Details

Ver. Rel. No.	Release Date	Prepared By	Reviewed By	To Be Approved	Remarks/Revision Details
1.0	16/02/2022	Aniket Bhuskute 40021151			

Contents

List of Figures

Miniproject – 1: M1_Game_TIK_TOK_TOE [Individual]

Modules: C Programming On Multiple Platforms
system.

Requirements:-

Introduction

This game is very popular and is fairly simple by itself. It is actually a two player game. In this game, there is a board with n x n squares. In our game, it is 3 x 3 squares.

Features

```
Play with 'X' or 'O'
Either player or computer wins the game.
Either player or computer Lose the game.
```

Department Store Management

Research:-

Features and Benefits of the Tic-Tac-Toe Game It's often used as a pedagogical tool to teach ideas like good sportsmanship and the branch of artificial intelligence that deals with game tree searching. On this space, developing a computer algorithm to play faultless tic-tac-toe or enumerating the 765 basically different positions (state space complexity) or the 26,830 possible games up to rotations and reflections (game tree complexity) is simple. Tic-tac-toe is a pointless game since it always ends in a draw if both players play optimally.

SWOT ANALYSIS:-

a) Strengths:

```
The game can assist the player in predicting the outcome of another player's
action.
It aids in the formulation of the strategy.
It aids in the development of logic and problem-solving abilities.
```

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b) Weaknesses

```
Connection lost
```

c) Opportunity

```
To improve your computer gaming knowledge.
```

d) Threats

Virus is nothing but a program which disrupts the normal functioning of your computer systems. Computers attached to internet are more prone to virus attacks and they can end up into crashing your whole hard disk, causing you considerable headache.

4W's and 1'H :-

- **What-This is a purely leisure game. Because there are so many different outcomes in this game, businesses can utilise it to design strategies.**

- **Where-A simple tic tac toe game is accessible on a number of websites. In addition, corporations and organisations use it.**

- **When-This game can be played if you're bored or want to learn more**

about the game's methods, consequences, and scenarios. game.

. # How-Blocks your opponent from winning as you try to win.

Detail requirements :-

High Level Requirements

ID	Description
HLR1	From the landing page, the user should choose the game's difficulty level and begin playing.
HLR2	When a user moves, the game page allows them to move.
HLR3	The user can see the opponent's movements in real time on the game page.
HLR4	When one player gets three symbols in a row, the game should be over.

Low Level Requirements

ID	Description
LLR_1_HLR1	•Players personal details like gender,contact number.

High Level Requirements
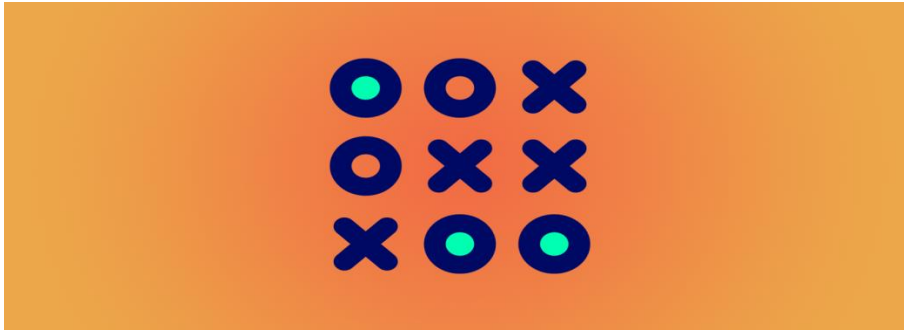
Low Level Requirements

Flowchart

L&T Technology Services
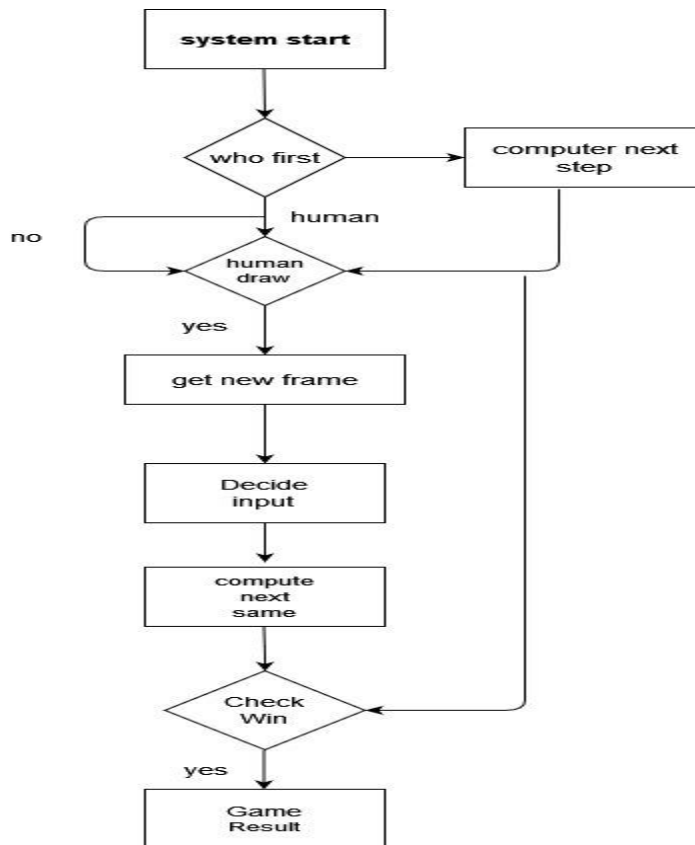
IMPLEMENTATION:

Implementation of Game: A player can choose between two symbols with his opponent, usual games use "X"and "O". If first player choose "X" then the second player have to play with "O" and vice versa. A player marks any of the 3x3 squares with his symbol (may be "X" or "O") and his aim is to create a straight line horizontally or vertically or diagonally with two intensions: a) Create a straight line before his opponent to win the game. b) Restrict his opponent from creating a straight line first. In case logically no one can create a straight line with his own symbol, the game results a tie. Hence there are only three possible results – a player wins, his opponent (human or computer) wins or it's a correctness of the TicTacToe application. The application is distributed and consists of four major threads of activity executing on as many as four different platforms.

