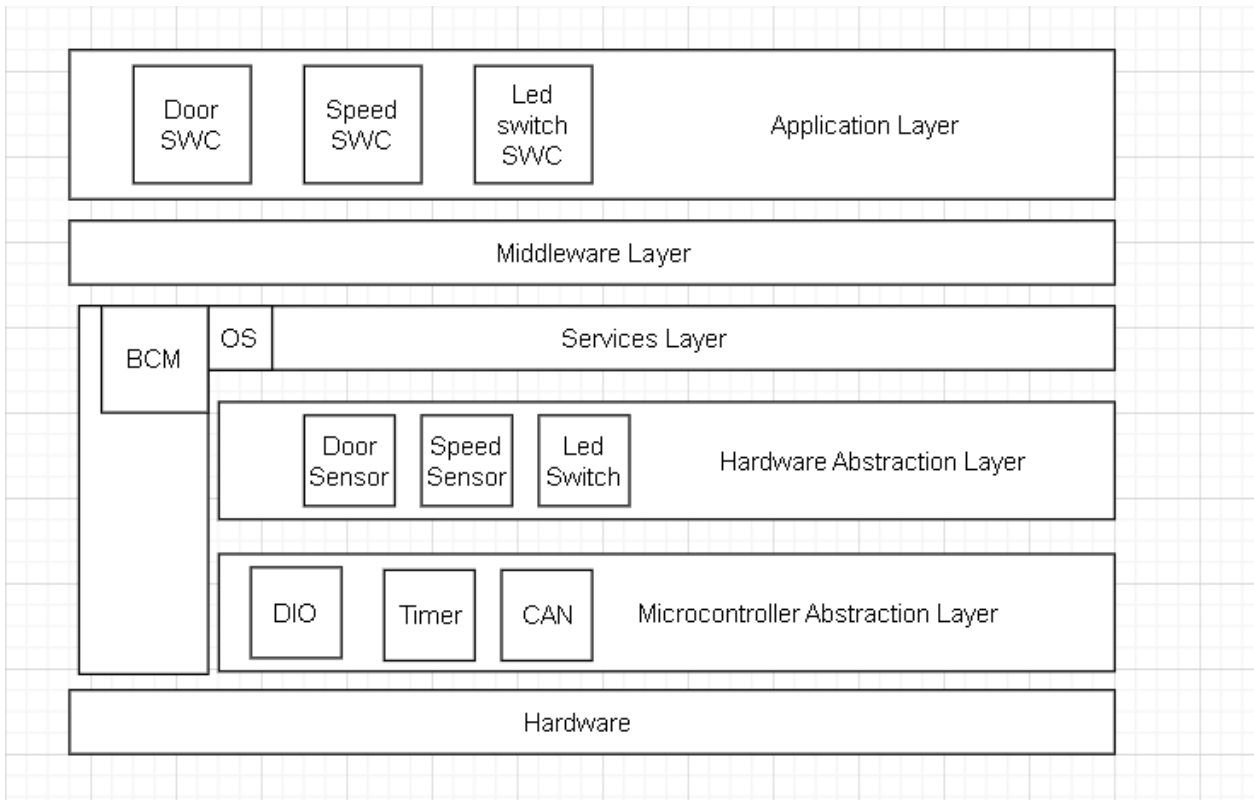


ECU 1:

1- The Layered Architecture:



2- ECU 1 Components and Modules:

- ECU1 consists of 3 main components: Door Software Component, Speed Software Component, Led Switch Software Component.
- It has also an operating system which will be used for scheduling the periodicity of sending the status of each of the three components.
- It has the Basic Communicatino Module (BCM) which is used to send the status of the three modules to the other side.
- It has a CAN drivre as it will send the messages through the CAN bus to the other side.

