Details

Ver. Rel. No.	Release Date	Prepared By	Reviewed By	To Be Approved	Remarks/Revision Details
1.0	16/02/2022	VISARAPU SAI KUMAR			

Contents

Miniproject – 1:APPLICATION DIARY [Individual]

Modules:

C-Programming.

Git-Hub.

Requirements:

4 W's and 1 H:

WHO

Only Authorized users can able to access Diary.

WHAT

It is used to save the personal data in a secured format.

WHEN

Any Authorized user can see thier saved data whenever they want to.

WHY

It is more efficiently to prevent the data theft.

HOW

It is created using functionalities such as protection.

optimized code results in less time consumption for running the program.

FEATURES:

It is efficient and it's easy to open, close and delete the data.

it takes less memory occupation.

It is Password Protected so no one can see your data.

TOOLS:

Tested output in different platforms with tools like GitBash, Command Prompt.

VS Code with extentions C/C++.

High level Requirments

ID	DESCRIPTION	Status
1	Function prototype can manage the login page in the system	IMPLEMENTED
2	Functions and structures prototype can manage the contact information being stored in the system	IMPLEMENTED
3	The entered data are stored as a text extension file in the system folder	IMPLEMENTED
4	Structure mechanism for packing data of different types	IMPLEMENTED

Low level Requirments

ID	DESCRIPTION	Status
1	Function prototype as Add,View,Edit,Display and Delete	IMPLEMENTED
2	Data are stored as "record.txt" in the system folder	IMPLEMENTED
3	Structure has the data type of name, date	IMPLEMENTED

SWOT Analysis:

OPPURTUNITIES

This project can be used as the basis for several upcoming projects. Cost Effectiveness.

THREATS

Changing Technologies may cause threats.

STRENGTH

Internal attributes and resources that support a successful outcome. Highly Secured.

WEAKNESS

Password should be kept private or else it may lead to data theft.

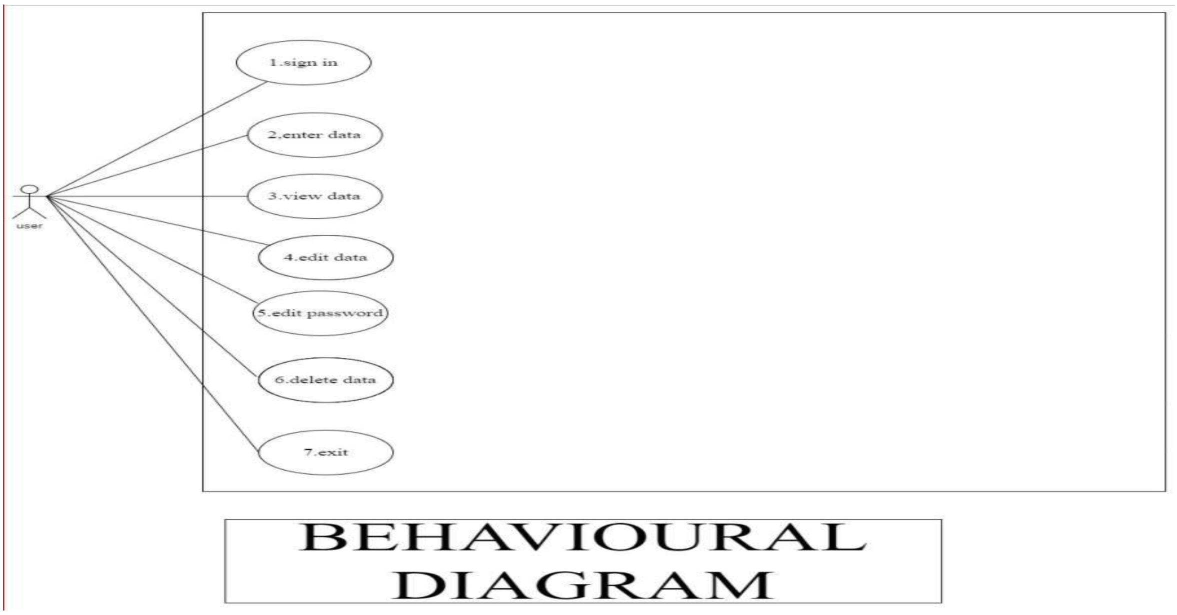
Requirements

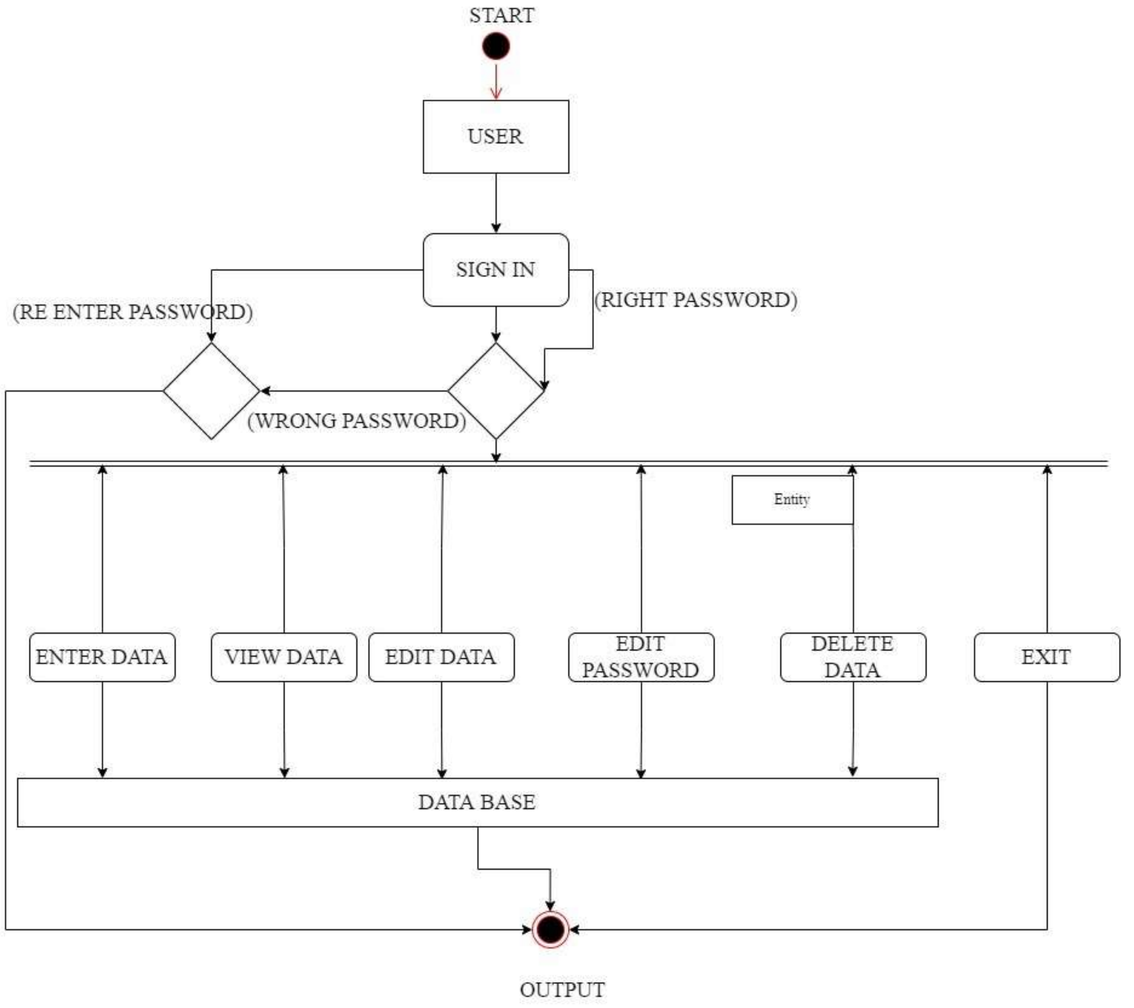
In this project, user can keep their personal record like they do in a diary. You can keep records of the important things you do in your daily life, like meetings and various other tasks.And it is password protected too.

FEATURES:

- It is Password Protected where no one can see our notes.
- It is efficient and doesn't require that much time to open, close and delete the notes.
- Less memory occupation.

Behavioural:

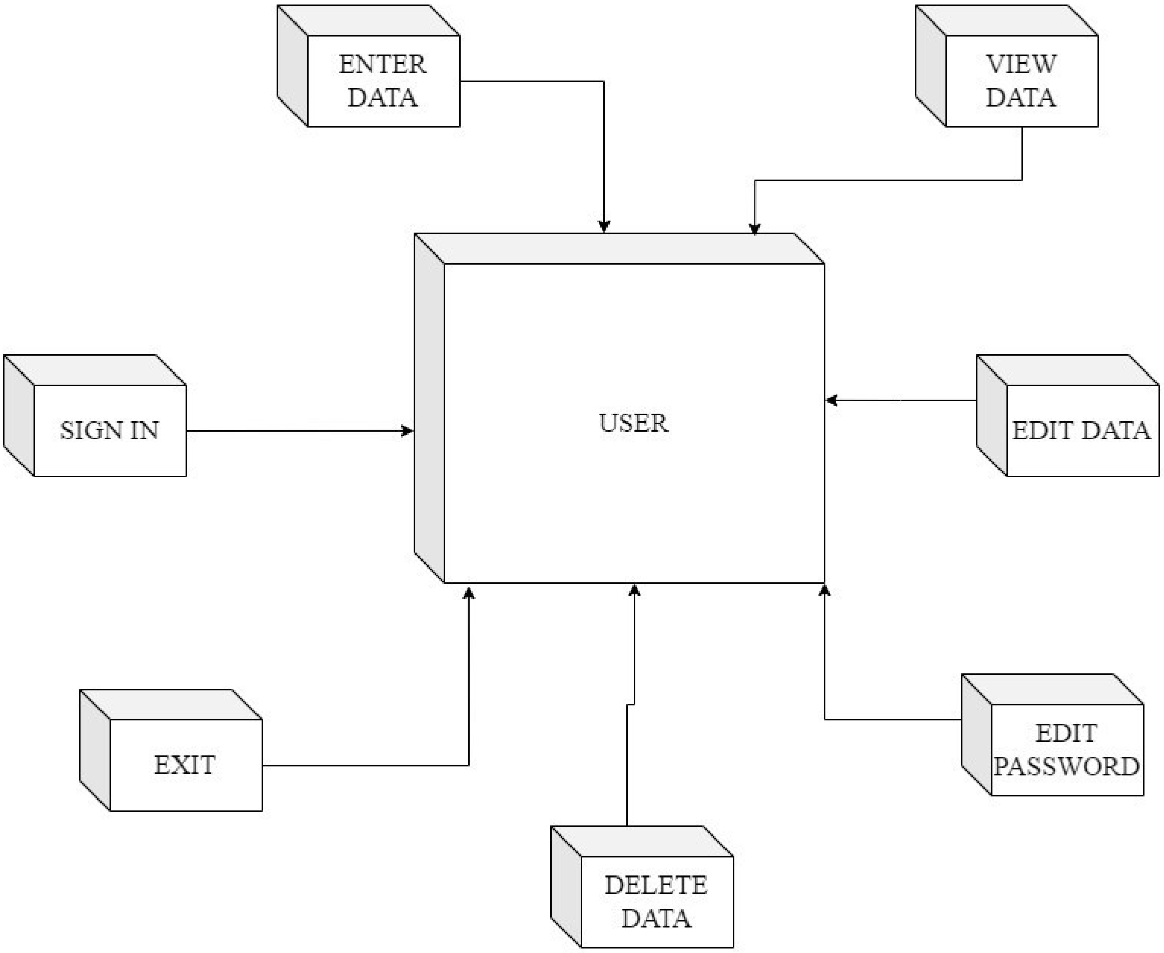




BEHAVIOURAL DIAGRAM

-

Structural:



STRUCTURAL DIAGRAM

Test Plane:

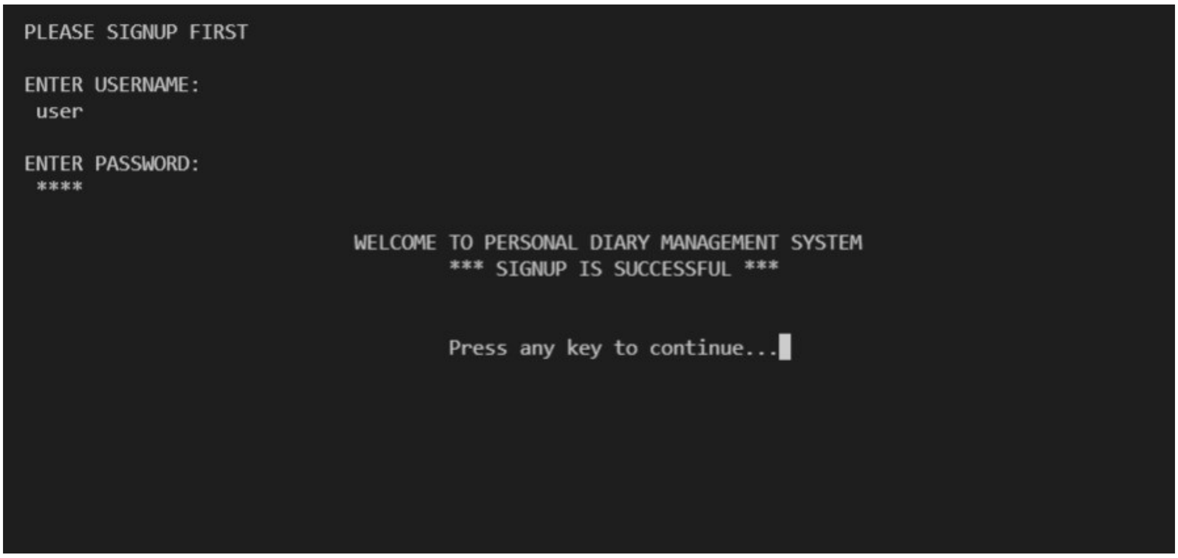
Table no: High level test plan

Test ID	Description	Expected Output	Actual Output	Pass/fail(Result)
H_01	Add Record	SUCCESS	SUCCESS	PASS
H_02	View Record	SUCCESS	SUCCESS	PASS
H_03	Edit Record	SUCCESS	SUCCESS	PASS
H_04	Delete Record	SUCCESS	SUCCESS	PASS
H_05	Edit Password	SUCCESS	SUCCESS	PASS
H_06	Exit	SUCCESS	SUCCESS	PASS

