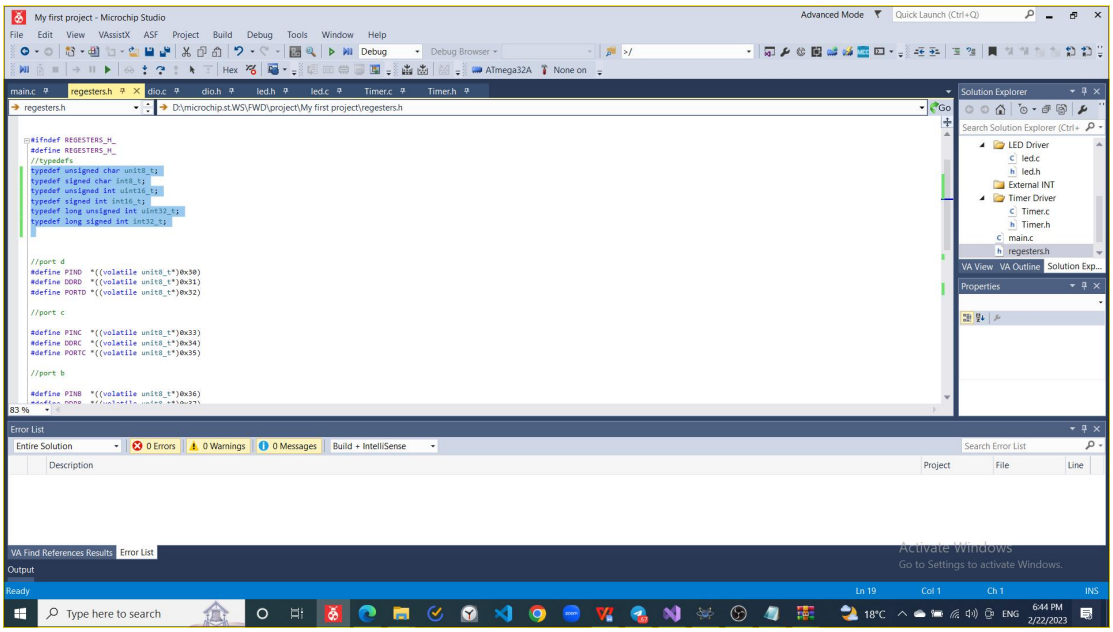
On damned traffic
Software desgine

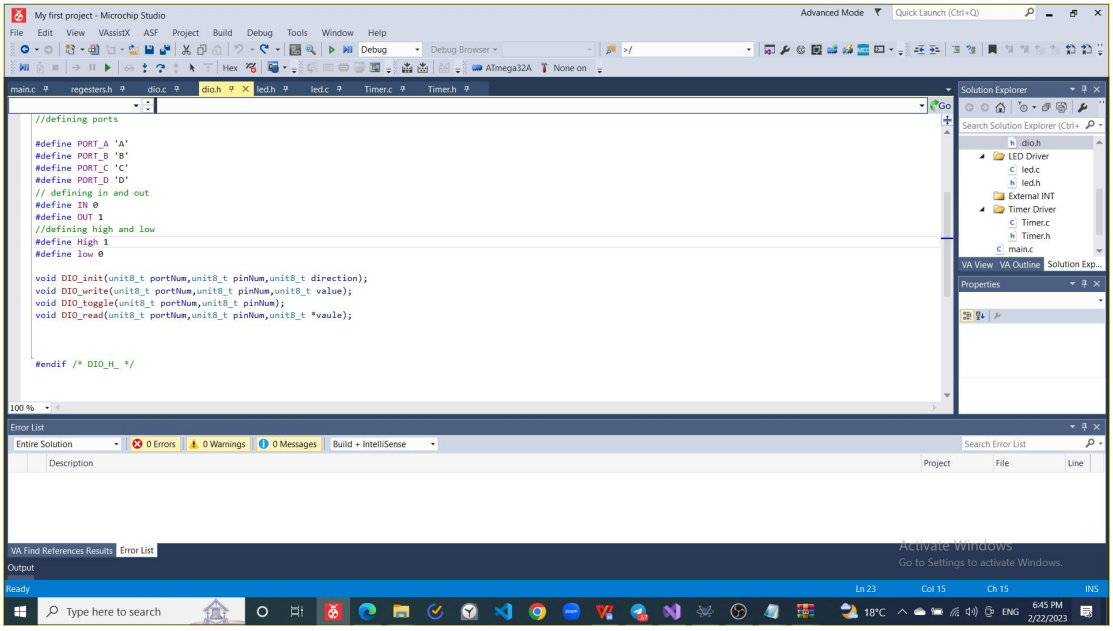
Layer 1

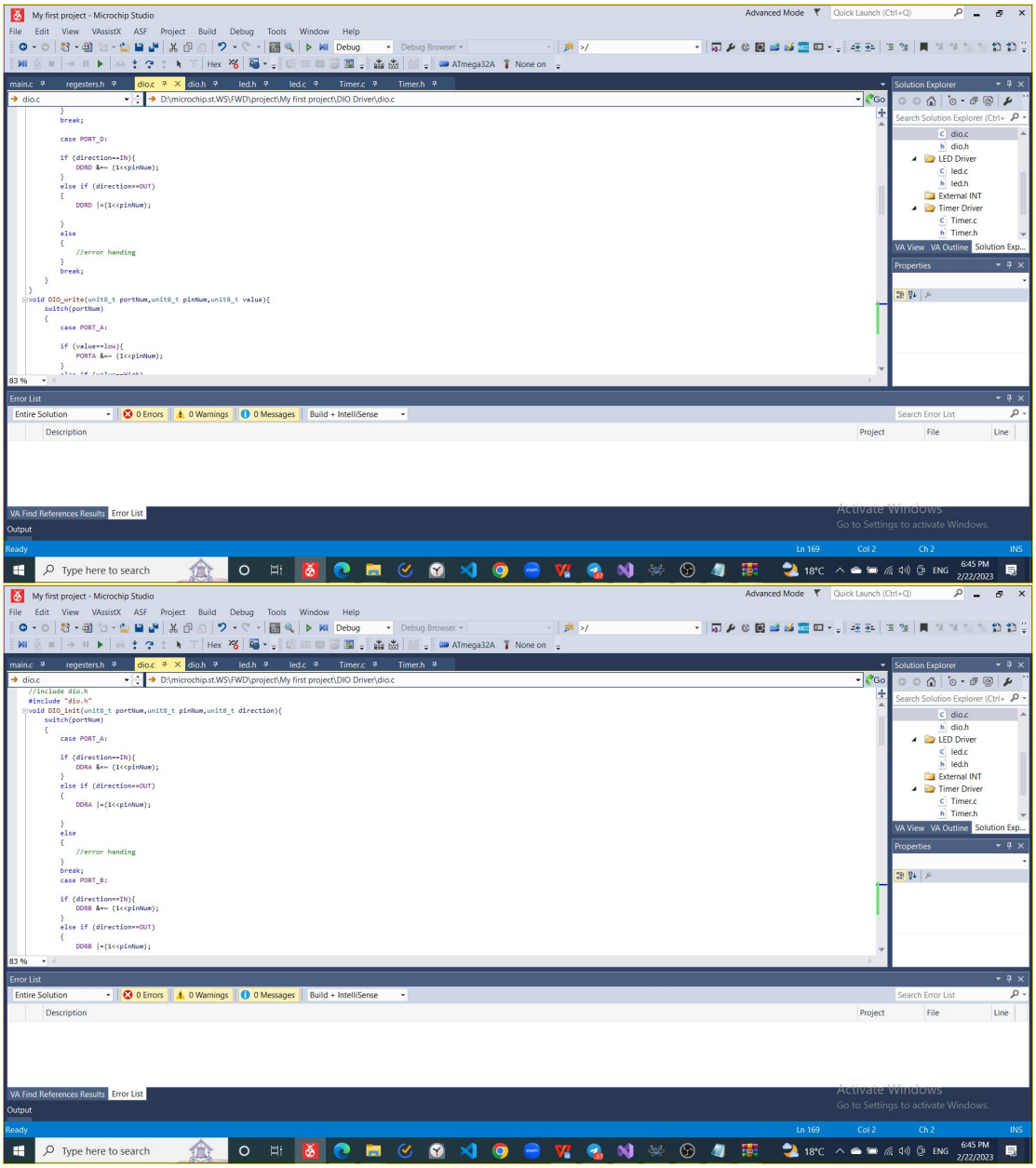
Registers
Typedefs



Layer 2

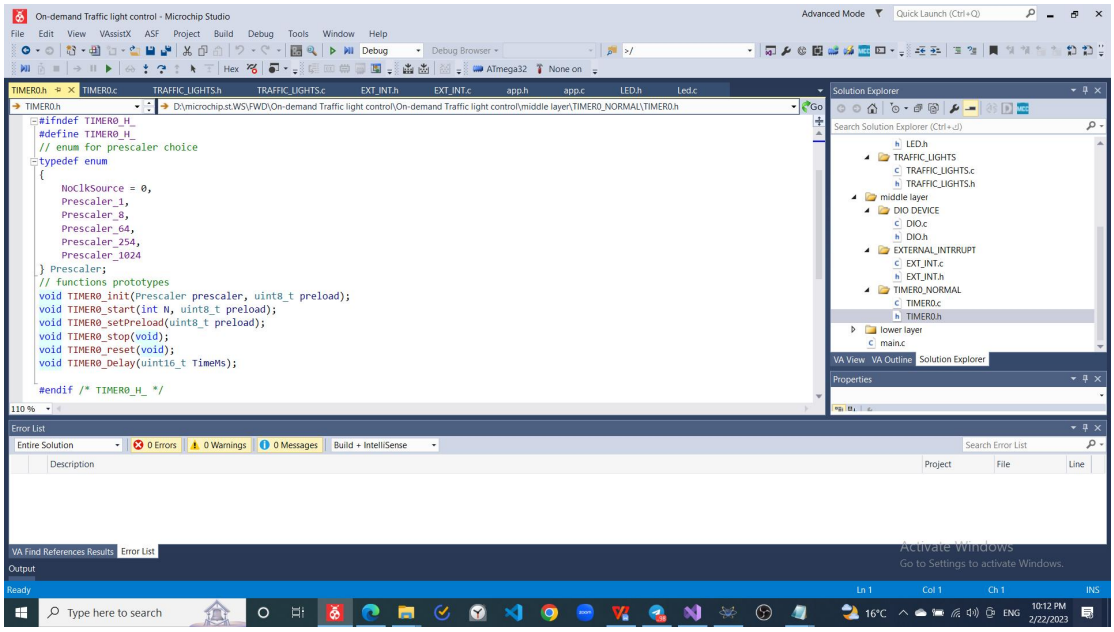
dio device

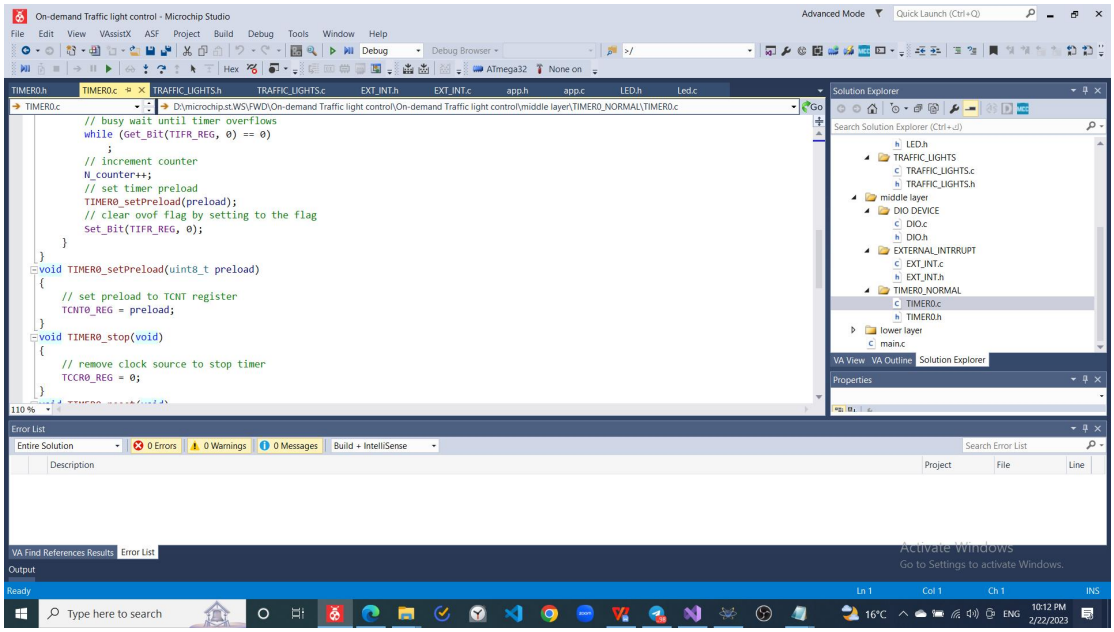




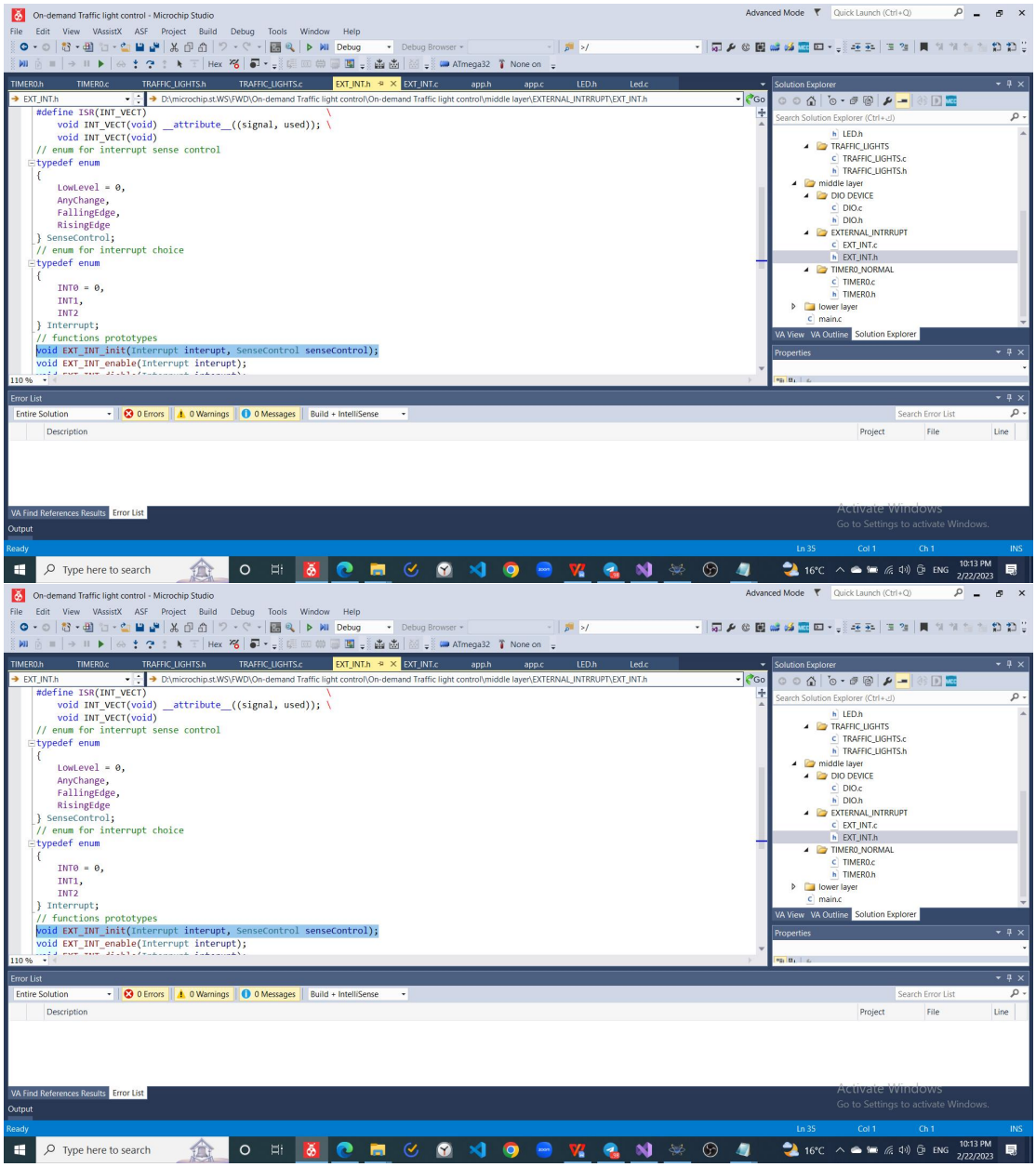
Layer 3

timer





Layer 4 : external interrupt


On-demand Traffic light control - Microchip Studio