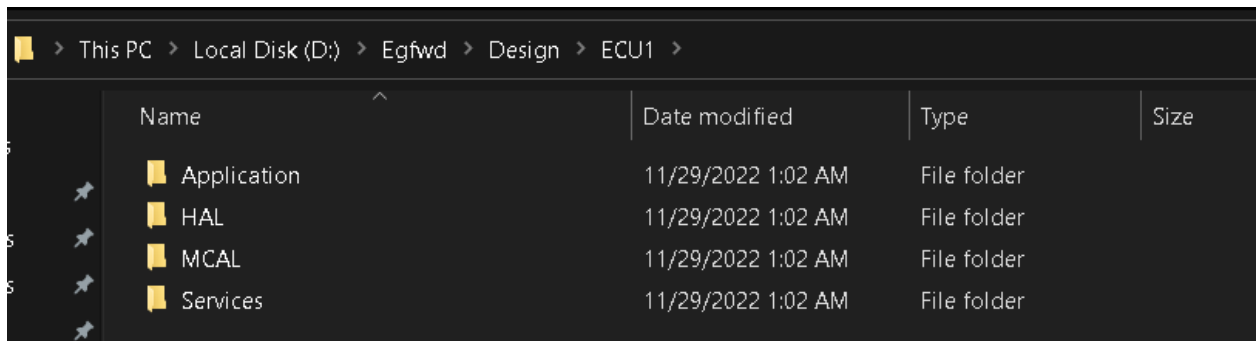
3- APIs and Typedefs for each Module:

- Door:
 - o API: Door_Status Is_Door_Open (void);
 - Description: This function gets the status of the door whether it's open or closed.
 - Input parameters: None
 - Return Value: This function returns a value of type Door_Status
 - o Typedef: typedef boolean Door_Status;

- Typedef: typedef char boolean;
- Speed:
 - API: Speed_Status Is_Car_Stopped (void);
 - Description: This function gets the value of the car's speed.
 - Input Parameters: void
 - Return: value of type Speed_Status .
 - Typedef: typedef uint8_t Speed_Status;
 - Typedef: typedef char uint8_t;
- Led Switch::
 - API: LedSwitch_Status Is_LedSwitch_Pressed (void);
 - Description: This function gets the status of the car's Led Switch whether it is pressed or not.
 - Input Parameters: None
 - Return: the function returns a value of type LedSwitch_Status.
 - Typedef: typedef boolean LedSwitch Status;
 - Typedef: typedef uint8_t boolean;
 - Typedef: typedef char uint8_t;
- Operating System:
 - API: void vStartScheduler();
 - Description: This function starts the scheduler of the system which handles the tasks of the system.
 - Input Paramters: None
 - Return value: void

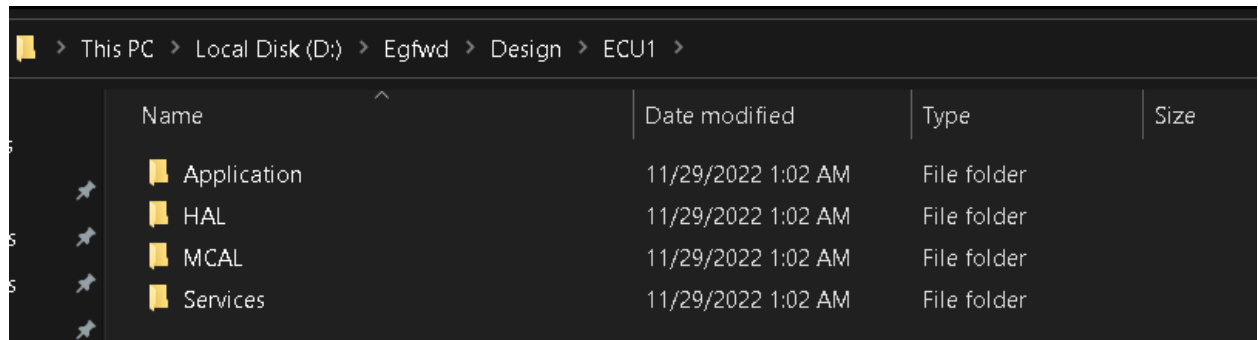
4- Folders Architecture:

- ECU 1 Folder:



Name	Date modified	Type	Size
Application	11/29/2022 1:02 AM	File folder	
HAL	11/29/2022 1:02 AM	File folder	
MCAL	11/29/2022 1:02 AM	File folder	
Services	11/29/2022 1:02 AM	File folder	

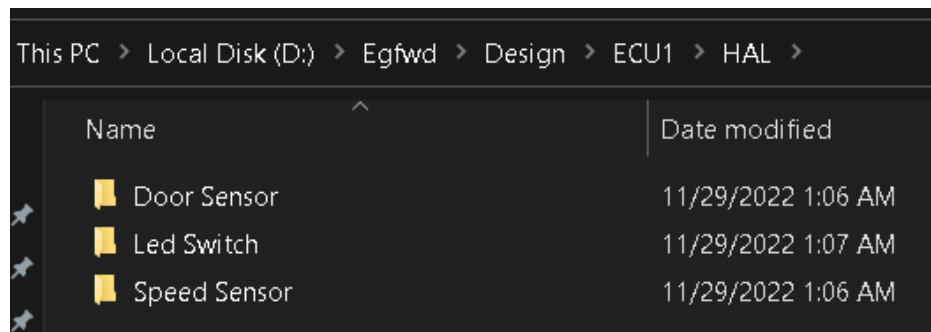
- ECU1 Application Folder:



This screenshot shows a Windows File Explorer window with the address bar set to 'This PC > Local Disk (D:) > Egfwd > Design > ECU1 >'. The main pane displays a table of files and folders. The table has four columns: 'Name', 'Date modified', 'Type', and 'Size'. There are four entries, all of which are folders named 'Application', 'HAL', 'MCAL', and 'Services', all with a 'Date modified' of '11/29/2022 1:02 AM' and 'Type' of 'File folder'.

Name	Date modified	Type	Size
Application	11/29/2022 1:02 AM	File folder	
HAL	11/29/2022 1:02 AM	File folder	
MCAL	11/29/2022 1:02 AM	File folder	
Services	11/29/2022 1:02 AM	File folder	

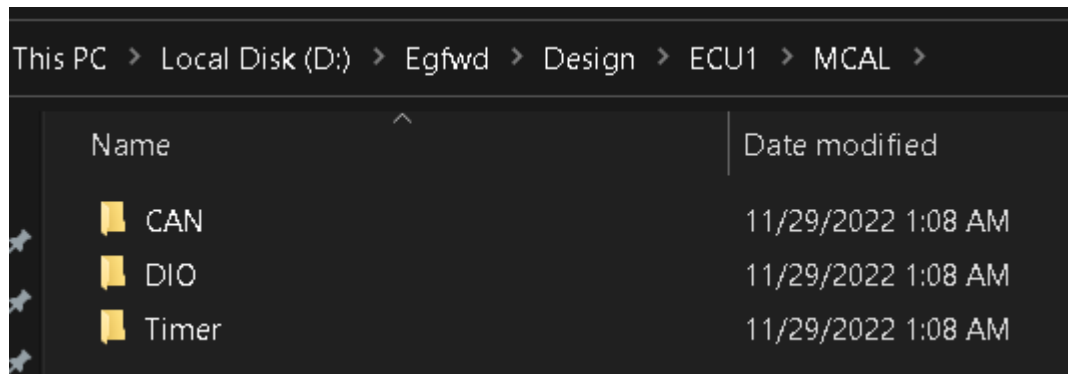
- ECU1 HAL Folder:



This screenshot shows a Windows File Explorer window with the address bar set to 'This PC > Local Disk (D:) > Egfwd > Design > ECU1 > HAL >'. The main pane displays a table of files and folders. The table has two columns: 'Name' and 'Date modified'. There are three entries, all of which are folders named 'Door Sensor', 'Led Switch', and 'Speed Sensor', with 'Date modified' values of '11/29/2022 1:06 AM', '11/29/2022 1:07 AM', and '11/29/2022 1:06 AM' respectively.