Table no: Low level test plan

Test ID	Description	Exp Input	Exp OUT	Actual Out	Type Of Test
L_01	MAIN MENU	SUCCESS	SUCCESS	SUCCESS	PASS
L_02	Display data	SUCCESS	SUCCESS	SUCCESS	PASS

Output:



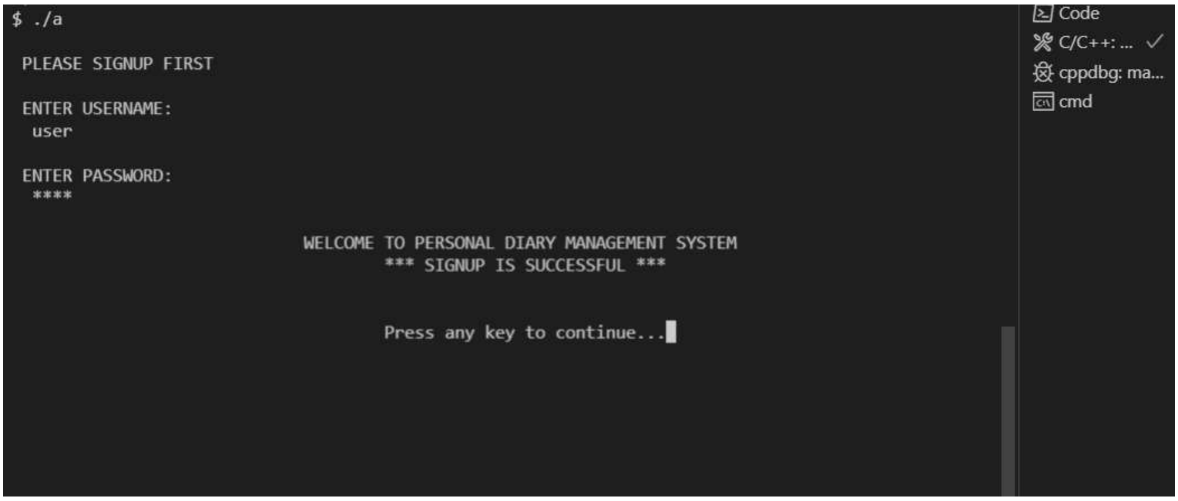
```
PLEASE SIGNUP FIRST

ENTER USERNAME:
 user

ENTER PASSWORD:
 ****

                              WELCOME TO PERSONAL DIARY MANAGEMENT SYSTEM
                                      *** SIGNUP IS SUCCESSFUL ***


                                      Press any key to continue...
```



```
$ ./a

 PLEASE SIGNUP FIRST

 ENTER USERNAME:
  user

 ENTER PASSWORD:
  ****

                              WELCOME TO PERSONAL DIARY MANAGEMENT SYSTEM
                                      *** SIGNUP IS SUCCESSFUL ***


                                      Press any key to continue...
```

Implementation and Summary

Git Link:

Link: https://github.com/lakshmanswamiyalla/M1_Application_Number_conversion.git

Miniproject – 2: M2 Project Atmega[Individual]

Modules:

Atmega.

Git-Hub.

Requirements:

4 W's an 1 H

What

- we have made a setup based on a microcontroller in which real time distance is sensed by an ultrasonic sensor and displays measured distance on an LCD display.

Where

- It measures accurate distance using a non-contact technology - A technology that involves no physical contact between sensor and object.

When

- In 1959, Satomura created an ultrasonic flowmeter that used doppler technology.

Why

- I am Developing this project for easily measure the distance between objects

How

- By using Atmega328 an display an ultrasonic sensor mainly used to determine the distance of the target object.

Features

Hardware Features

- ATmega328 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed.
- A sound sensor is defined as a module that detects sound waves through its intensity and converting it to electrical signals.
- A display device is an output device for presentation of information in visual or tactile form.

Software Features

- SimulIDE tool provides ATmega, AVR, Arduino and PIC microcontrollers that can be accessed just like other components. Features like gpsim and simavr allow you to use PIC and AVR microcontrollers, respectively.
- An automatic voltage regulator (AVR) is an electronic device that maintains a constant voltage level to electrical equipment on the same load. The AVR regulates voltage variations to deliver constant, reliable power supply.

High Level Requirements

ID	Description
HLR_01	Used to measure the distance within a wide range of 2 cm to 400 cm
HLR_02	Depth of certain places like wells, pits etc can be measured since the waves can penetrate through water
HLR_03	Used to avoid and detect obstacles with robots like biped robot, obstacle avoider robot, path finding robot etc.

Low Level Requirements

ID	Description
	Power Supply :+5V DC.
LLR_01	Measuring Angle: 30 degree.
	Trigger Input Pulse width: 10uS TTL pulse.
LLR_02	Depth of certain places like wells, pits etc can be measured since the waves can penetrate through water.

SWOT ANALYSIS

Strength:

- The distance to an obstacle can be measured with the low cost ultrasonic sensor . The sensors can measure distances form 2 to 400 cm with an accuracy of 3 mm. This sensors module includes ultrasonic transmitter, ultrasonic receiver and control circuit.

Weakness:

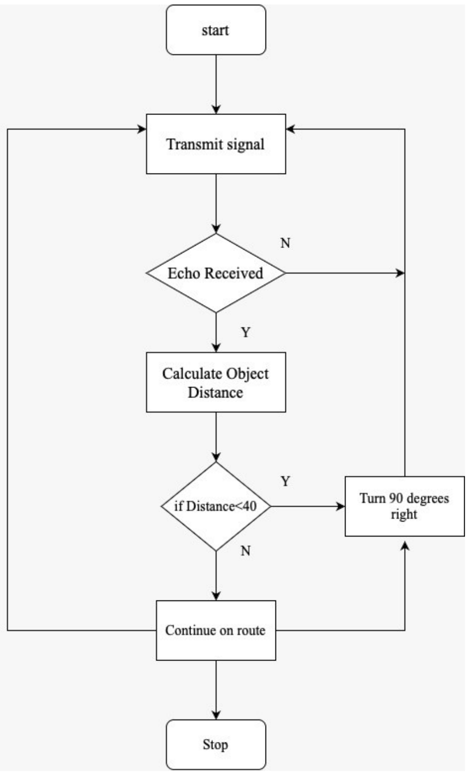
- Although we fully believe in the capability of our sensors, we understand that ultrasonics are not suited for every application. Focuses of low thickness, similar to froth and fabric, have a tendency to assimilate sound liveliness. These materials may be hard to sense at long range.

Opportunity:

- This project can be used as parking assistance systems in vehicles with high power ultrasonic transmitter. This Project can be used as burglar alarm with suitable additional software for homes and offices.

Threats:

- Ultrasonic sensors must view a surface (particularly a hard, level surface) unequivocally (oppositely) to get adequate sound reverberation. Additionally, solid detecting requires a base target surface range, which is indicated for every sensor sort. If connection is wrong there might be chances of short-circuit.



Bill of Material:

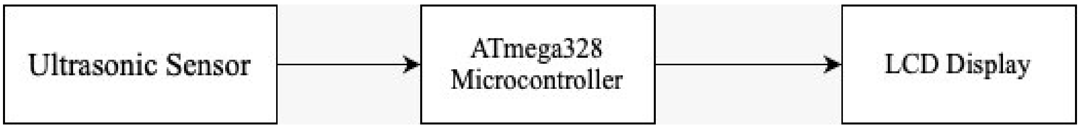
Circuit: DistMeas.simu

Bill of Materials:

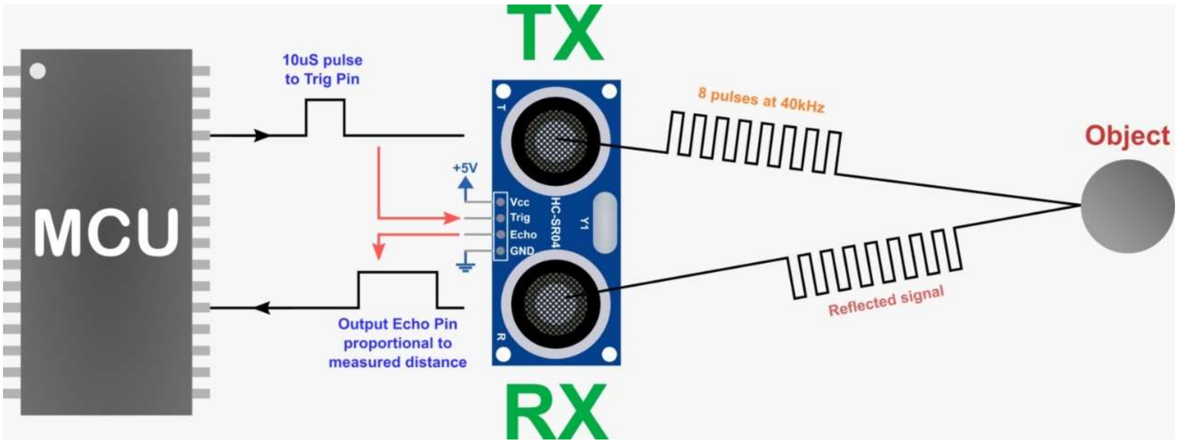
- Hd44780-104: Hd44780
- SR04-114: SR04

- atmega328-105 : atmega328
- Potentiometer-286 : Potentiometer 1 kΩ

Block Diagram:



Structural Diagram:



M2_emedded_projectonatmega328

Contribution Check - Git Inspector passing

Code Quality Score 80

Code Grade B

Implementation and Summary:

GitHubLink: https://github.com/visarapu/M2_emedded_projectonatmega328.git

Mini Project-3: ESSENTIALS OF PYTHON

Lesson 1: print()
It’s the tradition. Print **“Hello World!”**

Lesson 2: Variables
Variables are probably the most fundamental building blocks in high-level programming. Learn and Practice variables with this Python course.

Lesson 3: Data Types
Learn Python data types: int, float and str. They have different functions to store, process and represent different types of data.

Lesson 4: Type Conversion
Sometimes it makes sense to convert Python data types between each other (when possible). int, float and str are also functions for converting data types. And when you’re not sure of a variable’s type, you can use type function!

Lesson 5: Data Structures
In this Python course data gets a bit more structured. Python lists, dictionaries and tuples are famous sequences that can contain various type of data. You will learn most common Python data structures along with functions to create them.

Lesson 6: Lists
A closer look at Python lists and some of their built-in methods and functions. This lesson introduces a lot of fundamental Python topics but it’s so worth it. Make sure you take your time and get comfortable with Python lists as you will be using them a lot.

Lesson 7: Tuples
Python tuple concept, difference between tuple and list along with some tuple examples and built-in tuple methods in Python.

Lesson 8: Dictionaries

Yet another cool Python data structure: dictionaries will be unraveled in detail. Python Dictionaries new perspectives to data such as usage of key and unindexed structure.

Lesson 9: Strings
Good ol’ strings revisited. More string methods, more built-in functions and more string examples. When you think about string, it’s everywhere. Web data, reports, news, social media, books, descriptive text, user input, survey answers, gui and many more. So it deserved a revisit.

Lesson 10: len()
A practical Python function to get length of different types of data in Python.

Lesson 11: .sort()

This list method can be very useful to sort data in a list. Later in intermediate lessons its cousin **sorted** function will be introduced along with slightly more advanced concepts. sort is a list method while sorted is a built-in function.

Lesson 12: .pop() method

In this course an interesting dictionary method, pop, will be introduced. It's also an opportunity to polish our Python dictionary knowledge.

Lesson 13: input()

One of the most exciting Python function for many beginners, input allows interacting with users. You can ask questions or share messages with users and harvest their answers to use them in your computer program. Input also provides opportunities to practice Python data types.

Lesson 14: range() |

Range function is practical and it can be used to create range objects in Python. Range objects are very useful when used with for loops and they can also be used to create lists of numbers (int or float) with different steps (default 1).

Lesson 15: Error Handling

Errors are a way of computers to say something's not right or they don't understand something when we write computer programs. It can be very useful to know what different errors mean in Python and how to handle them. As you get familiar with more errors they will stress you less when coding!

Lesson 16: Defining Functions

In computer world you are not limited to built-in functions only. Often it makes sense to construct a user-defined function and tuck your pieces of code in there. Re-usability, structure, sophisticated Python operations… You are advancing in Python programming. Congrats!

Lesson 17: Slicing

Slicing notation is a must know. It may seem a bit weird at first but Python slicing notations are actually addictively cool. Slice many different types of data, from the beginning to the end, end to beginning and with steps too!