#define ISR(INT_VECT) \
void INT_VECT(void) __attribute__((signal, used)); \
void INT_VECT(void)
// enum for interrupt sense control
typedef enum
{
LowLevel = 0,
AnyChange,
FallingEdge,
RisingEdge
} SenseControl;
// enum for interrupt choice
typedef enum
{
INT0 = 0,
INT1,
INT2
} Interrupt;
// functions prototypes
void EXT_INT_init(Interrupt interupt, SenseControl senseControl);
void EXT_INT_enable(Interrupt interupt);
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main.c
Error List
Activate Windows
Go to Settings to activate Windows.

On-demand Traffic light control - Microchip Studio
#define ISR(INT_VECT) \
void INT_VECT(void) __attribute__((signal, used)); \
void INT_VECT(void)
// enum for interrupt sense control
typedef enum
{
LowLevel = 0,
AnyChange,
FallingEdge,
RisingEdge
} SenseControl;
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typedef enum
{
INT0 = 0,
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} Interrupt;
// functions prototypes
void EXT_INT_init(Interrupt interupt, SenseControl senseControl);
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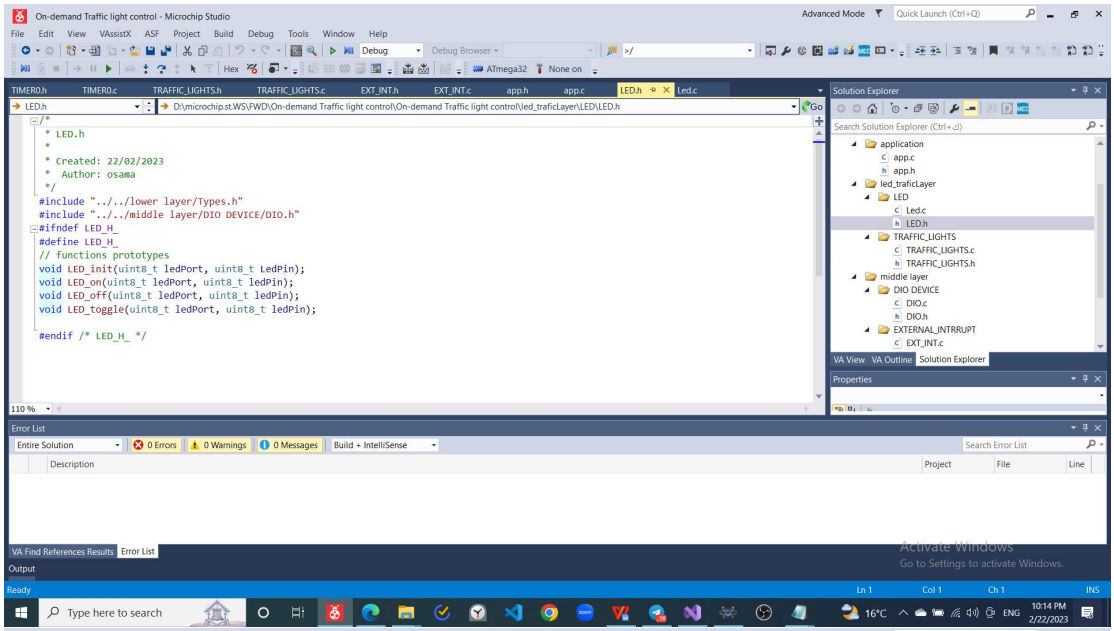
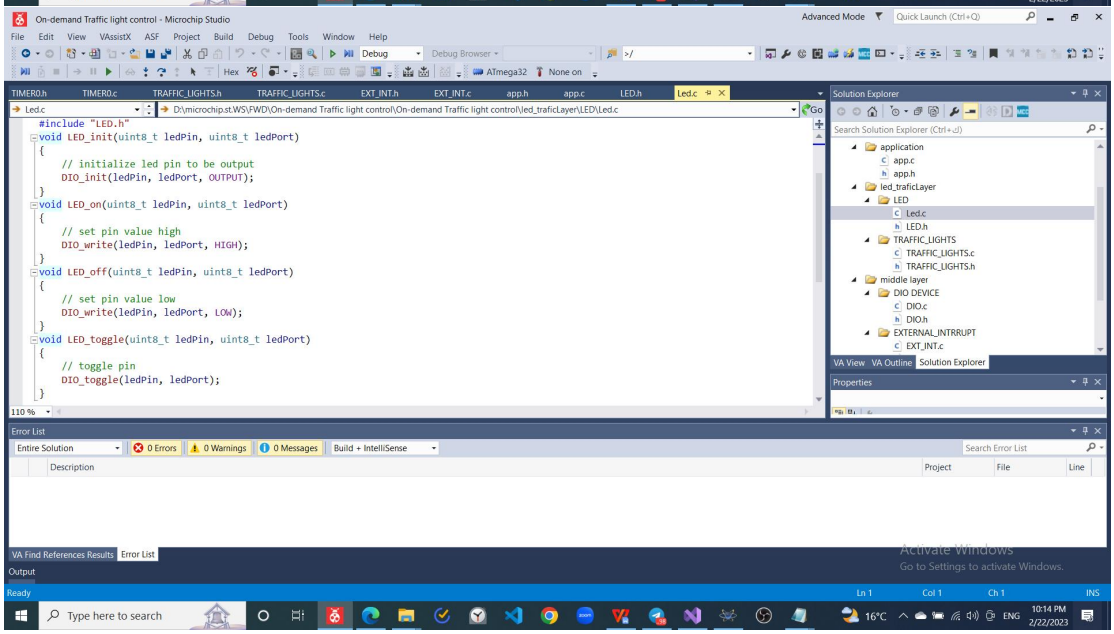
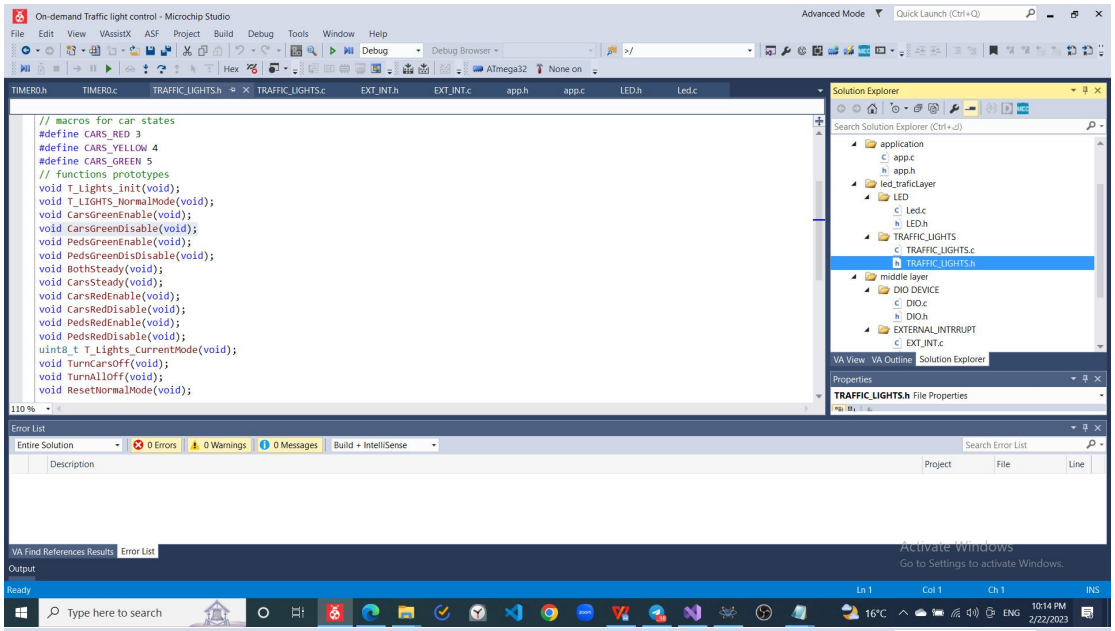
Layer 5: led





Layer 6: full traffic light control


On-demand Traffic light control - Microchip Studio
