STATIC DESIGN

1.System Design

Hardware Components:

1. ATmega32 microcontroller
2. One push button connected to INT0 pin for pedestrian
3. Three LEDs for cars - Green, Yellow, and Red, connected on port A, pins 0, 1, and 2
4. Three LEDs for pedestrians - Green, Yellow, and Red, connected on port B, pins 0, 1, and 2

Software requirements:

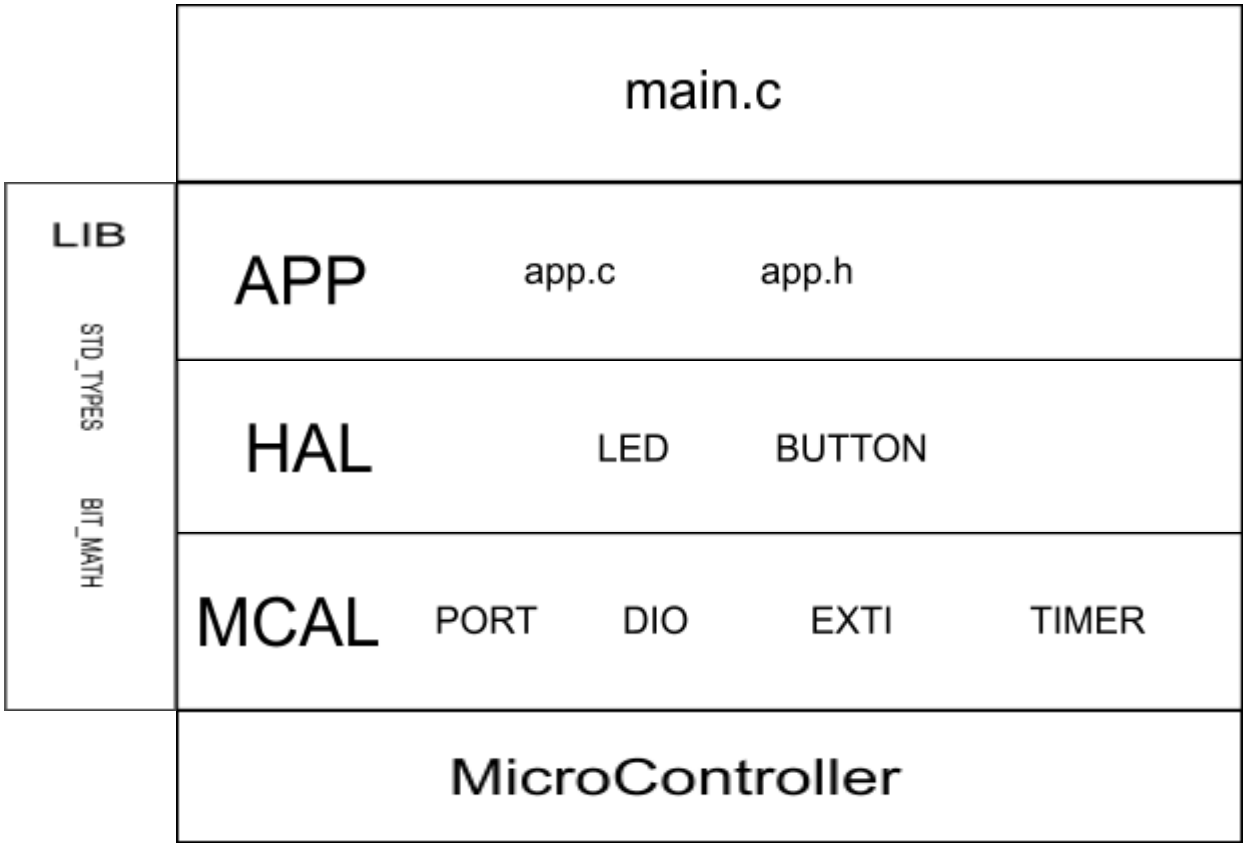
In normal mode:

1. Cars' LEDs will be changed every five seconds starting from Green then yellow then red then yellow then Green.
2. The Yellow LED will blink for five seconds before moving to Green or Red LEDs.

In pedestrian mode:

1. Change from normal mode to pedestrian mode when the pedestrian button is pressed.
2. If pressed when the cars' Red LED is on, the pedestrian's Green LED and the cars' Red LEDs will be on for five seconds, this means that pedestrians can cross the street while the pedestrian's Green LED is on.
3. If pressed when the cars' Green LED is on or the cars' Yellow LED is blinking, the pedestrian Red LED will be on then both Yellow LEDs start to blink for five seconds, then the cars' Red LED and pedestrian Green LEDs are on for five seconds, this means that pedestrian must wait until the Green LED is on.
4. At the end of the two states, the cars' Red LED will be off and both Yellow LEDs start blinking for 5 seconds and the pedestrian's Green LED is still on.
5. After the five seconds the pedestrian Green LED will be off and both the pedestrian Red LED and the cars' Green LED will be on.
6. Traffic lights signals are going to the normal mode again

2.Layered Architecture



3.full detailed APIs

2.1.1 PORT

Name	**Port Init**
Syntax	void Port_Init()
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	void
Description	Initialize Port Module