SWOT ANALYSIS:-

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Low Level Requirements

ID	Description
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IMAGES :

Structural Images:
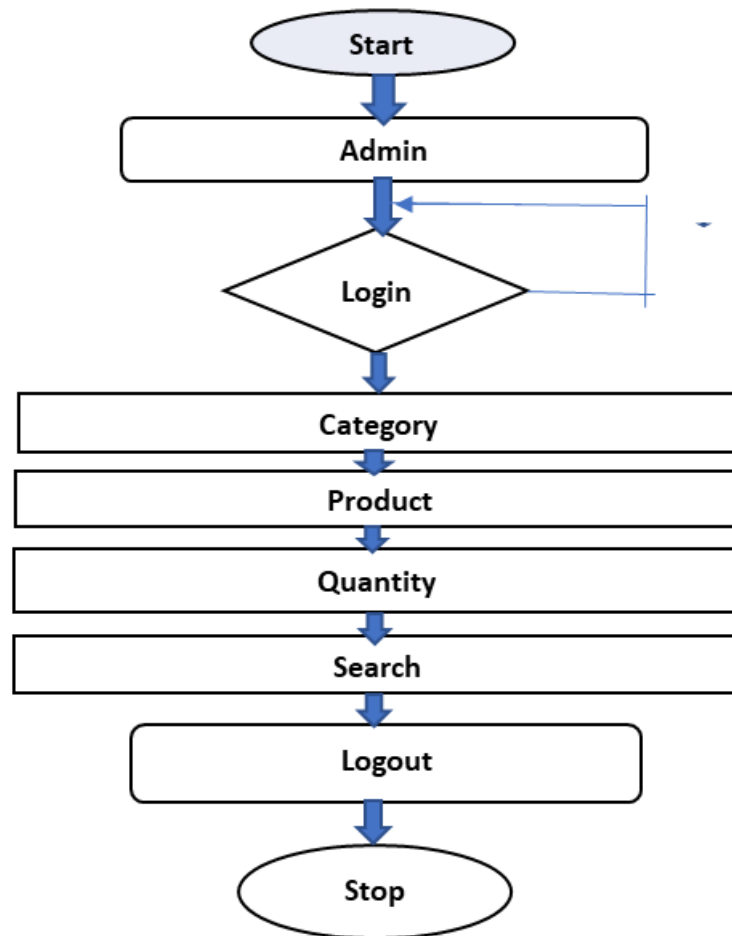
Git link:

https://github.com/Aniket169/M1_game_tic_tac_toe

CERTIFICATION DONE IN MODULE

- SOLO-Learn Certification
- Linux Certification
- Github Learning Certification

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Miniproject 2 – Ultrasonic Sound Sensor with Atmega328Microprocessor [Individual]

Module: - Essentials of Embedded System

Topic: - ULTRASONIC SOUND SENSOR WITH ATmega328 MICROPROCESSOR

Requirements

Introduction

The project as the name suggests is based on Ultrasonic sensors. Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

Features, Hardware and Software:-

a) HARDWARE:-

1] SimulIDE:

   - SimulIDE provides AVR, Arduino and PIC microcontrollers that can be accessed just like other components.

   - Features like gypsum and simavr allow you to use PIC and AVR microcontrollers, respectively.

2] AVR:

   - 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.

b) SOFTWARE:-

1] ATmega328:

   - ATmega328 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed
   - Perhaps the most common implementation of this chip is on the popular Arduino development platform.

2] Sound:

   - A sound sensor is defined as a module that detects sound waves through its intensity and converting it to electrical signals.

3] Display:

   - A display device is an output device for presentation of information in visual or tactile form.

SWOT ANALYSIS:-

d) Strength:

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

b) Weakness:

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

c) 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.

d) 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.

4W's a 1H:-

- **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.

-3 When: In 1959, Satomura created an ultrasonic flow meter that used Doppler technology.

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

- **How:**

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

High Level Requirements

ID	Description
HLR1	Used to avoid and detect obstacles with robots like biped robot, obstacle avoider robot, path finding robot etc.
HLR2	Used to measure the distance within a wide range of 2cm to 400cm
HLR3	Depth of certain places like wells, pits etc can be measured since the waves can penetrate through water

Low Level Requirements

ID	Description
LLR_1	• Power Supply: +5V DC.
LLR_2	• Measuring Angle: 30 degree.

ID	Description
LLR_3	• Trigger Input Pulse width: 10uS TTL pulse.
LLR_4	• Depth of certain places like wells, pits etc can be measured since the waves can penetrate through water.