Lesson18:PythonOperators

You have probably been using Python Operators all along. In this course you will be officially introduced to different Python operators

Mini Project -4: FOOD COURT [Team]

Module/s:

1. C Programming
2. SDLC
3. Git

Requirements:

4W1H:

Who-
It can be used by the owner of the food court to update and to use it treely

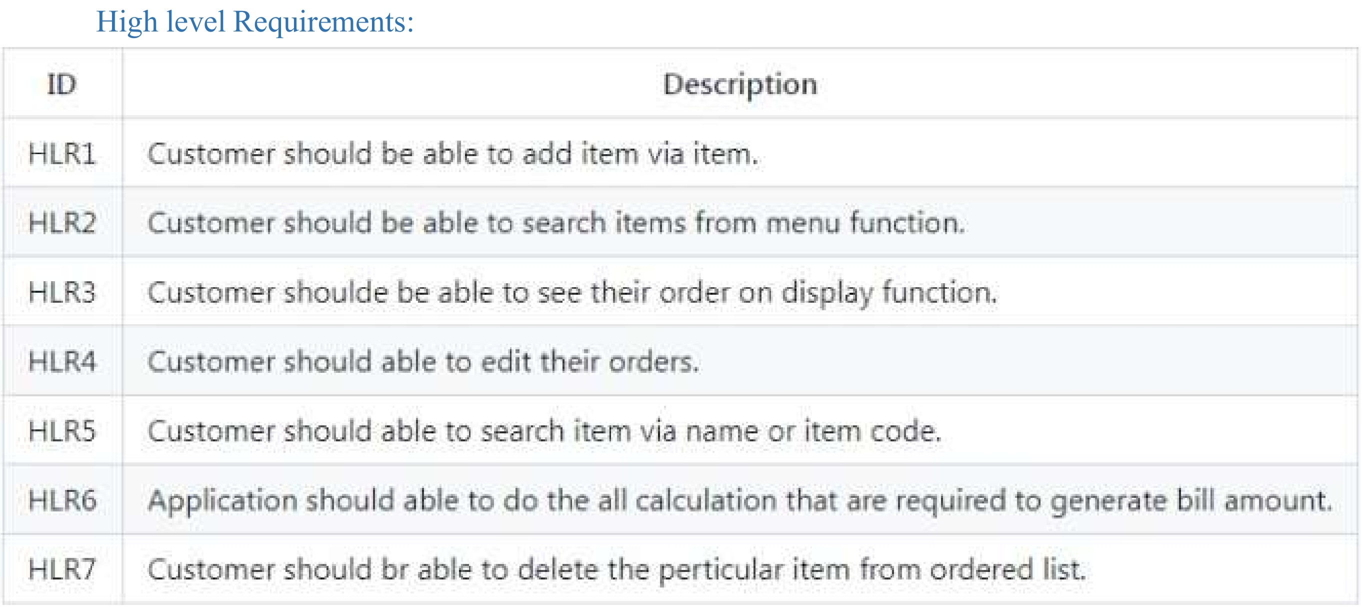
What-
A userfriendly application for used to check update in food court daily.

When-
As the customers in their recess time use food court inside the company for their food consumption they will need a Managementsystem to check todays update.

Where-
Used in all mess centers running inside a company for owes benefit.

How-
It can be used in a mobile app easily or can login in a PC.

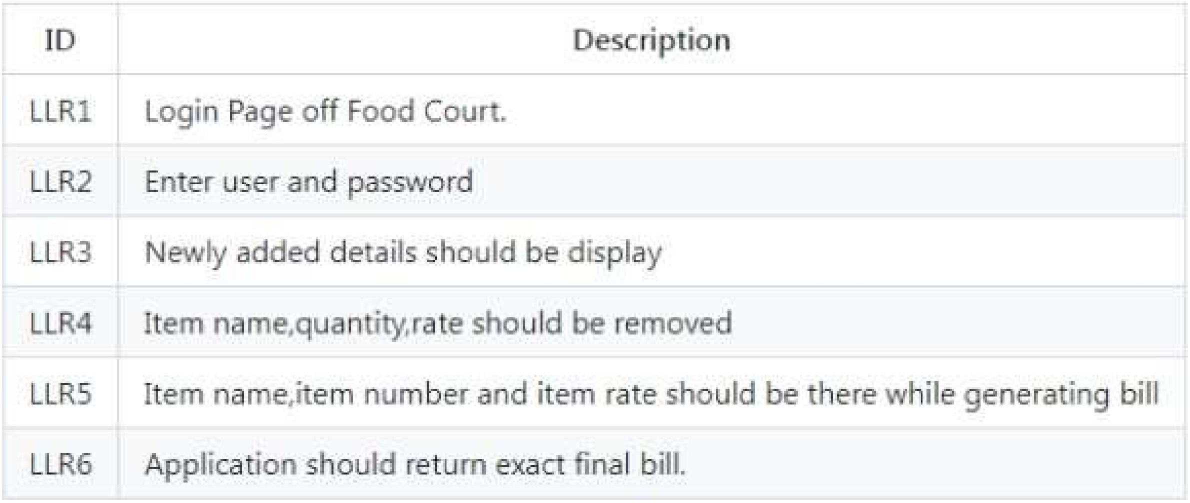
High level Requirements:



High level Requirements:

ID	Description
HLR1	Customer should be able to add item via item.
HLR2	Customer should be able to search items from menu function.
HLR3	Customer shoulde be able to see their order on display function.
HLR4	Customer should able to edit their orders.
HLR5	Customer should able to search item via name or item code.
HLR6	Application should able to do the all calculation that are required to generate bill amount.
HLR7	Customer should br able to delete the perticular item from ordered list.

Low level requirement:



ID	Description
LLR1	Login Page off Food Court.
LLR2	Enter user and password
LLR3	Newly added details should be display
LLR4	Item name,quantity,rate should be removed
LLR5	Item name,item number and item rate should be there while generating bill
LLR6	Application should return exact final bill.

Block Diagram:

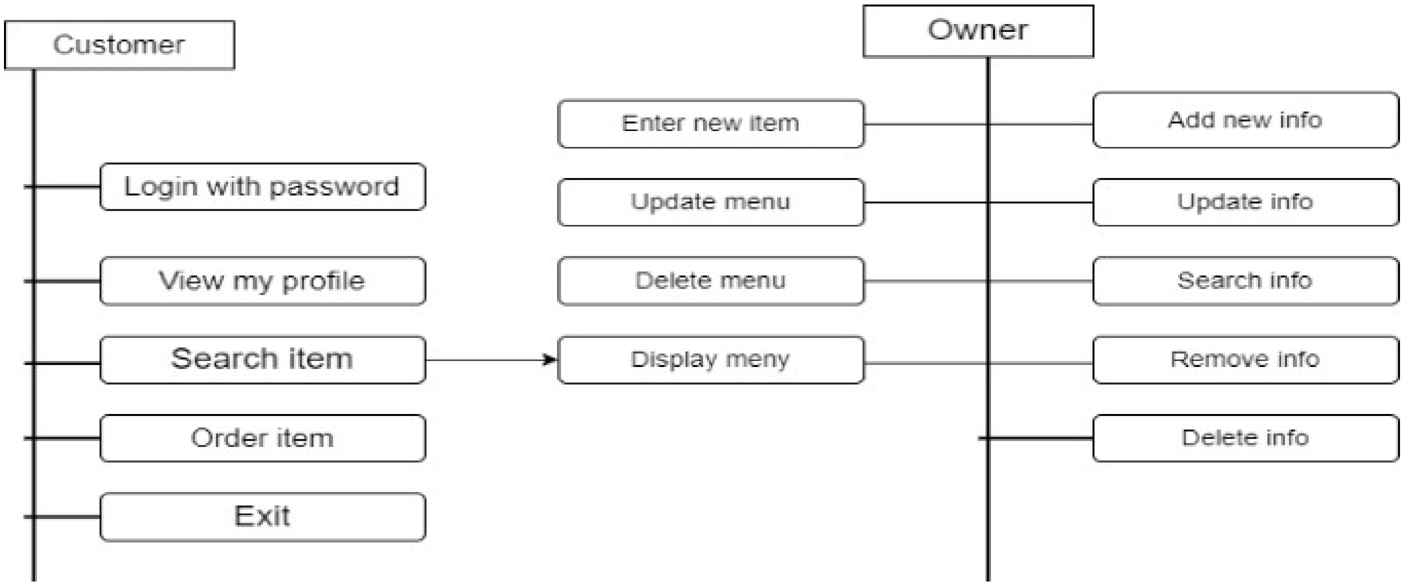


Figure 7 Block Diagram

Behavioral diagram:

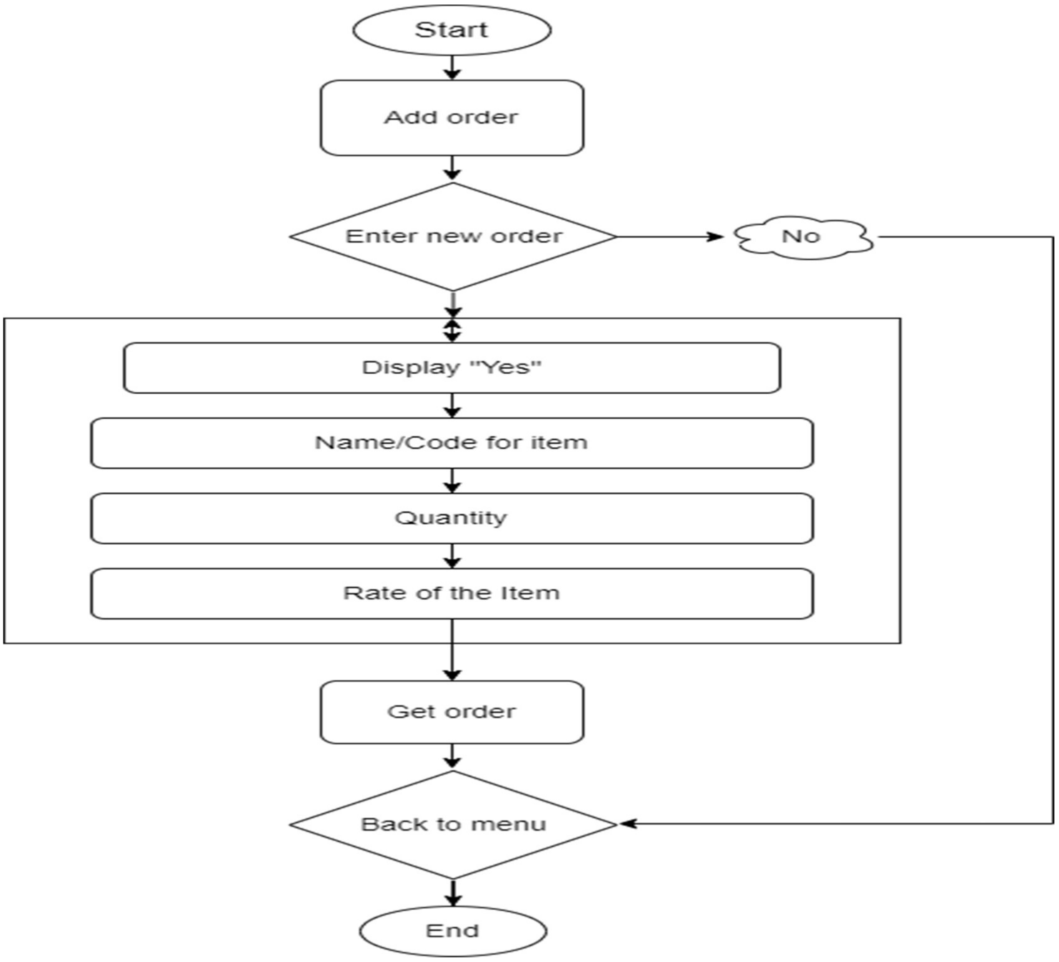


Figure 8 Behavioral Diagram

Structural diagram:

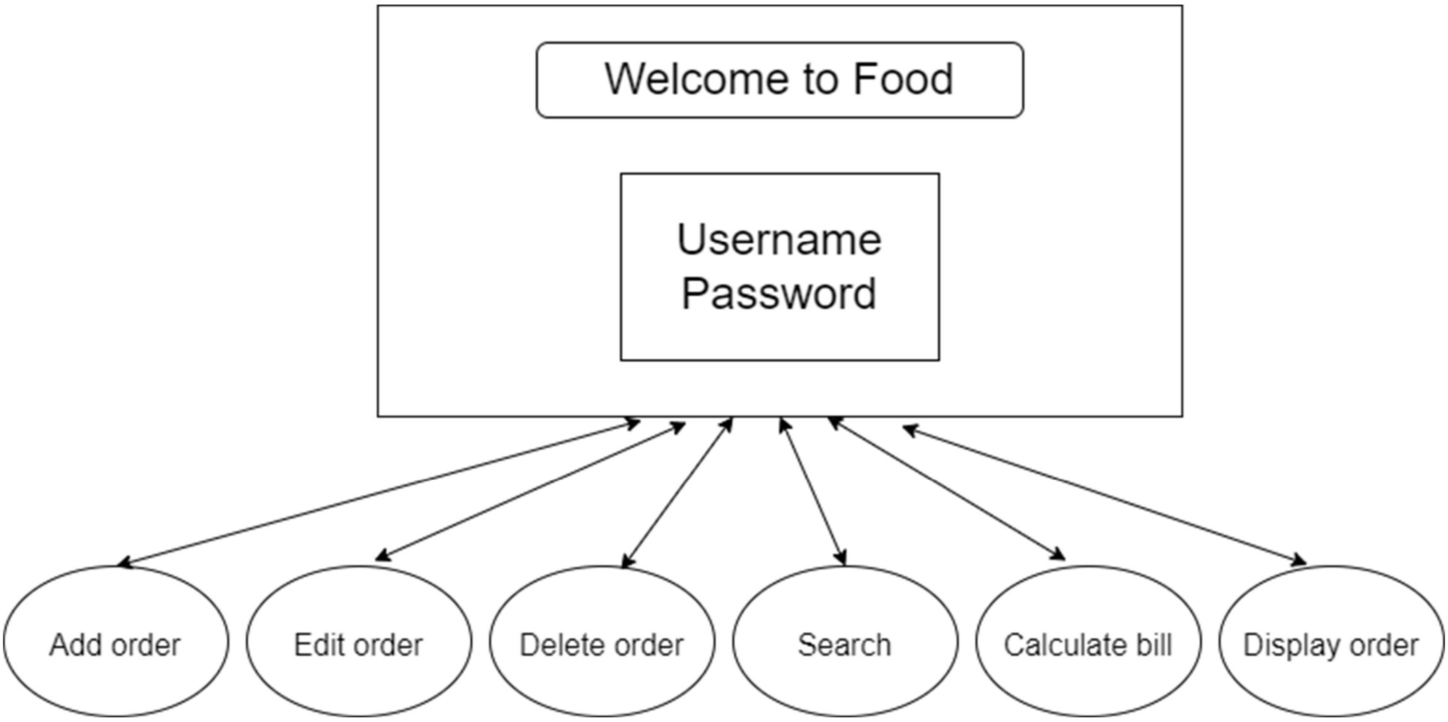


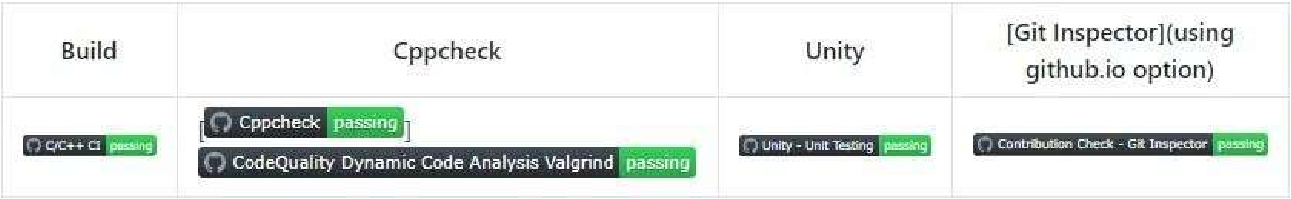
Figure 9 Structural Diagram

Implementation and Summary:

Git Link:

Link: https://github.com/GENESIS2021Q1/Applied_SDLC-Dec_Team_47.git

Git Dashboard:



Build	Cppcheck	Unity	[Git Inspector](using github.io option)
C/C++ CI passing	[Cppcheck passing] CodeQuality Dynamic Code Analysis Valgrind passing	Unity - Unit Testing passing	Contribution Check - Git Inspector passing

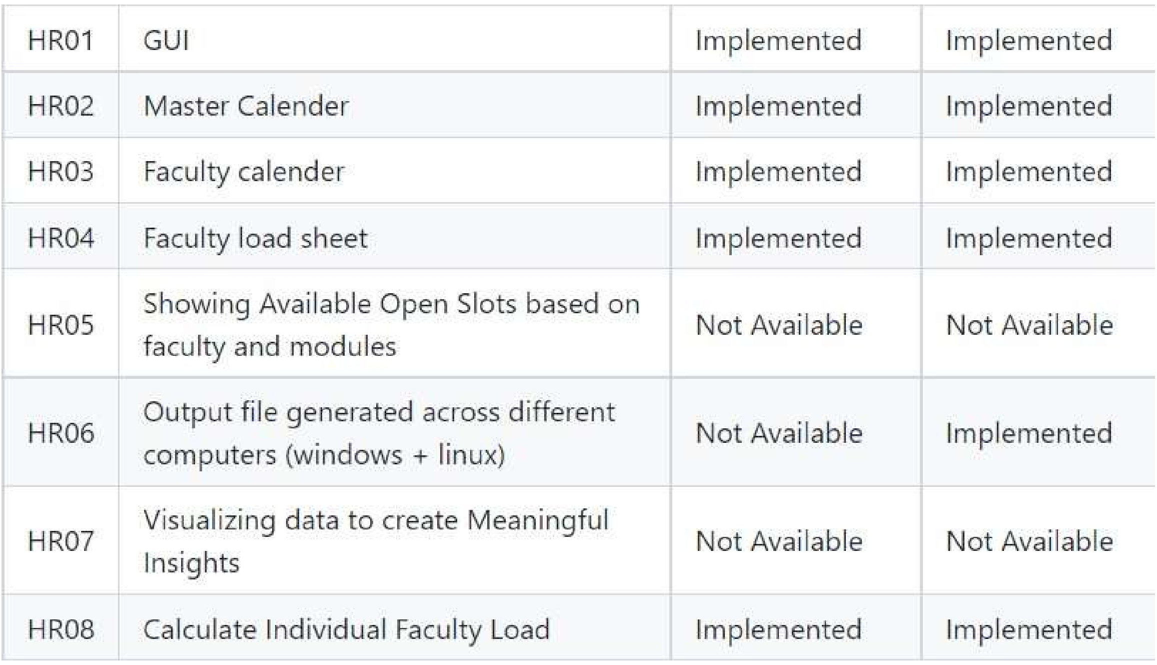
Mini Project 5 – Calendar Automation [Team]

Modules

1. Python
2. Git

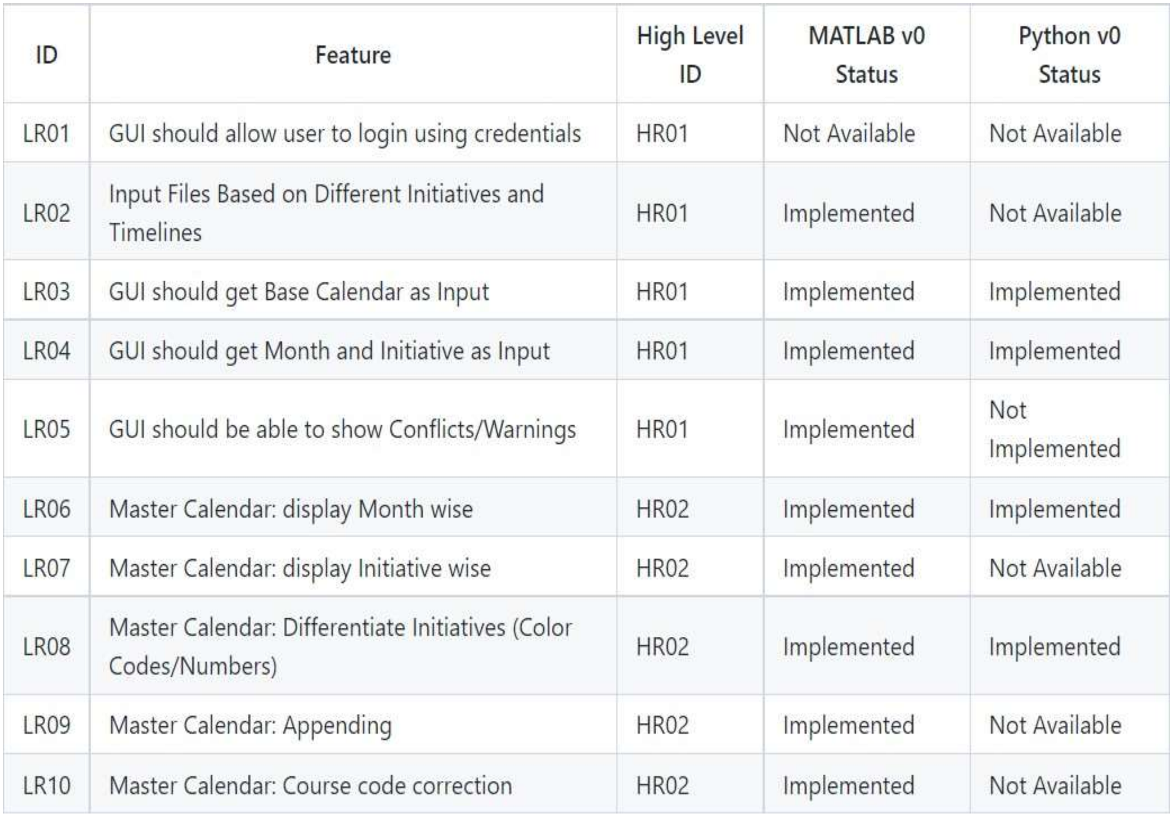
Requirements

High Level Requirements



HR01	GUI	Implemented	Implemented
HR02	Master Calender	Implemented	Implemented
HR03	Faculty calender	Implemented	Implemented
HR04	Faculty load sheet	Implemented	Implemented
HR05	Showing Available Open Slots based on faculty and modules	Not Available	Not Available
HR06	Output file generated across different computers (windows + linux)	Not Available	Implemented
HR07	Visualizing data to create Meaningful Insights	Not Available	Not Available
HR08	Calculate Individual Faculty Load	Implemented	Implemented

Low Level Requirements:



ID	Feature	High Level ID	MATLAB v0 Status	Python v0 Status
LR01	GUI should allow user to login using credentials	HR01	Not Available	Not Available
LR02	Input Files Based on Different Initiatives and Timelines	HR01	Implemented	Not Available
LR03	GUI should get Base Calendar as Input	HR01	Implemented	Implemented
LR04	GUI should get Month and Initiative as Input	HR01	Implemented	Implemented
LR05	GUI should be able to show Conflicts/Warnings	HR01	Implemented	Not Implemented
LR06	Master Calendar: display Month wise	HR02	Implemented	Implemented
LR07	Master Calendar: display Initiative wise	HR02	Implemented	Not Available
LR08	Master Calendar: Differentiate Initiatives (Color Codes/Numbers)	HR02	Implemented	Implemented
LR09	Master Calendar: Appending	HR02	Implemented	Not Available
LR10	Master Calendar: Course code correction	HR02	Implemented	Not Available

Implementation and Summary

Git Link:

Link: https://github.com/Pradnya579/GENESIS2021-OOP-Python_Team_46.git

Individual Contribution and Highlights

1. Improved implementation of Python Programming
2. Source code management using GitHub

Role in Project Team

1. Programmer: Done Programming for calendar Automation
2. Integrator: Integrated all the codes

Mini Project 6 – Hyundai Project [Team]

Modules

1. Matlab
2. Git

Contribution:

S.No	NAME	PS Number	Feature
1	Y. Lakshman Swami	40021033	Door locking
2	P. Haritha	40021034	Sunroof control
3	V. V K Mallikarjunudu	40021038	Sunroof control
4	V. Sai Kumar	40021040	Window control
5	S. Usha Rani	40021045	Power Window
6	N. Kesava Kumar	40021058	Security Systems
7	T. Lakshmi Narayana	40021060	Wiper Control

Requirements:

Door Locking System:

Power door locks (also known as electric door locks or central locking) allow the driver or front passenger to simultaneously lock or unlock all the doors of an automobile or truck, by pressing a button or flipping a switch. Nearly every car model todayoffers this feature as at least optional equipment.

Sunroof control:

A sunroof is a movable panel that opens to uncover a window in an automobile roof, allowing light and fresh air to enter thepassenger compartment. Sunroofs can be manually operated or motor driven, and are available in many shapes, sizes and styles. While the term sunroof is now used generically to describe any glass panel in the roof, the term "moonroof" was historically used to describe stationary glass panes rigidly mounted in the roof panel over the passenger compartment.

Power Windows:

Power windows or electric windows are automobile windows which can be raised and lowered by pressing a button or switch, as opposed to using a crank handle.Power windows are usually inoperable when the car is not running. This is primarily a security feature. It would be a simple thing to allow electric power windows to be operable when the ignition isturned off, however it would also make the car much easier to steal. Some systems offer the compromise of leaving power applied to the windows until a passenger door is opened at which time the window power is removed.

Security System:

A car alarm is an electronic device installed in a vehicle in an attempt to discourage theft of the vehicle itself, its contents, or both. Car alarms work by emitting high-volume sound (often a vehicle-mounted siren, klaxon, pre-recorded verbal warning, the vehicle's own horn, or a combination of these) when the conditions necessary for triggering it are met. Such alarms may also cause the vehicle's headlights to flash, may notify the car's owner of the incident via a paging system, and may interruptone or more electrical circuits necessary for the car to start. Although inexpensive to acquire and install, the effectiveness of such devices in deterring vehicle burglary or theft when their only effect is to emit sound appears to be negligible. He individual triggers for a car alarm vary widely, depending on the make and model of the vehicle, and the brand and model ofthe alarm itself (for aftermarket alarms). Since aftermarket alarms are designed to be universal. Although car alarms of somekind have been available since the beginning of the automobile.

Wiper Control:

A windscreen wiper, windshield wiper or wiper blade (American English) is a device used to remove rain, snow, ice, washerfluid, water, and/or debris from a vehicle's front window so the vehicle's operator can better see what's ahead of them. Almost all motor vehicles, including cars, trucks, buses, train locomotives, and watercraft with a cabin—and some aircraft—are equipped with one or more such wipers, which are usually a legal requirement.On some vehicles, a windscreen washer system is also used to improve and expand the function of the wiper(s) to dry or icy conditions. This system sprays water, oran antifreeze window washer fluid, at the windscreen using several well-positioned nozzles.Most wipers are of the pivot (orradial) type: they are attached to a single arm, which in turn is attached to the motor. These are commonly found on many cars, trucks, trains, boats, airplanes, etc.Wipers may be powered by a variety of means, although most in use today are powered by an electric motor through a series of mechanical components, typically two 4-bar linkages in series or parallel.