2.2.1 DIO

Name	**DIO GET PIN**
Syntax	DIO_u8GetPinValue(u8 copy_u8Port , u8 copy_u8Pin ,u8* copy_Pu8Value)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port, Pin
Parameters (out)	Value
Return Value	u8
Description	Read Pin Status

2.2.2 DIO

Name	**Set Port Value**
Syntax	u8 DIO_u8SetPortValue(u8 copy_u8Port , u8 copy_u8Value)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port, Pin
Parameters (out)	-

Return Value	u8
Description	Set Port value all high or low

2.2.3 DIO

Name	**Toggle Pin Value**
Syntax	u8 DIO_u8TogglePinValue(u8 copy_u8Port , u8 copy_u8Pin)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port, Pin
Parameters (out)	-
Return Value	u8
Description	Change Pin Value

2.2.4 DIO

Name	**Set Pin Value**
Syntax	u8 DIO_u8SetPinValue(u8 copy_u8Port , u8 copy_u8Pin , u8 copy_u8Value)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port, Pin,Value
Parameters (out)	-
Return Value	u8
Description	Change Pin Value from high to low and opposite

2.3.1 GIE

Name	**GIE Enable**
Syntax	void GIE_voidEnable(void);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	void
Description	Set Global Interrupt Enable

2.3. GIE

Name	**GIE Disable**
Syntax	void GIE_voidDisable(void);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	void
Description	Set Global Interrupt Disable

2.4.1 TIMER0

Name	**TIMER0 Init**
Syntax	void TIMER0_voidInit(void);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-

Return Value	void
Description	Initialize TIMER0

2.4.2 TIMER0

Name	**Timer0 Delay**
Syntax	void Timer0_vDelayms(u16 Copy_u16delay)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	void
Description	Make a delay by timer 0

2.5.1 LED

Name	**LED Init**
Syntax	void LED_Init(void);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	void
Description	Initialize LED

2.5.2 LED

Name	LED ON
Syntax	void LED_voidON(u8 copy_u8Port,u8 copy_u8Pin);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port,Pin
Parameters (out)	-
Return Value	void
Description	Set LED on

2.5.2 LED

Name	LED OFF
Syntax	void LED_voidOFF(u8 copy_u8Port,u8 copy_u8Pin);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port,Pin
Parameters (out)	-
Return Value	void
Description	Set LED Off

2.5.2 LED

Name	LED TOGGLE
Syntax	void LED_voidTOGGLE(u8 copy_u8Port,u8 copy_u8Pin);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Port,Pin

Parameters (out)	-
Return Value	void
Description	Set LED Toggle

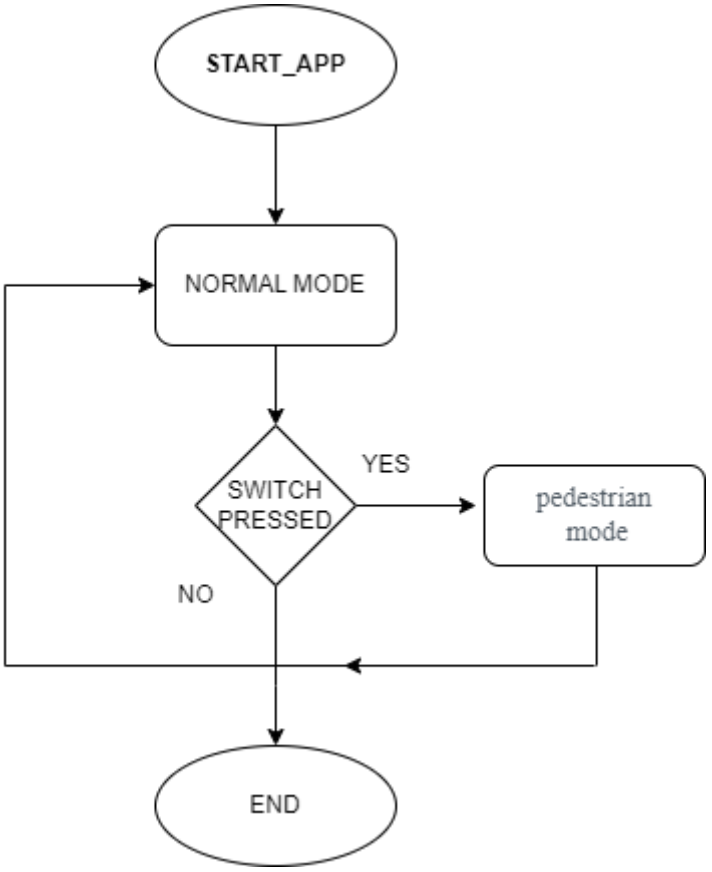
2.6.1 BUTTON

Name	**Button Init**
Syntax	void Button_Init(void);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	void
Description	Initialize Button

2.6.2 BUTTON

Name	**Button Get State**
Syntax	u8 Button_GetState(void);
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	-
Parameters (out)	-
Return Value	u8
Description	Get Button state

4.FLOW CHART


START_APP
NORMAL MODE
SWITCH PRESSED
YES
pedestrian mode
NO
END

5.system constraints