Design
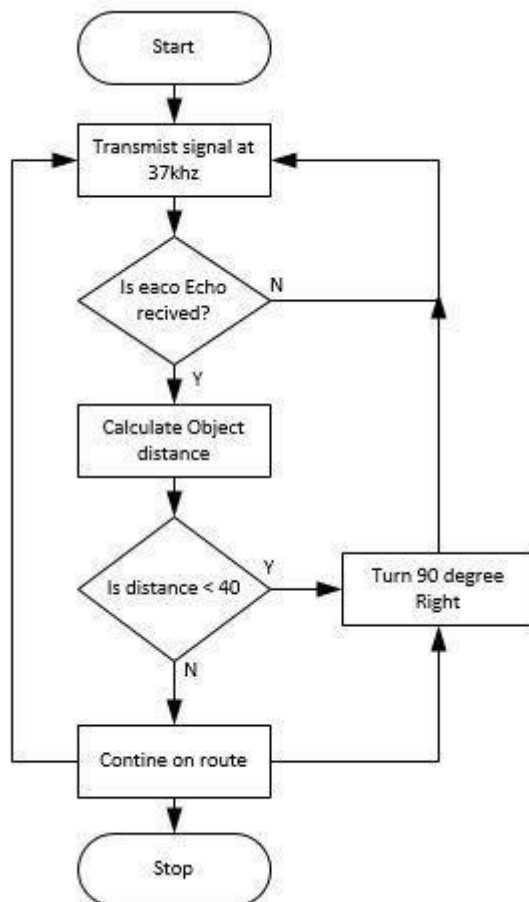
Figure 1Behaviour Diagram

Figure 2Block Diagram
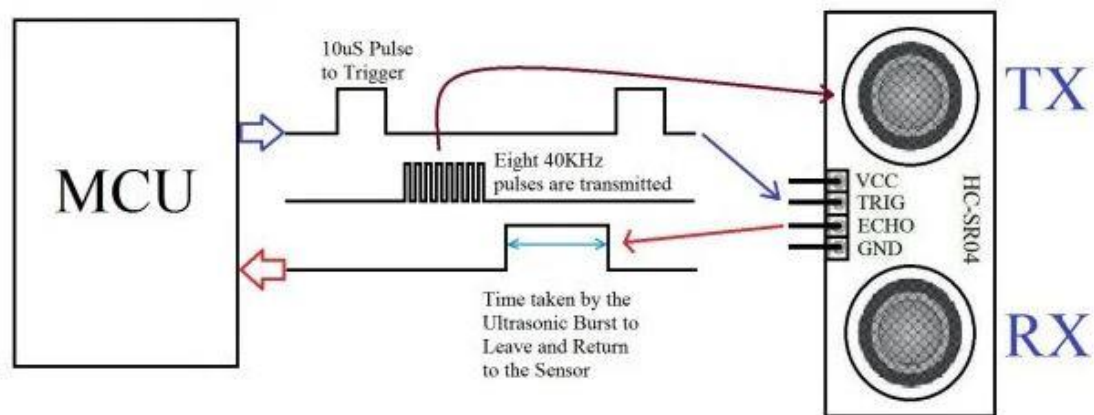
Working of HC-SR04 Ultrasonic Sensor

Figure 7Structural Diagram
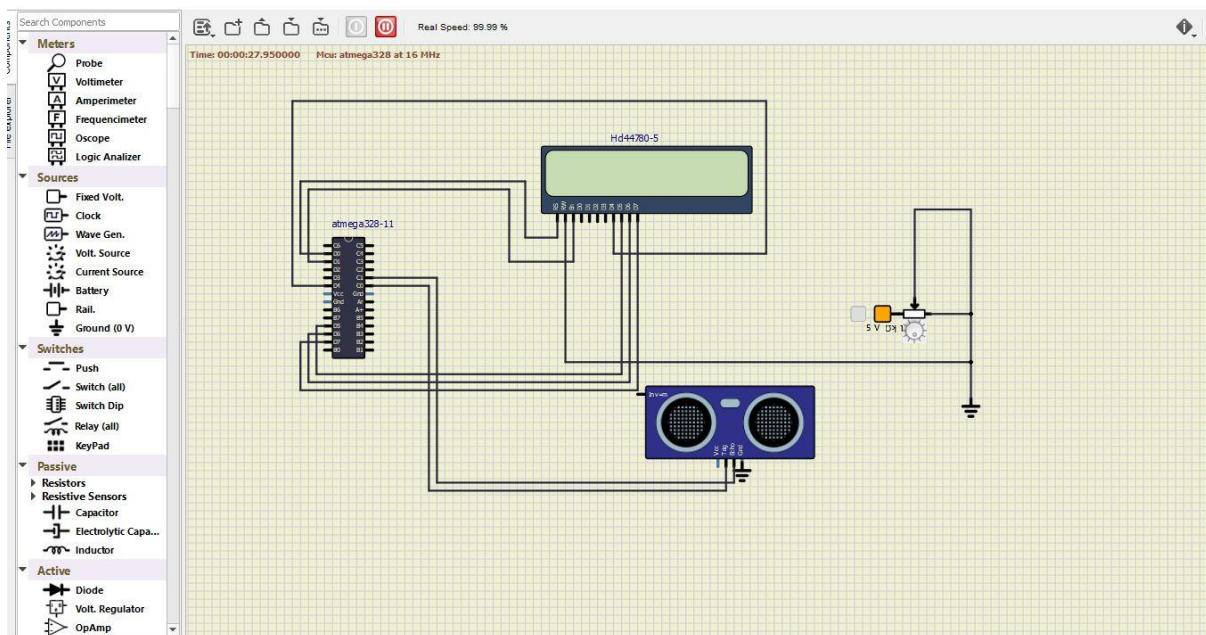
Figure 8 Simulation

Summary

The objective of the project was to design and implement an ultrasonic distance meter. The device described here can detect the target and calculate the distance of the target. The ultrasonic distance meter is a low cost, low a simple device for distance measurement. The device calculates the distance with suitable

accuracy and resolution. It is a handy system for non-contact measurement of distance. The device has its application in many fields. It can be used in car backing system, automation and robotics, detecting the depth of the snow, water level of the tank, production line. This device will also have its application in civil and mechanical field for precise and small measurements. For calculating the distance using this device, the target whose distance is to be measured should always be perpendicular to the plane of propagation of the ultrasonic waves. Hence the orientation of the target is a limitation of this system. The ultrasonic detection range also depends on the size and position of the target. The bigger is the target, stronger will be the reflected signal and more accurate will be the distance calculated. Hence the ultrasonic distance meter is an extremely useful device.