References:

https://mechvibesblog.com/control-modules/ https://youtu.be/7zzpTH9Hl-s
https://youtu.be/4KS8jUCCbkQ
https://youtu.be/g6MgZY6Gbc8
https://youtu.be/PdH792tFV7M
https://youtu.be/r6gbQTt1Blc

Design

This project was implemented using Matlab.

Individual contribution:

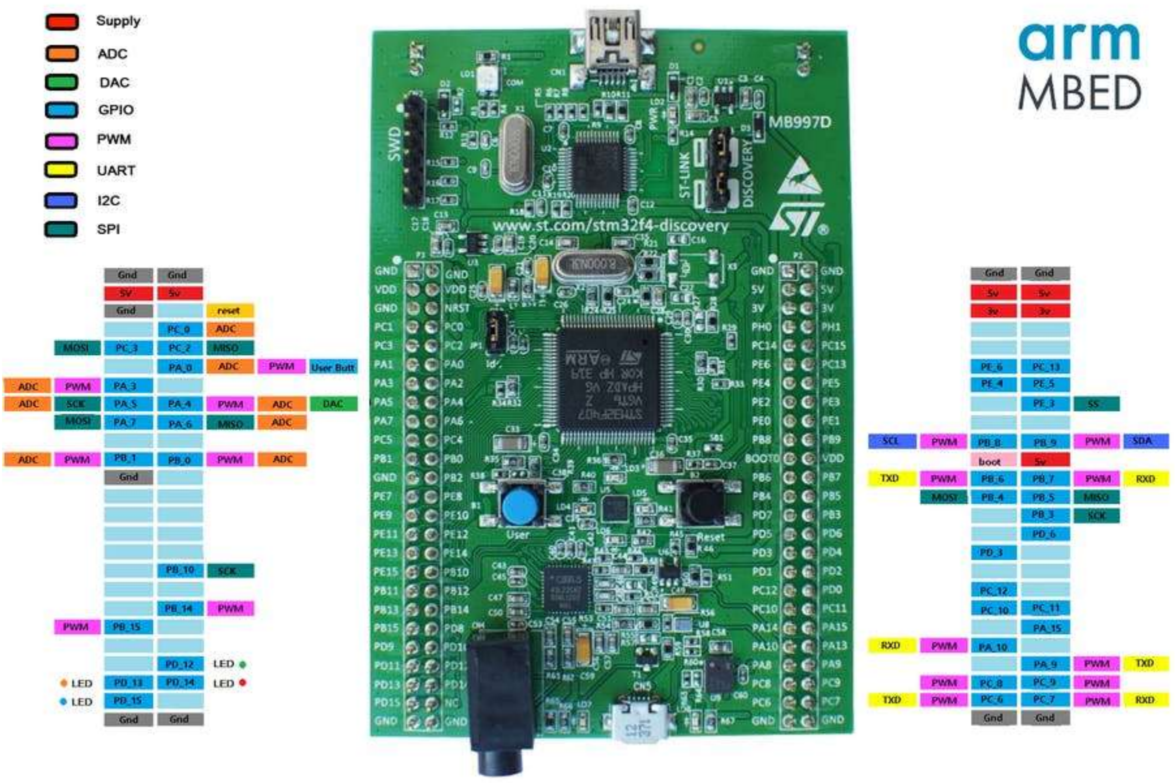
Design the matlab scripting for titanic data sheet from google information

Mini Project 7 - Wiper Control System

Requirements

Introduction:

A wiper speed control system for an automotive wiper controls the operational speed of a wiper in accordance with rain conditions. The control signal is applied to a wiper driver circuit to adjust the operational speed or timing in accordance with the control signal. Most of cars have two wipers on the windscreen, one on the rear window and the other on each headlight. The wiper parts visible from outside the car are the rubber blade, the wiper arm holding the blade, a spring linkage, and parts of the wiper pivots. The wiper itself has about six parts called pressure points or claws that are small arms under the wiper. The wipers combine two mechanical technologies to perform their task: A combination electric motor and worm gear reduction provides power to the wipers. A neat linkage converts the rotational output of the motor into the back-and-forth motion of the wipers.



4W's & H:

Who:

- Cars, Truck and Bus drivers will use this prototype.

What:

- This project is concerned is about Automatic Wiper system in vehicles.

When:

- When it rains we use wiperssystems

Why:

- This projects helps the users to achieve the clear path when there is a change of weather or Suddenly RainFall.

How:

- The wiper system is controlled using rain sensor temperature sensor and SMT32 microcontroller.

FEATURES

- The Wiper Control System (WCS) controls up to 9 windshield wipers.
- Each wiper has its own on/off button and fore and after wipers are grouped together for simultaneous on/off control.
- Separate Aft and Fore buttons area available for Low/High Speed, Heating and Washing functions.
- In Lowspeed mode the interval can be varied with the Interval+/Interval- pushbuttons.
- The wipers are synchronized witheach other.

Advantages

- The relatively low cost of cleaning tape.
- The main purpose of the wiper system is to clean the windscreen sufficiently to provide suitable visibility at all times.

- It is for this reason that they are the most popular.
- Easy replacement of the cleaning tape, which is easy to implement and independently, without resorting to the service station or auto mechanic.
- This device used to remove rain, snow, washer fluid, water, and/or debris from a vehicle's front window so the vehicle's operator can better see what's front of them.
- To carry out the replacement need only to remove the brush from the machine, install new tape, and then gently straighten it, which typically use simple scissors.
- All this makes the construction of a strong and stable.

Disadvantages

- Due to the ingestion of water or ice hinges may become immobile (janitors in this case, stop).
- susceptibility to corrosion.

SWOT ANALYSIS:

STRENGTH

- Easy to use.
- Effective planning.
- Best resources for development and testing.
- The Wiper system has a lost coast and maintanence and it consumes less power with respect to manual wiper systems.
- Accuracy of the system is good compared to working condition.

WEAKNESS:

- Internal competition
- Time management
- During slight rain ,the accuracy of rain sensing wiper system is low.
- Dust fall and other obstracles cannot be determined .
- Cracks and tears on the rubber lining.
- Slight separation of the blades from the frame.

OPPORTUNITIES:

- Develop new product.
- No creative linits.
- Can run without internet.
- Lack of dominant competition.
- Smart helmets.
- Unmanned areal Vehicles

THREAT:

- New competitor
- Existing Competitor modifies existing product.
- Security issues.

High Level Requirements

ID	Description
HLR1	Able to automate wiper operations
HLR2	A windscreen wiper or windshield wiper is a device used to remove rain, snow, ice and debris from a windscreen or windshield.
HLR3	These systems detect droplets of rain on the windshield and automatically turn on and adjust the wiper system in accordance to the level of precipitation.
HLR4	Able to display the working conditions

Low level Requirements

ID	Description
LR1	Working with Temperature sensor

ID	Description
LR2	Wiper motor is automatically ON during the time of rainfall
LR3	LCD displays the output
LR4	A new mechatronic reversing system can now be used to clean the windshield with two wiperarm

Design:

INTRODUCTION:

The wiper serves to clean the windshield of the car at the front and rear, although not all cars have wipers on the rear side. WIper works by removing oil, dust, rainwater, and dirt that get stuck to the windshield.

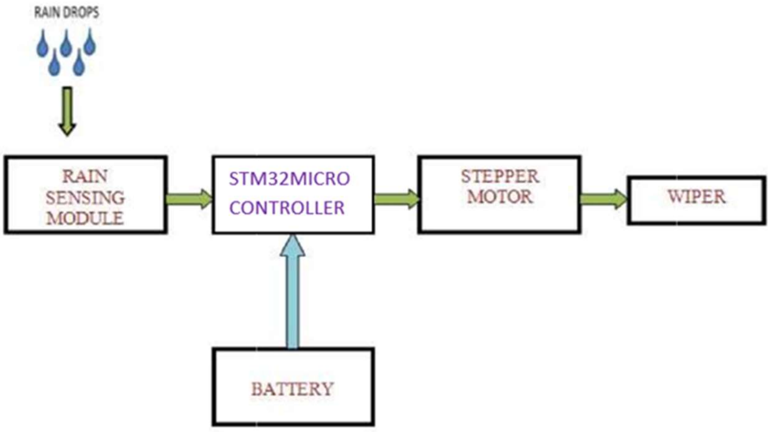
A windscreen wiper or windshield wiper is a device used to remove rain and debris from a windscreen. Almost all motor vehicle, including trains, aircraft and watercraft, are equipped with such wipers, which are usually an essential requirement. A wiper generally consists of an arm, pivoting at one end and with a long rubber blade attached to the other. The blade is swung back and forth over the glass, pushing water from its surface. The speed is normally adjustable, with several continuous speeds and often one or more "intermittent" settings. Most automobiles use two synchronized radial type arms. It takes a lot of force to accelerate the wiper blades back and forth across the windshield so quickly. In order to generate this type of force, a worm gear is used on the output of a small electric motor.

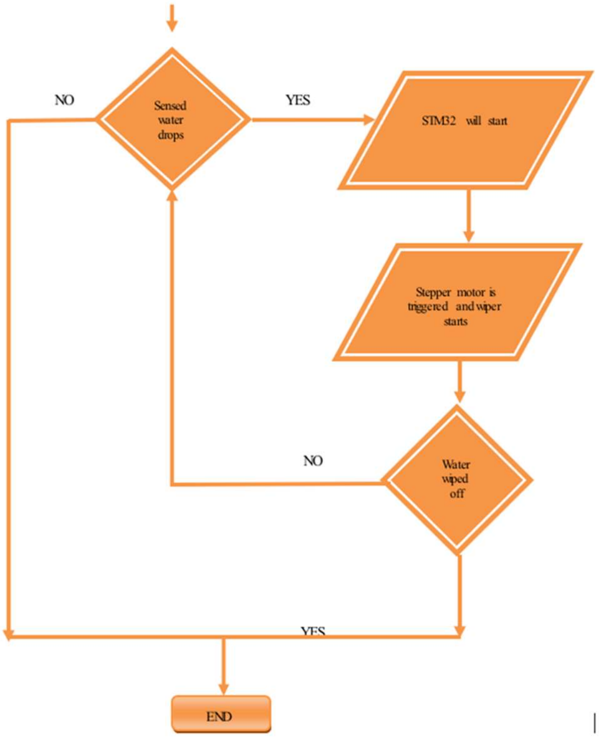
PROPOSED SYSTEM:

The concept of this wiper system is similar to other conventional wiper, yet this system will be upgraded to an automatic control system by using an STM32 Microcontroller and a rain sensor. Whenever the water hits the dedicated sensor that is located on windscreen, it will send a signal to move on the wiper motor. The wiper will automatically stop moving on the windscreen once water is not detected by sensor. This will help the driver to give more concentration and reduce the road accident probability. The speed of the wiper can be adjusted according to the intensity of rainfall with the help of STM32 Programming.

DESIGN:

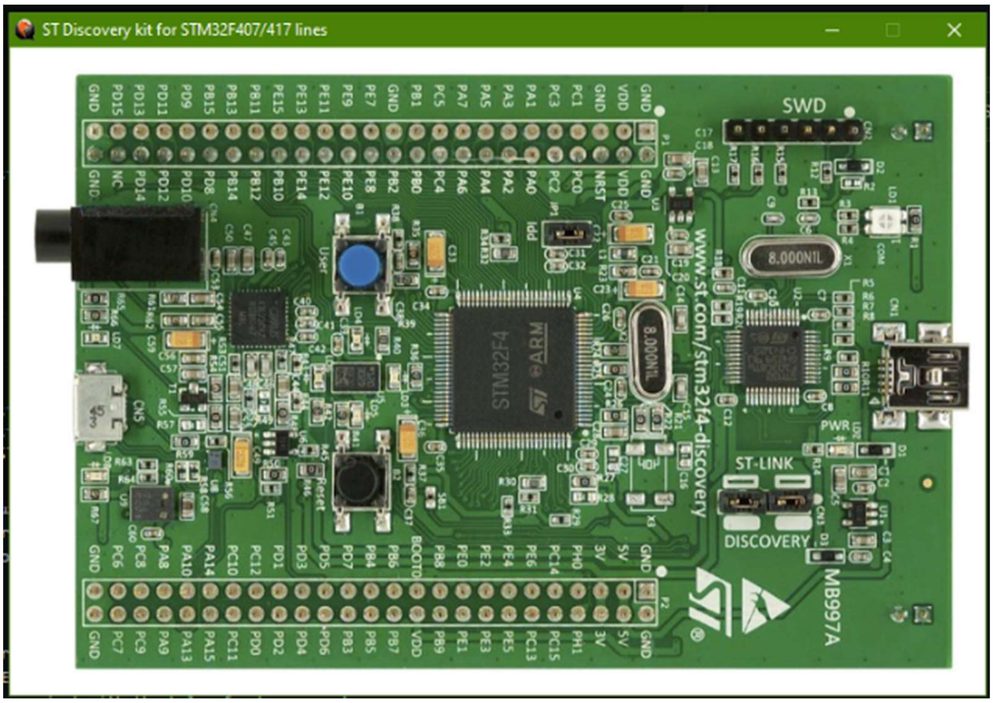
I. BLOCK DIAGRAM

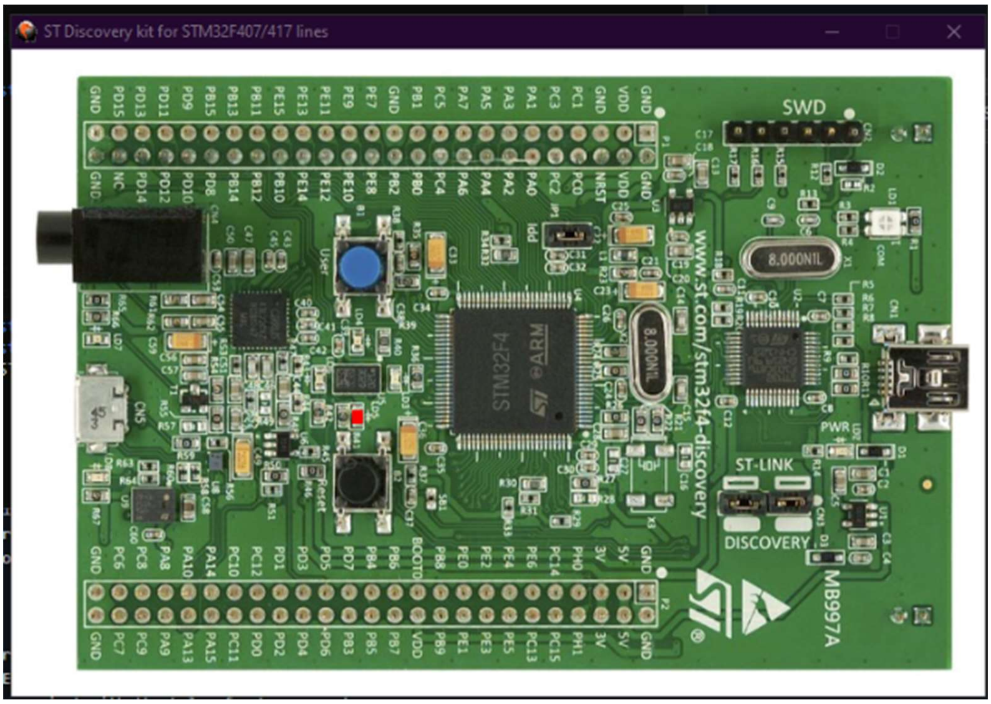




II. FLOW CHART

Test Plan:


ST Discovery kit for STM32F407/417 lines
SWD
User
Reset
STM32F4
ARM
8.000NIL
www.st.com/stm32f4-discovery
ST-LINK
DISCOVERY
PWR
MB997A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ST-LINK
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MB997A

High Level Requirements

ID	Description
HLR1	Able to automate wiper operations
HLR2	A windscreen wiper or windshield wiper is a device used to remove rain, snow, ice and debris from a windscreen or windshield.
HLR3	These systems detect droplets of rain on the windshield and automatically turn on and adjust the wiper system in accordance to the level of precipitation.
HLR4	Able to display the working conditions

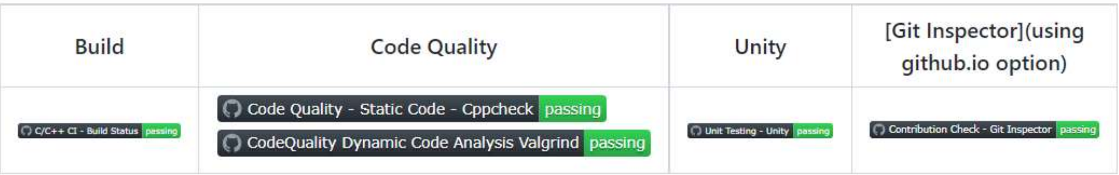
Low level Requirements

ID	Description
LR1	Working with Temperature sensor
LR2	Wiper motor is automatically ON during the time of rainfall
LR3	LCD displays the output
LR4	A new mechatronic reversing system can now be used to clean the windshield with two wiperarm

Images and Videos:

Git Link

Link : https://github.com/GENESIS-2022/MasteringMCU-Team75.git



Build	Code Quality	Unity	[Git Inspector](using github.io option)
C/C++ CI - Build Status passing	Code Quality - Static Code - Cppcheck passing CodeQuality Dynamic Code Analysis Valgrind passing	Unit Testing - Unity passing	Contribution Check - Git Inspector passing

Challenges Faced and How Was It Overcome

1. Initialize the variables Ports to decide
2. choose the correct GPIO PIN
3. Debug the Program

#Refrence https://www.youtube.com/watch?v=IQWhNH-gpOA&t=923s https://www.researchgate.net/publication/348251442_Rain_Sensing_Automatic_Car_Wiper_Using_AT89C51_Microcontroller

Mini Project 8 - AUTOMOTIVE_TATA_ALTROZ

WIPER CONTROL:

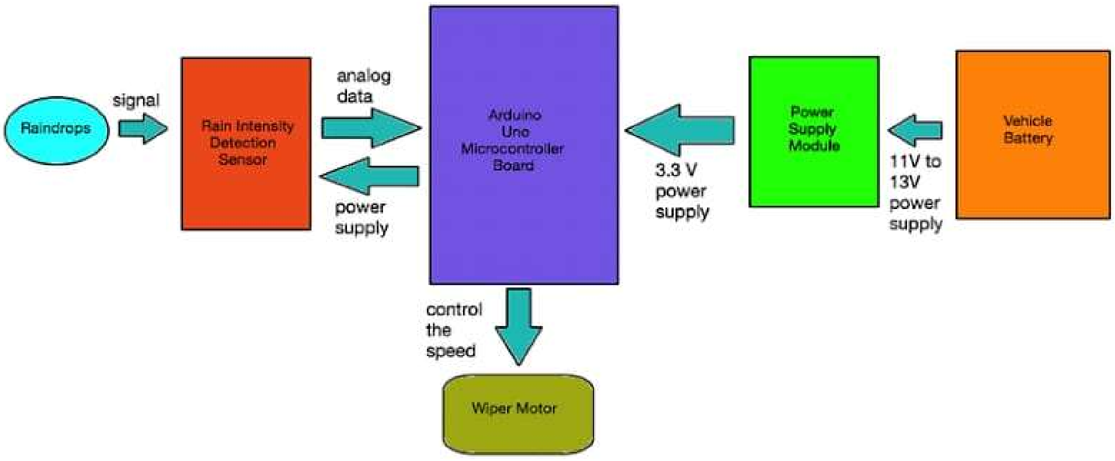
High Level Requirements

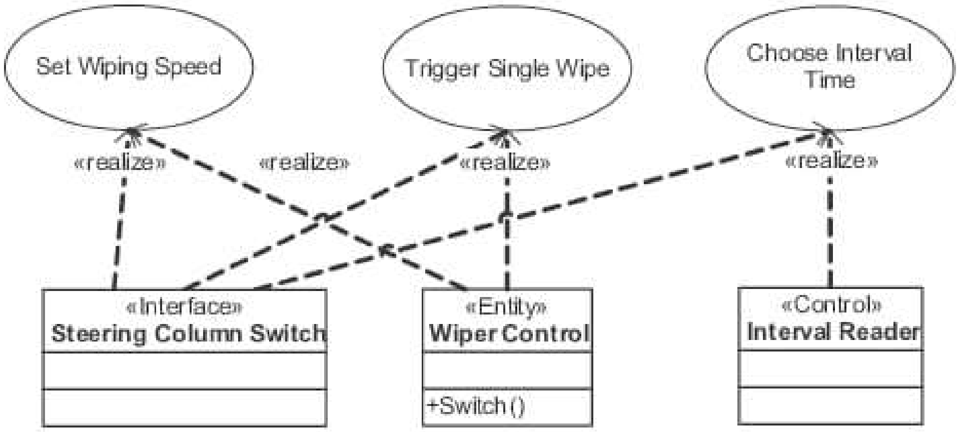
Number	Requirements	Description	Features
HLR1	Rain and Humidity sensor	checks the intensity of rain and humidity	Wiper Control
HLR2	Semi-Automatic control	Operated automatically or manually	Wiper Control
HLR3	Speed control	High,Medium,Low	Wiper Control
HLR4	Dry mode	front and back wiper system	Wiper Control

Low Level Requirements

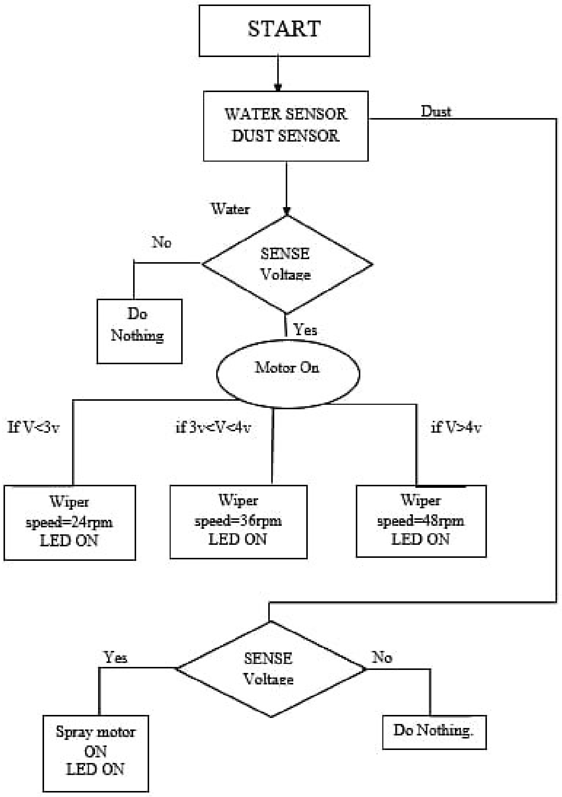
Number	Requirements	Description	Features
LLR1	Lenght of wipers	Depends on the model of the car	Wiper Control
LLR2	Direction of wipers	Same and Opposite Directions(180 degrees)	Wiper Control

BLOCK DIAGRAM





FLOW CHART



Implementation and Summary

Git Link:

Link: https://github.com/vettri1827/Automotive_Tata_Altroz.git

Individual Contribution and Highlights

1. Wiper Control system Case Study
2. Source code management using GitHub

Role in Project Team

1. Designer: Done Designing for Project
2. Researcher: Done case study for Wiper Control system

Mini Project 9 – Learnings of Electrical vehicles

Domain Knowledge Videos

1. Understanding Hill Start Assist!- https://youtu.be/aXEPnWgRnjk?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
2. Differential | How does it work?- https://youtu.be/nC6fsNXdcMQ?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
3. *Seatbelt | How does it work?-*
4. https://youtu.be/uRaU1HMJyCo?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
5. Understanding Wheel Alignment !- https://youtu.be/7d2K_mKgsZ0?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
6. How does the Steering Wheel automatically returns to its center?- https://youtu.be/wLbs8kBXgrw?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
7. Understanding your Car's Steering & Power Steering !- https://youtu.be/em1O8mz7sF0?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
8. Understanding Anti-lock Braking System (ABS) !- https://youtu.be/98DXe3uKwfc?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
9. Torque Converter, How does it work ?- https://youtu.be/bRcDvCj_JPs?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
10. Why you should not PARTIALLY press the Clutch ?- https://youtu.be/_hKvS6xTC0E?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
11. Clutch, How does it work ?- https://youtu.be/devo3kdSPQY?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
12. Electric cars vs Petrol cars- https://youtu.be/ewcWN-rHQ6Q?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg

13. How does an Electric Car work ? | Tesla Model S- https://youtu.be/3SAxXUIre28?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
14. Understanding PLANETARY GEAR set !- https://youtu.be/ARdOm2VyiE?list=PLuUdFsbOK_8rJsh_osoZKf IRUkb8-rOg
15. Automatic vs Manual Transmission- https://youtu.be/auQgOtveQi0?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
16. *Working of Dual Clutch Transmission (DSG)-* https://youtu.be/lFAtc-zOKZs?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg

17. Manual Transmission, How it works ?- https://youtu.be/wCu9W9xNwtI?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg

18. Automatic Transmission, How it works ?- https://youtu.be/u_y1S8C0Hmc?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg
19. Petrol (Gasoline) Engine vs Diesel Engine

https://youtu.be/DZt5xU44IfQ?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg

1. How a Differential works ?- https://youtu.be/SOgoejxzF8c?list=PLuUdFsbOK_8rJsh_osoqVKfIRUkb8-rOg

Electrical vehicle basics:

1. EPT trainings learning content

EPT Trainings Learning Content | Microsoft Stream (mcas.ms)

1. EV Architecture and components
2. Inverter Hardware and software -part 1
3. Inverter Hardware and software -part 2
4. EV Lab and testing training
5. Worst case analysis Tolerance analysis
6. Design calculations -Inverter losses & thermal design
7. Hardware Simulation and control simulation of Dc Dc converter topologies
8. Software closed loop control DC -DC Converter topologies2.BMS (Battery management system)

EV Learning Content

1. System requirements, specification feature and DFMEA
2. BMS -software application and Algorithm
3. FUSA-1
4. FUSA-2
5. Wireless BMS
6. BMS testing and BI HIL
7. EV lab Demo and Amaze BMS
8. Overall BMS Architecture and platform

System Level - Conventional/EV

1. Inviting for Battery Management System
2. Introduction to Functional Safety
3. Function Safety Session 2
4. Overview of Engine After treatment System, Engine Sensors and transmission System
5. Inviting for Battery Management System – Session 2
6. Overview of different Vehicle architectures
7. DC – DC converter

2.