Name	Date modified
Door Sensor	11/29/2022 1:06 AM
Led Switch	11/29/2022 1:07 AM
Speed Sensor	11/29/2022 1:06 AM



- ECU1 MCAL Folder:



This screenshot shows a Windows File Explorer window with the address bar set to 'This PC > Local Disk (D:) > Egfwd > Design > ECU1 > MCAL >'. The main pane displays a table of files and folders. The table has two columns: 'Name' and 'Date modified'. There are three entries, all of which are folders named 'CAN', 'DIO', and 'Timer', all with a 'Date modified' of '11/29/2022 1:08 AM'.

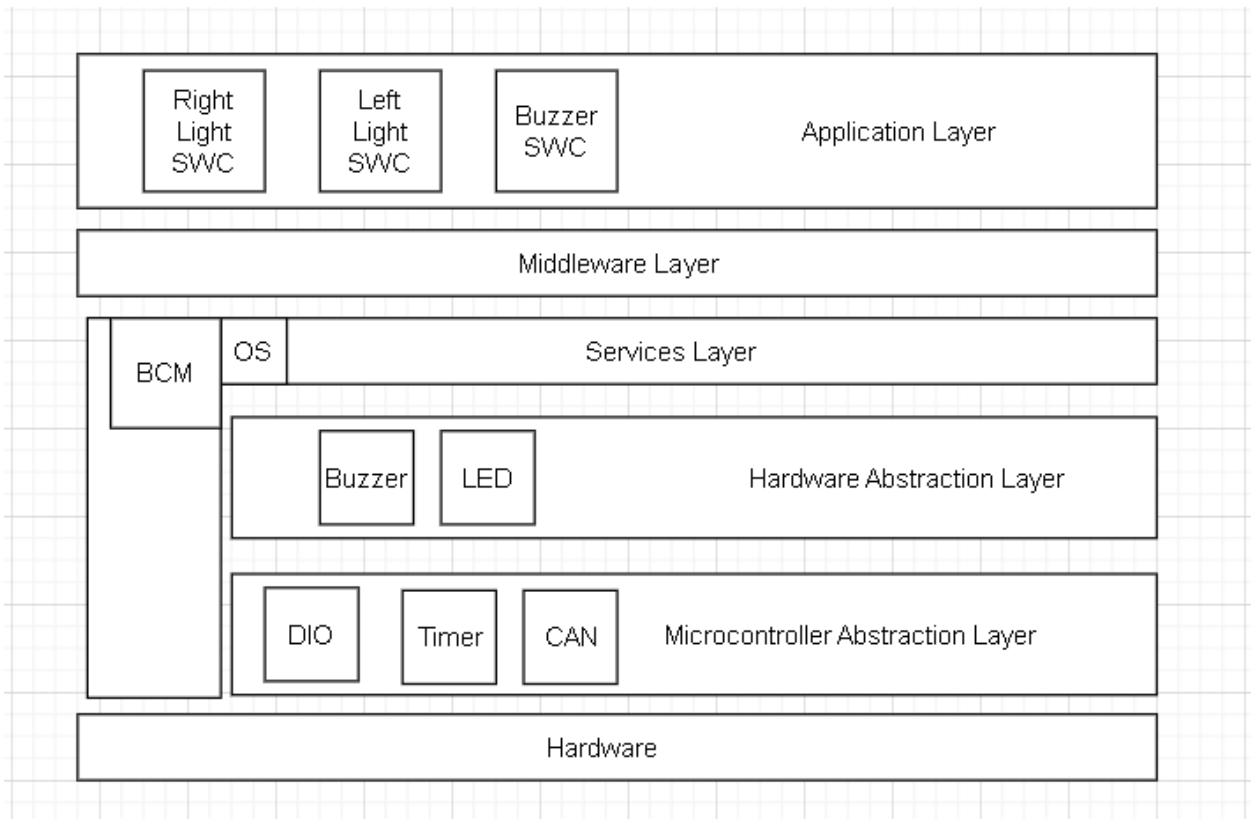
Name	Date modified
CAN	11/29/2022 1:08 AM
DIO	11/29/2022 1:08 AM
Timer	11/29/2022 1:08 AM