Git Link:

Link: https://github.com/Aniket169/M2_Embedded_Ultrasonic-sound-sensor

Git Dashboard

Figure 3Git Dashboard

Mini project 3 – Costumer advisor SYSTEM

Modules: -Applied SDLC and Software Testing

INTRODUCTION

Choosing a best outfit is one of the challenges that we face while we go for shopping. Even after spending lots of time on shopping for dresses, finally we buy a dress that we will not be fully satisfied in. Some dress that attracts us while its shown in the showcase, may not be good after we wear them on the big day.So, this project is to calculate the body shape of female, according to their bust size, waist size, high hip size and hip size values. Then, according to to body shape, with respect to the choice of dress, jumsuits, shorts, skrits, jeans, the different types of the outfit chosen will be displayed which is best suitable for that particular body type, will be displayed.

4W's And 1'H

Who

- People who want to look good by getting targeted outfit ideas for their body shape.

What

- Calculates the body shape and occassion they are addressing then suggests them the best suitable outfit for their body.

When

- Anytime they want to get themselves dressed well for perticular occassions.

Where

- In the Application/system which has this program.

How

- By entering the measurements of the induviduals bust size, waist size, high hip size, hip size.

Software Requirements

ID	Description	Platform
HLR_1	Visual Studio code platform	Software
HLR_2	Windows 10 or Linux	Software
HLR_3	Github	Software

High Level Requirements

ID	Description	Platform
HLR_1	Getting the measurements from the user	Application
HLR_2	Calculating the body type	Vs code
HLR_3	Getting the choice of outfit type from the user	Application
HLR_4	Getting the choice of listed costume from the user	Application

Low Level Requirements

ID	Description	Platform
LLR_1	The measurements should be properly taken and entered correctly by the user	Application
LLR_2	Coding formula to calculate body type should be accurate	Vs Code

ID	Description	Platform
LLR_3	The Choice of outfit type should be properly Chosen and entered correctly by the user	Application
LLR_4	The Choice of costume should be properly taken and given correctly by the user	Application

Behavioural Diagram Low Level

Behavioural Diagram High Level

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TEST PLAN:

TABLE NO:1 HIGH LEVEL TEST PLAN:

Test ID	Description	Exp I/P	Exp O/P	Type of Test
H_01	Check and verify all the measurement values are entered	Enter the proper measurements according to the description	Body shape is displayed	Requirement Based
H_02	Check and verify all the measurements entered are in centimeter	Enter the measurements in centimeter	Body shape is displayed	Requirement Based
H_03	Check whether all entered measurements is displayed correctly	Enter the measurements	Bodyshape is displayed	Scenario Based
H_04	Check whether choices of outfit types are displayed correctly	Enter the choice	Another set of choices displayed	Scenario Based
H_05	Check whether choices of costumes are displayed correctly	Enter the choice	The output of desired choice displayed	Scenario Based
H_06	Check whether entered choice of outfit type is correct	Enter the Choice number	Display Choices	Boundary Based

Test ID	Description	Exp I/P	Exp O/P	Type of Test
H_07	Check whether entered choice of costumes is correct	Enter the choice number	Display Choices	Boundary Based

TABLE NO:2 LOW LEVEL TEST PLAN:

Test ID	Description	Exp I/P	Exp O/P	Type of Test
L_01	To check if the measurements give the proper bodyshape	Measurements	Body Type	Requirement Based
L_02	To check if the choices give the proper bodyshape	Choice	The required outfit	Requirement Based
L_03	To check if the calculation is properly done to give proper output	Body Type	Scenario Based	
L_04	To check if all of the four required measurements are entered	Bust, Waist, Highhip, Hip sizes	Display Bodyshape	Scenario Based
L_05	To check if required choice of outfit type is entered	Choices	Display the best outfits	Scenario Based
L_06	To Check if required choice of costume is entered	Choices	Display the best costumes of the desired outfit	Scenario based

Git Link:

Link: https://github.com/GENESIS2021Q1/Applied_SDLC-Dec_Team_50

Individual Contribution and Highlights

- Requirements
- Implementation (Add Order in System)
- Created Unity File

Miniproject 4 – Calendar Automation[Team]

Modules:- OOPS with Python

Requirements

High Level Requirements

ID	Feature	MATLAB v0 Status	Python v0 Status
HR01	GUI	Implemented	Implemented
HR02	Master calendar	Implemented	Implemented
HR03	Faculty calendar	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

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ID	Feature	High Level ID	MATLAB v0 Status	Python v0 Status
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

Git Link:

https://github.com/Ramki17/Calender_Automation-Genesis21_Team49

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

Miniproject 5 –Team BMW [Team]

Module: - Applied Model Based Design Module
Individual Topic: -wiper control System

WIPER CONTROL SYSTEM

Requirements

Introduction

A Windscreen or windshield wiper is a device used to remove rain and debris from a windscreen or windshield. Almost all motor vehicles motor, including trains, aircraft and watercraft, are equipped with such wipers, which are usually a legal requirement.The windshield wiper control module drives the wiper motor based on the the current state of the wiper switch, mostly to support the intermittent wipe feature.

Research

Over the past two decades, the automotive industry has aggressively researched ways to exploit modern computing and electronic advances in the development of safety, reliability, and entertainment technologies for vehicles. With drivers exposed to an ever increasing number of distractions, automatic rain-sensing wiper systems become an even more appealing feature, as they work to minimize the time the

driver must take his/her hands off the wheel. Most traditional systems offer intermittent as well as variable speed operation. The traditional wiper system however requires driver constant attention in adjusting the wiper speed. Traditional windshield wiper speed constantly varies according to time and vehicle's speed. Because the manual adjustment of the wiper distracts driver's attention, which may be a direct cause accidents. The project goal is to modify the existing design of Car Wiper mechanisms.