Mini Project 10 – MINI AIRCRAFT [Team]

Modules

1. Matlab
2. Matlab Script

Requirements:

Introduction:

An electrical Energy management based on fixed priorities of the loads is considered a conventional implementation as applied in today's aircraft systems. It can cut and reconnect loads depending on their importance. Further implementations are depicted that are able to eliminate certain drawbacks of such a typical load management

Objective:

The main objective of the project is to Reduce the enegy consumption of the Aircraft

Features:

This project supports the following types of Energy Management in Aircraft

1 .SourceManagement:

If sources are available that can be connected in parallel one can apply a source management, that controls the different sources or generators in an energy efficient way.An intelligent source management will regulate the several sources to reachthe overall power losses

2.Electrical Storage Device:

The degree of freedom of an energy management method increases considerably if electrical storage devices like batteries or super caps are available. Storages can be used to smooth out the power consumption of load groups. This in turn enables to design lighter generators, feeders, and converter especially in case of many non-constant loads. However, the batteries orsuper caps will add weight. Thus, there will be an optimal tradeoff between installed battery-capacity and installed power of
eg. generators to minimize weight

Exploit Slow Responding Roads:

In today's aircraft systems there is a number of slow responding loads. That is systems and components with large time constants like heaters. Since electrical storages will add weight, one can also try to decrease power peaks by exploiting such slow responding loads (SRL). Thus, they can be handled like an electrical storage since they store energy in their respective physical state like the heat of a galley oven.

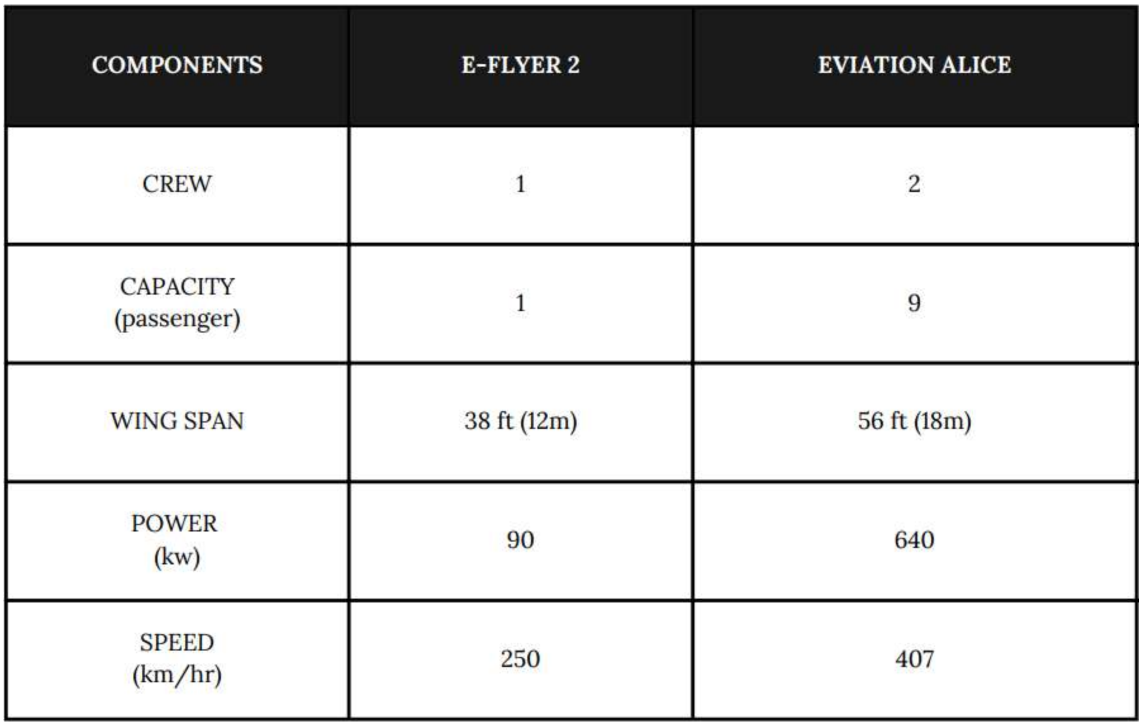
Variable Priorities:

To consider the changing importance of loads during a flightone can simply use variable priorities instead of fixed ones.

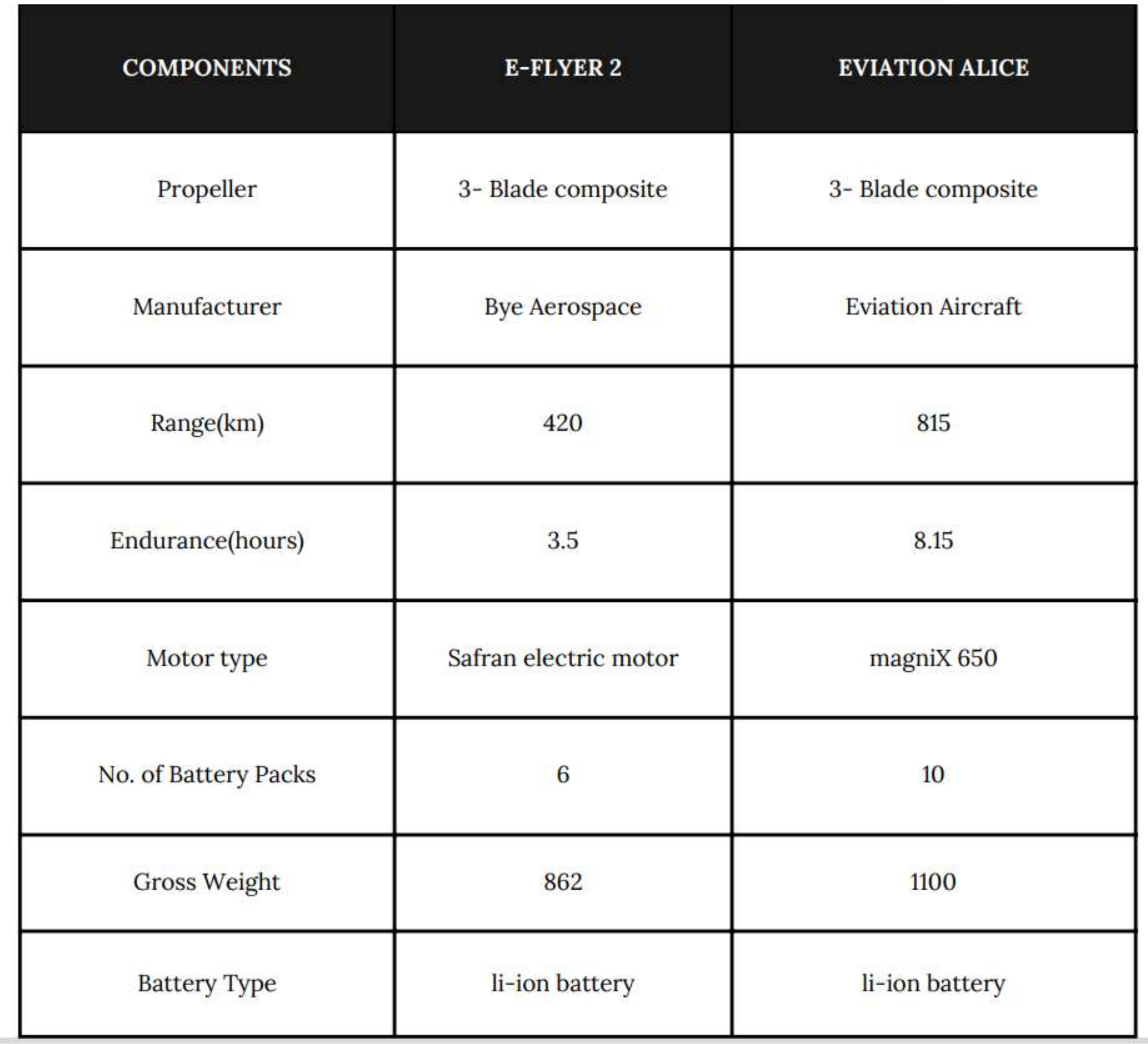
Thus, the priority can be determined by the loads themselves depending on their current importance.

Supervise Reconnection

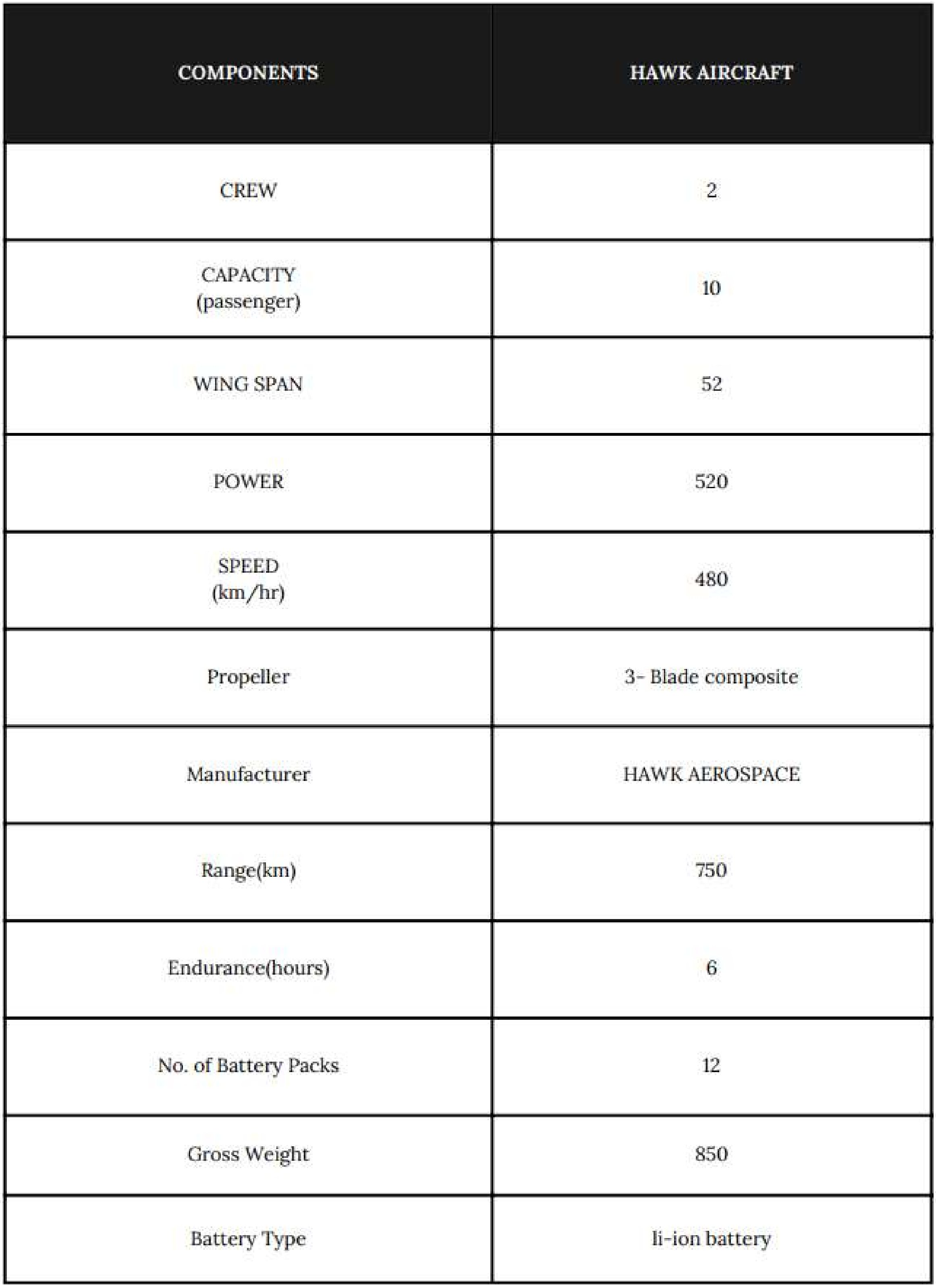
Instead of shedding loads if an overload occurs, one can also prevent loads from being reconnected if a dedicated power level is reached. Eviation Alice vs E-flyer 2:



COMPONENTS	E-FLYER 2	EVIATION ALICE
CREW	1	2
CAPACITY (passenger)	1	9
WING SPAN	38 ft (12m)	56 ft (18m)
POWER (kw)	90	640
SPEED (km/hr)	250	407

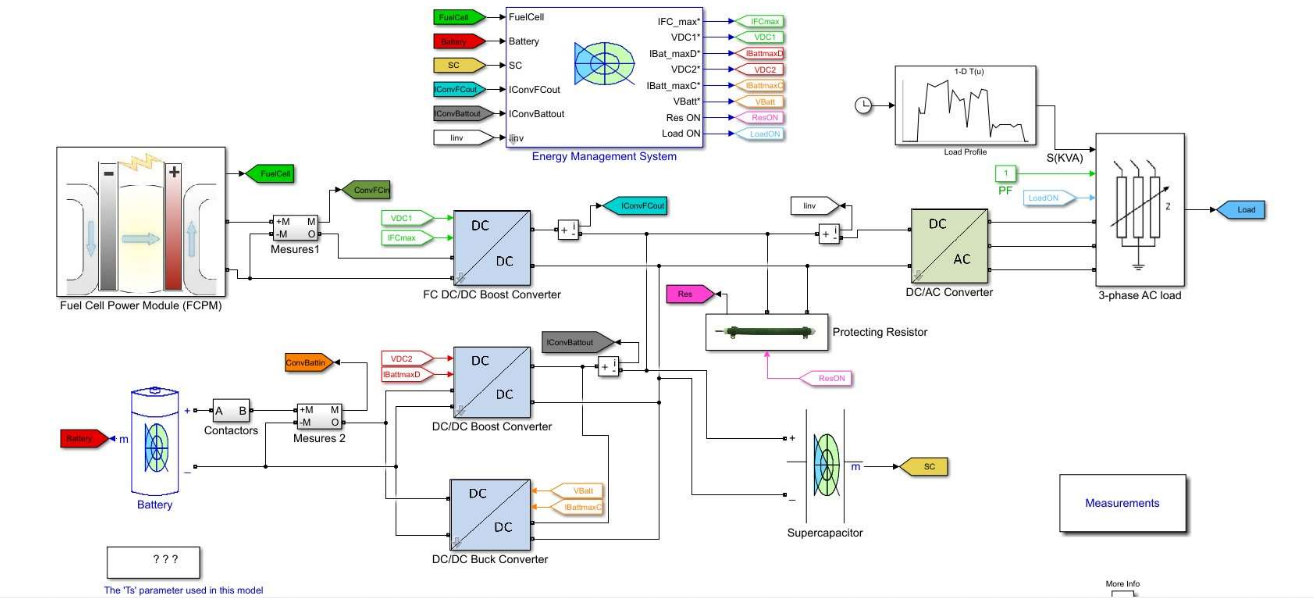


COMPONENTS	E-FLYER 2	EVIATION ALICE
Propeller	3- Blade composite	3- Blade composite
Manufacturer	Bye Aerospace	Eviation Aircraft
Range(km)	420	815
Endurance(hours)	3.5	8.15
Motor type	Safran electric motor	magniX 650
No. of Battery Packs	6	10
Gross Weight	862	1100
Battery Type	li-ion battery	li-ion battery