- ECU1 Services Folder:

This PC > Local Disk (D:) > Egfwd > Design > ECU1 > Services >	
Name	Date modified
 BCM	11/29/2022 1:09 AM
 OS	11/29/2022 1:09 AM

ECU2:

1- The Layered Architecture:



2- ECU 2 Components and Modules:

- ECU2 consists of 3 main modules: Right Light Component, Left Right Component and Buzzer Component.
- It has also a Basic Communication Module (BCM) which is responsible for receiving the messages from the sending ECU.
- It has CAN driver as well which will receive the messages through the CAN bus.

3- APIs and Typedefs for each module:

- Left Light:
 - API: `Led_State Is_LeftLight_ON (void);`
 - Description: This function checks if Left light led is on or off.
 - Input paramters: None
 - Return: a value of type `Led_State` that can be on or off.
 - API: `void LeftLightLed_TurnOn (void);`
 - Description: This function turns on the left light led .
 - Input Parameters: None

- Return: None
 - Typedef: typedef boolean Led_State;
- Right Light:
 - API: Led_State Is_RightLight_ON (void);
 - Description: This function checks if the right light led is on or off.
 - Input Parameters: None
 - Return: a value of type Led_State which can be on or off.
 - API: void RightLightLed_TurnOn (void);
 - Description: This function turns on the right light led .
 - Input parameters: None
 - Return: void
 - Typedef: typedef boolean Led_State;
- Buzzer:
 - API: void Buzzer_TurnOn (uint8_t time);
 - Description: This function turns the buzzer on.
 - Input parameters: time which represents the time for the buzzer to be turned on.
 - Return: void
 - API: void Buzzer_TurnOff (void);
 - Description: This function turns the buzzer off.
 - Input parameters: None
 - Return: void
 - API: Buzzer_State Is_Buzzer_On (void);
 - Description: This function checks if the buzzer is on or off.
 - Input parameters: None
 - Return: void
 - Typedef: typedef boolean Buzzer_State;
- CAN:
 - API: Reception_State CAN_Receive_Message (void);
 - Description: This function receives a message from the CAN bus.
 - Input Paramters: None
 - Return: this function returns a value of type Reception_State which marks reception ok or not_ok.
 - Typedef: typedef enum {Ok, Not_Ok} Reception_State;

4- Folders Architecture:

- ECU2 Folder:

his PC > Local Disk (D:) > Egfwd > Design > ECU2 >	
Name	Date modified
Application	11/29/2022 1:17 AM
HAL	11/29/2022 1:17 AM
MCAL	11/29/2022 1:16 AM
Services	11/29/2022 1:16 AM




- ECU2 Application Folder:

s PC > Local Disk (D:) > Egfwd > Design > ECU2 > Application >	
Name	Date modified
Buzzer SWC	11/29/2022 1:16 AM
Left Light SWC	11/29/2022 1:16 AM
Right Light SWC	11/29/2022 1:16 AM



- ECU2 HAL Folder:

PC > Local Disk (D:) > Egfwd > Design > ECU2 > HAL >	
Name	Date modified
Buzzer	11/29/2022 1:16 AM
LED	11/29/2022 1:16 AM

- ECU2 MCAL Folder:

s PC > Local Disk (D:) > Egfwd > Design > ECU2 > MCAL >	
Name	Date modified
 CAN	11/29/2022 1:16 AM
 DIO	11/29/2022 1:16 AM
 Timer	11/29/2022 1:16 AM

- ECU2 Services Folder:

s PC > Local Disk (D:) > Egfwd > Design > ECU2 > Services >	
Name	Date modified
 BCM	11/29/2022 1:16 AM
 OS	11/29/2022 1:16 AM