Detail requirements

High Level Requirements

ID	Description
HLR_01	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.
HLR_02	A windscreen wiper or windshield wiper is a device used to remove rain, snow, ice and debris from a windscreen or windshield.
HLR_03	Quality and reliability wiper systems meet the highest technical requirements and are the basis for vehicles with sophisticated features
HLR_04	Almost all motor vehicle, including trains, aircraft and watercraft, are equipped with such wipers, which are usually an essential requirement.
HLR_05	Our project brings forward this system to automate the wiper system having no need for manual intervention.

Low level Requirements

ID	Description
LLR_01	A new mechatronic reversing system can now be used to clean the windshield with two wiper arm.

ID	Description
LLR_02	Wiper motor is automatically ON during the time of rainfall.
LLR_03	Existing system manually used control stalk to activate wiper and the process of pulling up wiper is difficult to be handled.
LLR_04	Lower level parsing. Under the hood, the Requirement class does most of the heavy lifting.. class requirements.
LLR_05	These systems detect droplets of rain on the windshield and automatically turn on and adjust the wiper system.

Merging with BMW (BCM MODULE)
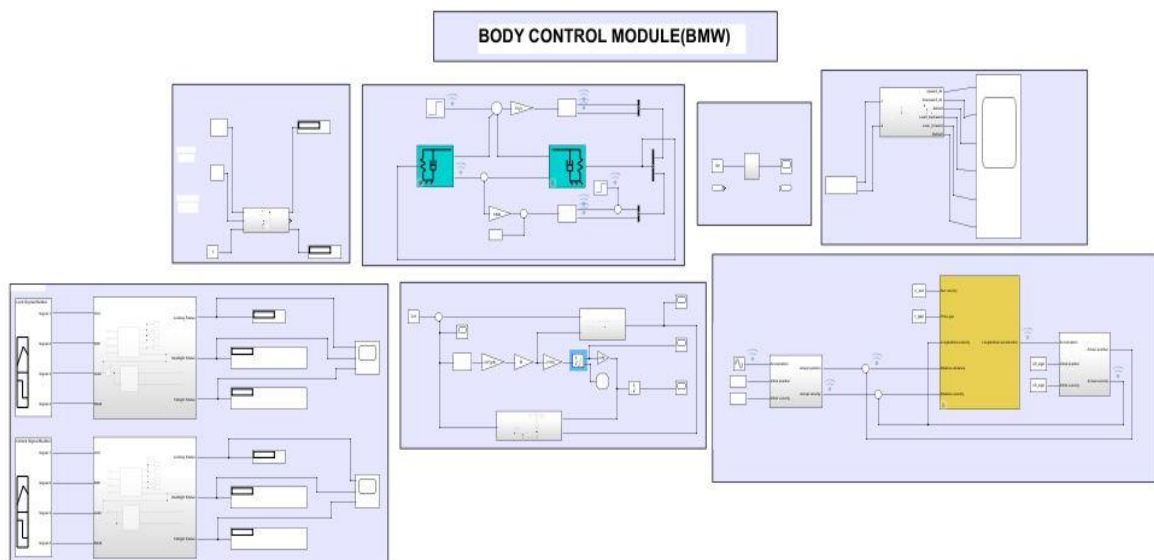
Miniproject 6 –Wiper Control[Team]

Modules:- Mastering Microcontrollers with Embedded Driver Development Module

WIPER CONTROL SYSTEM

Requirements

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Scope Of Wiper Control System

It improved visibility of car windshield during rain. The wiper has been controlled by a water level sensor which regulate tA cycle being the forward and return movement of the windscreen wiper. After tuning the switch on the wiper should start and clear the screen.The wiper motor through sensing the level of water or rain.

Features

- 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.
- The wipers are synchronized witheach other.
- Wiper works by removing oil, dust, rainwater, and dirt that get stuck to the windshield.

Advantages

The main purpose of the wiper system is to clean the windscreen sufficiently to provide suitable visibility at all times.

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.

Wiper systems can use wiper speeds to suit the driving conditions.

- It helps in saving money by switching off the irrigation system when it rains.

- Low cost project.

- Free from wear adjustment.

- Less power consumption.

- Operating principle is very easy Installation is simple.

Disadvantages

- Due to the ingestion of water or ice hinges may become immobile.

- susceptibility to corrosion.

- In the snow, fog, water, rainy season, if we move the wiper regularly, then its speed slows down.

Aplications

- It is used in four wheeler

- It is used in aircraft

- It is used in train

- It is used in six wheeler

- It is used in truck

SWOT Analysis

STRENGTH

- Easy to use

- Best resources for development and Testing

- Company support and Mentoring

- Effective Planning

OPPORTUNITIES

- Lack of dominant competition

- Develop new product

- No creative limits

- Can run without internet

Threat

- New competitor

- Existing Competitor modifies existing product.

- Security issues

WEAKNESS

- Internal competition

- Time management

- Mark a position of Project

- Inaccessible to large audience at a time

4 W's and 1 H

WHO

- Cars, Truck and Bus drivers will get the help from this System.

WHY

- We are making this project to improve the existing Wiper Control System.

- User can use the programme effeciently and get the required results.

WHEN

- When it rains, snow, fog we will use this wipers.

WHERE

- To wipe the rain drops to the cars or trucks we use wipers.

HOW

- It is flexible and user friendly.

Detail requirements

High Level Requirements

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ID   Description

LLR_05   These systems detect droplets of rain on the windshield and automatically turn on and adjust the wiper system.