COMPONENTS	HAWK AIRCRAFT
CREW	2
CAPACITY (passenger)	10
WING SPAN	52
POWER	520
SPEED (km/hr)	480
Propeller	3- Blade composite
Manufacturer	HAWK AEROSPACE
Range(km)	750
Endurance(hours)	6
No. of Battery Packs	12
Gross Weight	850
Battery Type	li-ion battery

Simulation:



Implementation and Summary

Submission: Submitted in GEALearn

Individual Contribution and Highlights

1. Done in Matlab Script

Role in Project Team

1. Done Matlab scripting for Mini Aircraft Bike
2. Researcher: Done case study for Mini Aircraft Bike

Mini Project 11 – WIPER CONTROL

INTRODUCTION

Our integrated circuits and reference designs for automotive exterior rearview mirror modules help you accelerate design through accurate light sensors and LED lighting solutions with high precision in controlling and driving electrochromic mirrors and high integration for human interface (HMI) control. Modern rearview mirror modules require: Accurate, stable control of large capacitive load for electrochromic auto dimming. Precise sensing of ambient light to allow effective auto dimming.

FEATURES

BLIND SPOT DETECTION

Blind Spot Detection tracks traffic just behind you. The alert stays active until the car in the adjacent lane is in front of you, or at least directly alongside and you'd have to be blind not to see it. Blind Spot Detection uses ultrasonic or radar sensors on the side and rear of the car.

DEFOGGERS

Defoggers are used to defog the rear window, and to remove raindrops, dew and frost from the outside rear view mirrors. The operation time changes according to the ambient temperature and vehicle speed, It may be 10 minutes to 25 minutes.

COMPONENTS

DC MOTOR

Each rear-view mirror has two DC motors. One DC motor operates the up/down function while the other DC motor operates the left/right function. Both switches inside the power mirror switch are constantly connected to the vehicle's electrical ground circuit with the switch at rest.

INFRARED SENSOR

An infrared sensor (IR sensor) is a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm … 50 µm. IR sensors are now widely used in motion detectors, which are used in building services to switch on lamps or in alarm system.

RADAR

Radar is a electromagnetic sensor used for detecting, locating, tracking, and recognizing objects of various kinds at considerable distances.

REQUIREMENTS

HIGH LEVEL REQUIREMENTS

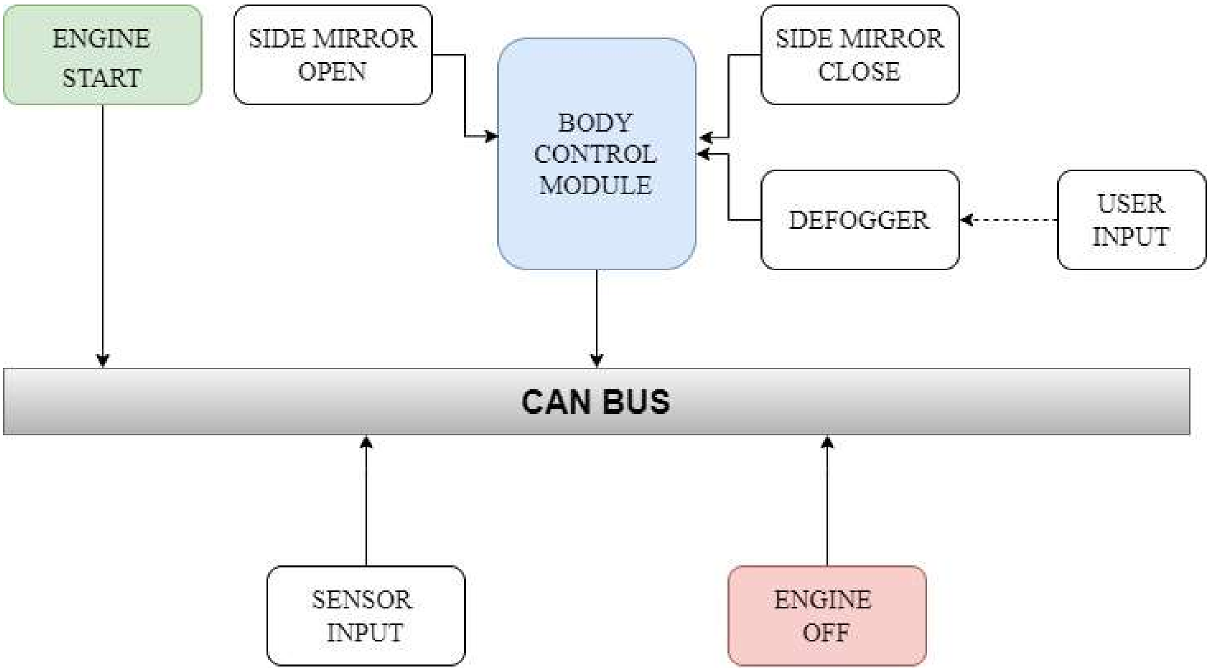
	TITLE	MODULES	DESCRIPTION
SYS_1	Requirments	DC MOTOR	The Side Rear View Mirror should Open when the Engine Started.
SYS_2	Requirments	DIGITAL CAMERA	The Main Camera Present in the Mirror gives the precise view of the mirror in an LCD Display inside the car when the weather outside is not good.
SYS_3	Requirments	DC MOTOR	When the Engine Turns off, the Mirror Should Close Automatically.

LOW LEVEL REQUIREMENTS

	TITLE	MODULE	DESCRIPTION
SYS_1	Requirements	H-MOD	The Defogger System should connect with the Aircon System to generate the heat and make the mirror crystal clear for the driver.
SYS_2	Requirements	INFRARED SENSOR	The Sensor in the side mirror which can detect the chasing vehicle near it and gives a signal to the driver to be cautious.
SYS_3	Requirements	RADAR	To detect the Blind spots of the DRIVER, up to 6 cameras have been placed in the rear mirror to cover the entire blind spot.

UML DIAGRAM

STRUCTURAL



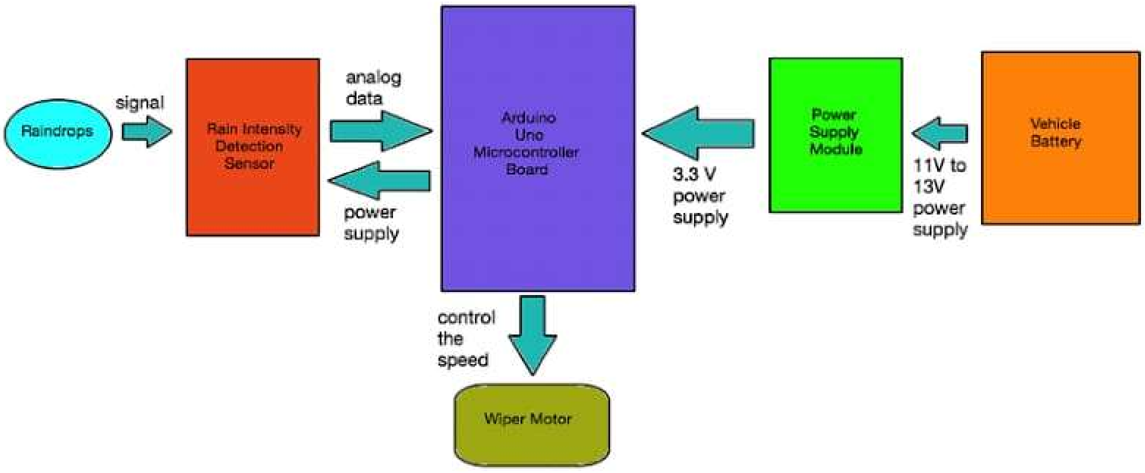
WIPER CONTROL

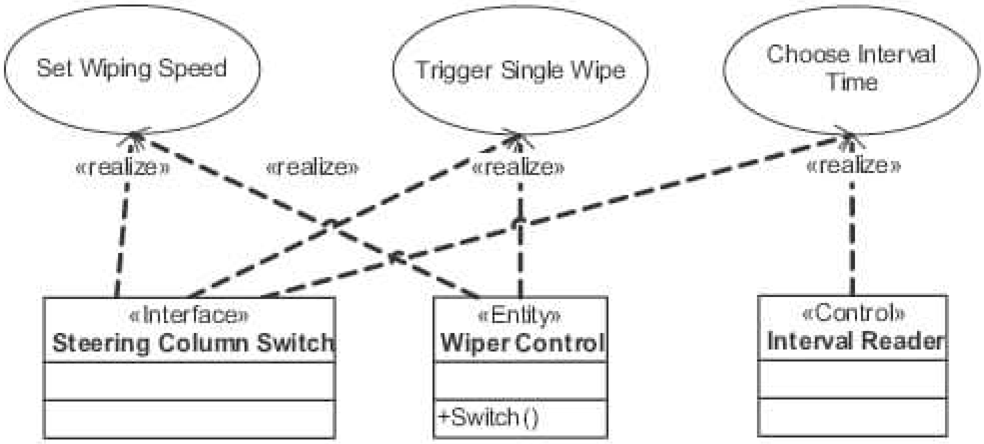
Number	Requirements	Description	Features
HLR1	Rain and Humidity sensor	checks the intensity of rain and humidity	Wiper Control
HLR2	Semi-Automatic control	Operated automatically or manually	Wiper Control
HLR3	Speed control	High,Medium,Low	Wiper Control
HLR4	Dry mode	front and back wiper system	Wiper Control

Low Level Requirements

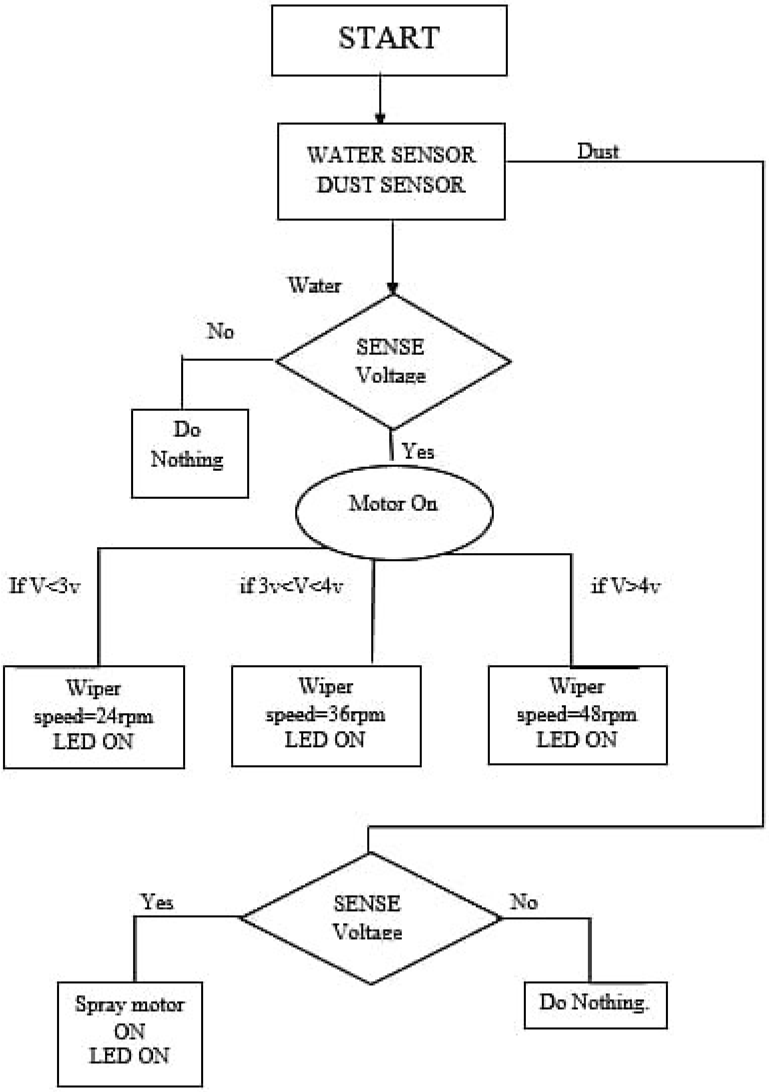
Number	Requirements	Description	Features
LLR1	Lenght of wipers	Depends on the model of the car	Wiper Control
LLR2	Direction of wipers	Same and Opposite Directions(180 degrees)	Wiper Control

BLOCK DIAGRAM





FLOW CHART



Implementation and Summary

Git Link:

Link: https://github.com/visarapu/WiperControl_40021040_TRN.git

Individual Contribution and Highlights

1. Wiper system Case Study
2. Source code management using GitHub
3. Atomic SW Component
4. SWC Internal Behavior
5. SWC Implementation