TRAFFIC_LIGHTS.h
TRAFFIC_LIGHTS.c
// macros for car states
#define CARS_RED 3
#define CARS_YELLOW 4
#define CARS_GREEN 5
// functions prototypes
void T_Lights_init(void);
void T_LIGHTS_NormalMode(void);
void CarsGreenEnable(void);
void CarsGreenDisable(void);
void PedsGreenEnable(void);
void PedsGreenDisDisable(void);
void BothSteady(void);
void CarsSteady(void);
void CarsRedEnable(void);
void CarsRedDisable(void);
void PedsRedEnable(void);
void PedsRedDisable(void);
uint8_t T_Lights_CurrentMode(void);
void TurnCarsOff(void);
void TurnAlloff(void);
void ResetNormalMode(void);
Solution Explorer
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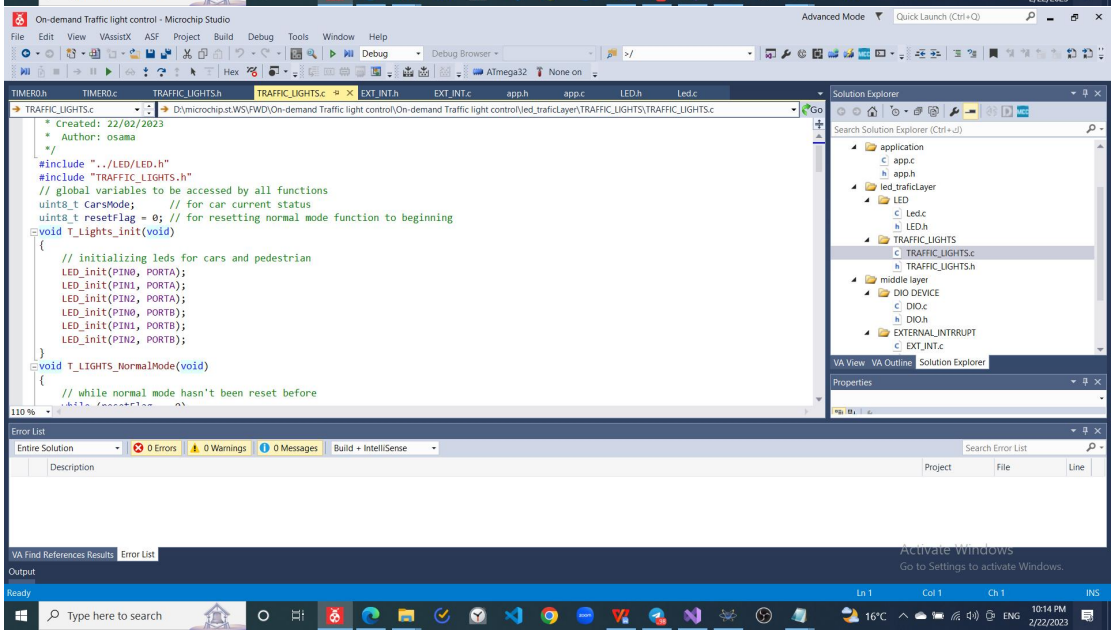
On-demand Traffic light control - Microchip Studio
TRAFFIC_LIGHTS.c
D:\microchip.st.WS\FWD\On-demand Traffic light control\On-demand Traffic light control\led_traficLayer\TRAFFIC_LIGHTS\TRAFFIC_LIGHTS.c