LOW LEVEL DESIGN

LOW LEVEL DIAGRAM

LEVEL 1

STATE A
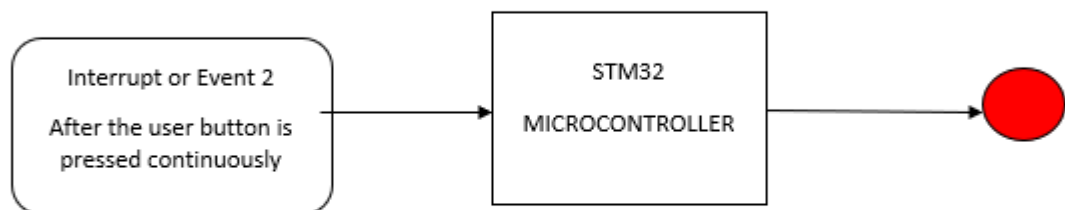
Ignition Key Position at Active – WIPER IS ON

LEVEL 2

STATE B

RED led will be ON

Interrupt or Event 2
After the user button is pressed continuously

STM32
MICROCONTROLLER

The frequency of the
wiping varies (1Hz,4Hz,8Hz and OFF)

Blue, Green and orange Led's Come ON and OFF alternatively for set frequency

LEVEL 3

STATE C

The RED led will be OFF, if the user
button is pressed and held for '2' sec

Interrupt or Event 2
After the user button is pressed continuously

STM32
MICROCONTROLLER

The LED glow
pattern stops on the
4th press

Ignition Key Position at Lock – WIPER IS OFF

HIGH LEVEL DESIGN

HIGH LEVEL DIAGRAM

TEST PLAN:

High level test plan

TEST PLAN ID	Discription	exp I/P	Exp O/P	Status
HLR01	Check Red LED on & wiper work	Press and held 2sec	Red LED On & Wiper works	pass
HLR02	Press button 1 more time	press button	Blue LED ON	Pass
HLR03	Cheack the frequency of blue LED	1HZ	Wiper recive 1HZ	Pass
HLR04	Press the button again 1 more time	press button	Green LED ON	Pass
HLR05	Cheack the frequency of Green LED	4HZ	wiper recive 4HZ	Pass

TEST PLAN ID	Discription	exp I/P	Exp O/P	Status
HLR06	Press the button 1 more time again	Press Button	Orange LED ON	Pass
HLR07	Cheack the frequency of Orange LED	8HZ	Wiper recive 8HZ	Pass
HLR08	Cheack the frequency of LED & check wiper work	5,6,7HZ	Wiper recive 5HZ for blue,6HZ for green & 7HZ for orange	Pass
HLR09	Check all LED OFF and wiper stops work	press and held 2secs	All LEDs are OFF & wiper stops	Pass

Low level test plan

LLR-ID	Discription	HLR-ID	exp I/P	Exp O/P	Status
LLR01	Run the system	HLR01	Check the LEDs & wiper	LEDs off & wiper off	Pass
LLR02	Press the button for 2sec	HLR01	Press and held 2sec	Red LED will be ON	Pass
LLR03	Press the button for 1sec	HLR01	Press and held 1sec	Red LED will be OFF	Pass
LLR04	Press the button for 3sec	HLR01	Press and held more then 3sec	Red LED will be OFF	Pass

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LLR-ID	Discription	HLR-ID	exp I/P	Exp O/P	Status
LLR05	Press the button for 2sec	HLR01	Press and held 2sec	Red LED will be OFF	Fail
LLR06	After red LED ON wiper is also ON	HLR01	Wiper ON	Wiper will start working	Pass
LLR07	After red LED ON wiper is also ON	HLR01	Wiper OFF	Wiper will stop working	Fail
LLR08	Press & check the blue LED	HLR02	press button	Blue LED ON	Pass
LLR09	Check the frequency of wiper working	HLR03	1HZ	Wiper gets 1HZ & work at 1HZ speed	Pass
LLR10	Check the frequency after some time	HLR03	1HZ	Wiper work at 1HZ range only	Pass
LLR11	Check the frequency after some time	HLR03	1HZ	Wiper working more then 1HZ	Fail
LLR12	Press the button & Green LED ON	HLR04	Press button	Green LED ON	Pass
LLR13	Press the button & Green LED ON	HLR04	Press button	Green LED OFF	Fail
LLR14	Check the frequency	HLR05	4HZ	Wiper should recive & work at 4HZ	Pass

LLR-ID	Discription	HLR-ID	exp I/P	Exp O/P	Status
	wiper reciving				
LLR15	Check the frequency after some time	HLR05	4HZ	Wiper working at 4HZ	Pass
LLR16	Check the frequency after some time	HLR05	4HZ	Wiper working more then 4HZ	Fail
LLR17	Press the button & Orange LED ON	HLR06	Press button	Orange LED ON	Pass
LLR18	Press the button & orange LED ON	HLR06	Press button	Orange LED OFF	Fail
LLR19	Check the frequency wiper reciving	HLR07	8HZ	Wiper works at same 8HZ level	Pass
LLR20	Check the frequency wiper reciving	HLR07	8HZ	Wiper works mare then 8HZ level	Fail
LLR21	Check the frequency for each LEDs	HLR08	5,6,7HZ	New frequency set for Blue,Green,Orange	Pass
LLR22	Repeat steps from LLR08 to LLR21	HLR09	same i/p	Same O/P	Same status
LLR23	Press & held button for 2sec	HLR09	Press button	Red LED OFF	Pass

LLR-ID	Discription	HLR-ID	exp I/P	Exp O/P	Status
	& Red LED OFF		for 2sec		
LLR24	Press & held button for 2sec & Red LED OFF	HLR09	Press button for 2sec	Still ON Red LED	Fial
LLR25	Check the wiper after Red LED OFF	HLR09	Press button for 2sec	Wiper stops working	Pass
LLR26	Check the other LED's too	HLR09	Press button for 2sec	Blue,Green,Orange LED's ON	Pass
LLR27	Press the button again & again check the LED's	HLR10	Press button again & again	Blue,Green,Orange LED's ON	Pass

Implementation and Summary

Git Link:

Link:

Github: https://github.com/GENESIS-2022/MasteringMCU-Team71
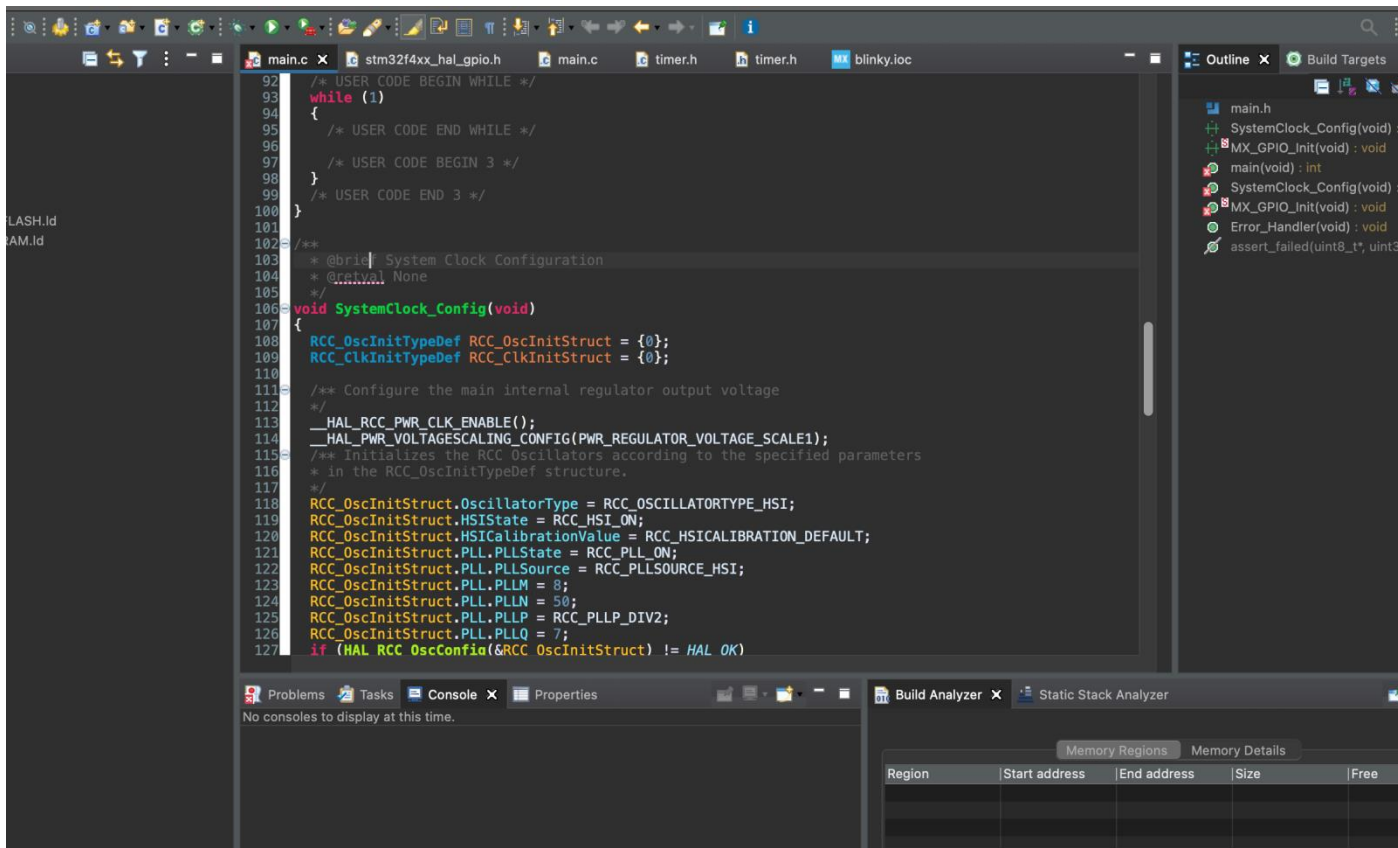
Individual Contribution and Highlights
1. Wiper System using C Programming
2. Source code management using GitHub
3. REQUIREMENTS+Implementation(start-up's , STM32F407XX.H)

Role in Project Team

1. Programmer: Done Programming for Wiper System
2. Integrator: Integrated all the codes
3. Tester: Writing Test cases and testing the integrated code

L&T Technology Services

Miniproject 7 – Power WindowProject [Individual]

Modules: - Automotive Systems

Power Window

Introduction

The windows on cars which can be opened or shut with the help of buttons, are called power windows. Power windows were first introduced by Ford Motors in 1941. The first cars to get the power windows were the Lincoln Custom and the Packard Custom Super 180. Power windows have replaced the traditional manual handles. It can be a built-in feature or installed in cars, using aftermarket accessories.

4W's and 1H

What: Power windows are automobile windows which can be raised and lowered by pressing a button or switch, as opposed to using a crank handle.

Where: whenever there is dust or rain the windows will close automatically. The tint of the window will change when there is abundance of sunlight.

Why: The power windows eliminates the hurdle of the traditional handles which needed a lot of effort and time to open or shut the windows. It allows the driver to control the windows with just the touch of his fingers.

When: Power windows were first introduced by Ford Motors in 1941. The first cars to get the power windows were the Lincoln Custom and the Packard Custom Super 180.

