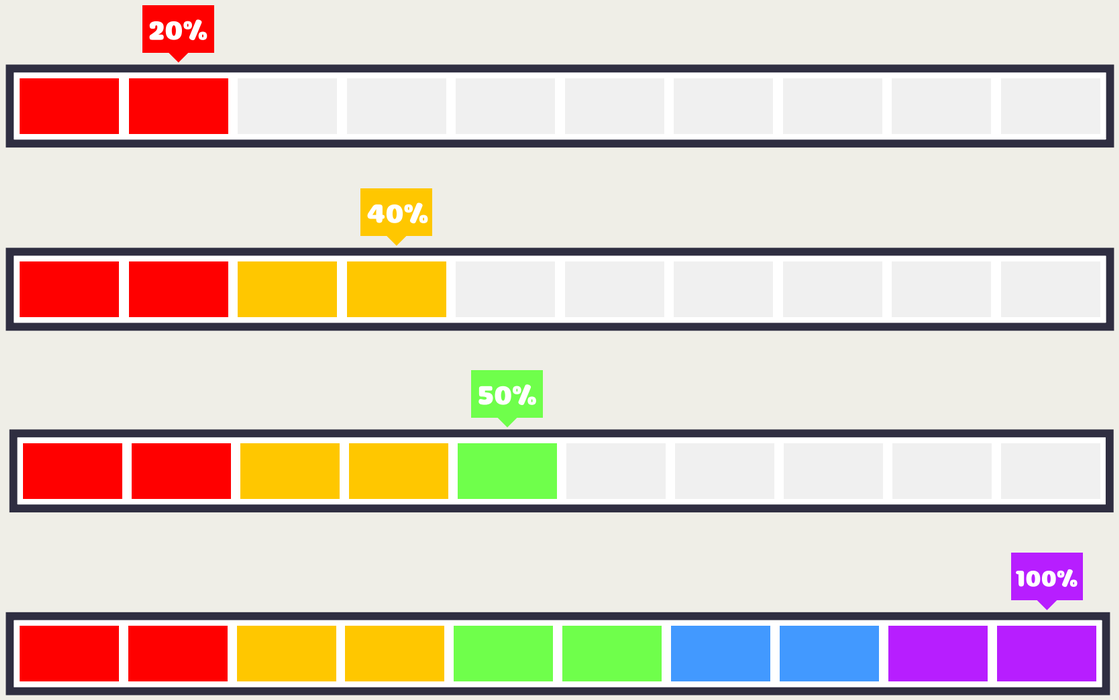


SOFTWARE PLAN

PLAN FOR TESTING

1. Integrating Vive and ToF sensor inputs
2. Performing wall following
3. Integrating RGB sensor input
4. Reaching button targets on nexus and towers + Pushing the buttons
5. Integrating obstacle avoidance
6. Following another bot + Attacking functionality

SUMMARIZNG OUR PROGRESS



Chassis manufacturing and assembly

Plan for testing

Code structure

PEFS form & ordering components

CRITICAL PARTS OF THE PROJECT

We expect to spend the most time on the following aspects of the project:

- Testing out sensor circuits
- Integrating PID with sensor outputs
- Executing efficient movement of the weapon based on ToF sensor values
- Debugging the system, due to the number of components that could potentially fail
- How to decide between tasks (would be finalized after seeing how tests go)

Thank You