How: Power windows are controlled by switches and wires and are powered by battery or electricity. Power windows do not function if the ignition of the car is not turned on. Unlike the traditional windows, power windows do not have manual handles. They do not work manually.
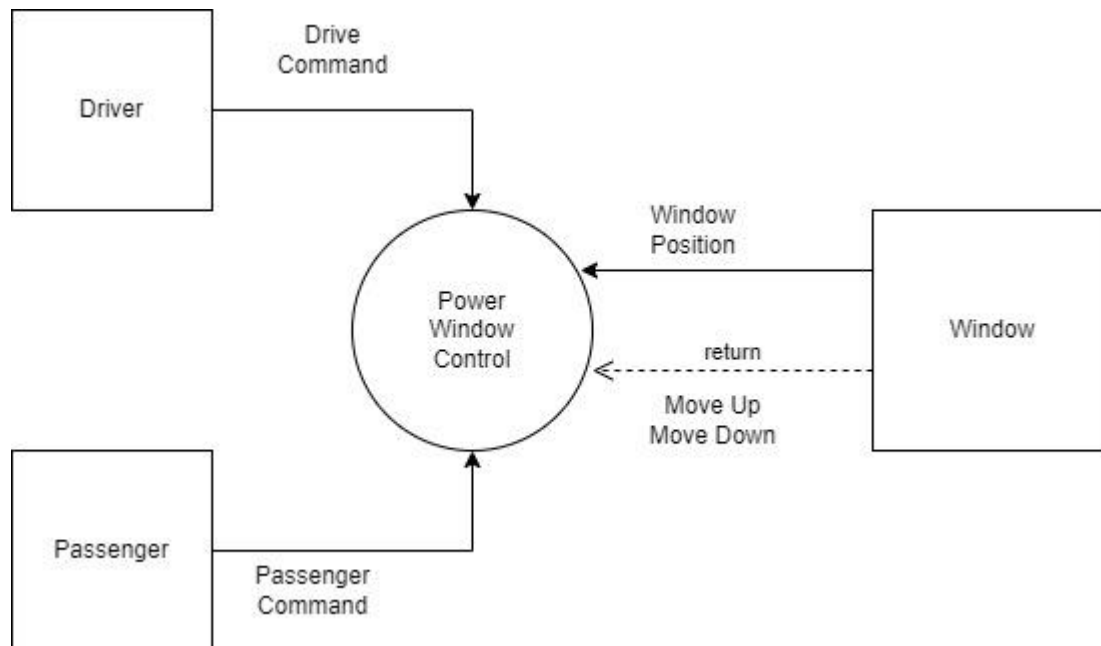
High level Requirement

	Description
HLR_1	When there is dust or rain the windows will close automatically.
HLR_2	The tint of the window will change when there is abundance of sunlight.
HLR_3	When the ac is on it will get detected and the windows will close automatically.
HLR_4	When the safety feature is on, only the driver will be able to control the positions of the windows.
HLR_5	When anything gets in the way of the window while goes up,the window will go down again.

Low level Requirement

	Description
LLR_1	The power window go all the way down by just tapping the button once. (Automatic down)
LLR_2	The power windows will go all the way up like the automatic down.(Automatic Up)
LLR_3	When the door is locked the windows will close automatically.
LLR_4	The control unit of the power window senses both high and low load

Description

obstructions. (Automatic down)

LLR_5   The system design meets these performance requirements.

WINDOW CONTROL UML DIAGRAM

Power Window Control UML Diagram

BLOCK DIAGRAM

Git Link: https://github.com/Aniket169/Automative-System_Power-Window-Project

Individual Contribution and Highlights
1. Power Window Project.

Mini project 7 –E-Golf Cart [Team]

Module: - Applied Control Systems and Vehicle Dynamics

Introduction:

In this project we are going to design and develop an Electric golf cart by comparing two existing models in the market and analysing the difference between them and compare them against our own design.

Requirements:

EZGO marathon Vs YAMAHA UMAX rally 2+2:

Motor Specifications:

Component	EZGO marathon	Y- UMAX rally 2+2
Engine Type	350cc twin cylinder unit 18 cubic inches	402cc low-emission single cylinder 60 degree incline OHV
Fuel Tank Capacity	Twin cylinder unit	5.2US GAL (20 LITERS)
Top speed	12-14 Nm	15 mph (24.1 km/hr)
Minimum Turning Radius	4.24m	3.98m
Maximum Forward Speed	12mph (19.3 km/h)	15mph (24.1 km/h)

Battery Specifications:

Component	EZGO marathon	Y- UMAX rally 2+2
Battery Type	Works on gas cylinder	Lithium-ion
Range	25-30 miles	35 miles
Battery Charging Time	Works on gas cylinder	4 Hours
Battery Capacity	Works on gas cylinder	2 kWh
No of Cells	Works on gas cylinder	20,500

Dimensions:

Component	EZGO marathon	Y- UMAX rally 2+2
Overall Length	125.5 in (317.3cm)	134.37 in (341.3cm)
Overall Width	50.3 in (127.6cm)	53.54 in (136cm)
Overall Height	72.7 in (182.4cm)	77.20 in (196.1cm)

Wheelbase	72.2 in (182.1cm)	77.28 in (196.3cm)
Front Wheel Tread	38.5 in (96.8cm)	41.26 in (104.8cm)
Rear Wheel Tread	37.2 in (94.1cm)	41.26 in (104.8cm)
Minimum Ground Clearance	5.1 in (12.7cm)	5.94 in (15.1cm)

Wheel Specifications:

Wheel Type	**EZGO marathon**	**Y- UMAX rally 2+2**
Front Wheel Size	10 inches	12 inches
Rear Wheel Size	11 inches	12 inches
Front Tyre Size	22*9-11*10.5 - ply monitor k272	23*10.5-12*4- ply monitor k389

Dimensions & Chassis Specifications:

Component	**EZGO marathon**	**Y- UMAX rally 2+2**
Kerb Weight	125 kg	108 kg
Overall Length	1,859 mm	1,800 mm
Overall Width	712 mm	700 mm
Overall Height	1,160 mm	1,250 mm
Wheelbase	1,359 mm	1,278 mm
Ground Clearance	165 mm	160 mm
Seat Height	792 mm	765 mm
Chassis Type	Tubular	Precision Machined Hybrid Chassis

Implementation

Git Link:

Link: https://github.com/Nayan349/Golf_Cart_Team7

Miniproject 9 – Power Window [Individual]

Module:-

1. Autosar
2. Git

Implementation and summary
Git Link: https://github.com/Aniket169/Automative-System_Power-Window-Project