* Created: 22/02/2023
* Author: osama
#include "../LED/LED.h"
#include "TRAFFIC_LIGHTS.h"
// global variables to be accessed by all functions
uint8_t CarsMode;   // for car current status
uint8_t resetFlag = 0; // for resetting normal mode function to beginning
void T_Lights_init(void)
{
// initializing leds for cars and pedestrian
LED_init(PIN0, PORTA);
LED_init(PIN1, PORTA);
LED_init(PIN2, PORTA);
LED_init(PIN0, PORTB);
LED_init(PIN1, PORTB);
LED_init(PIN2, PORTB);
}
void T_LIGHTS_NormalMode(void)
{
// while normal mode hasn't been reset before
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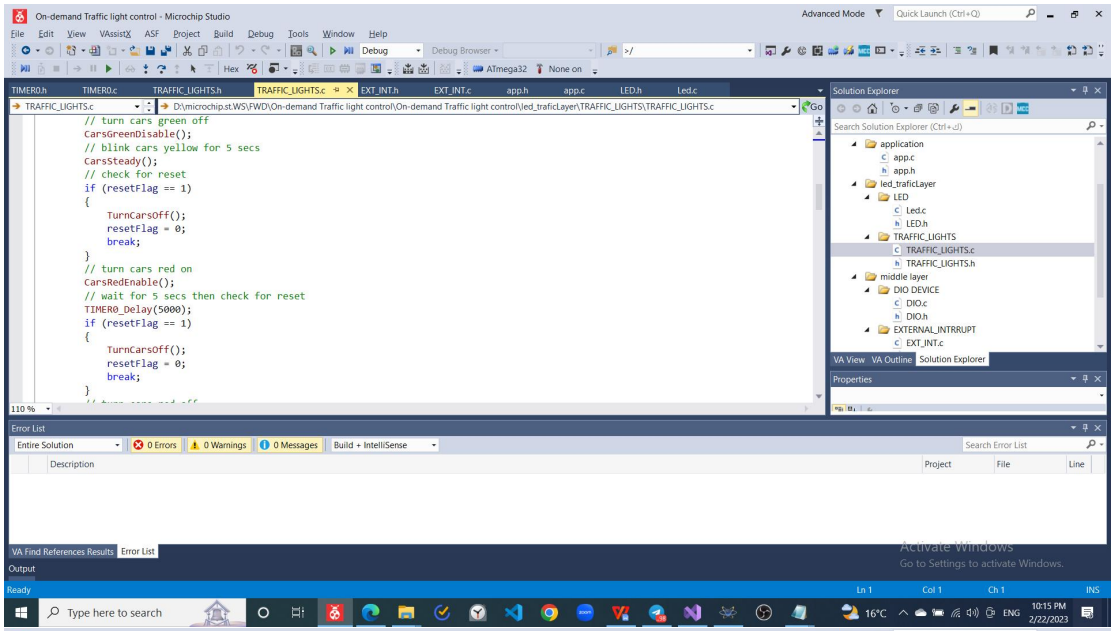
On-demand Traffic light control - Microchip Studio
// turn cars green off
CarsGreenDisable();
// blink cars yellow for 5 secs
CarsSteady();
// check for reset
if (resetFlag == 1)
{
TurnCarsOff();
resetFlag = 0;
break;
}
// turn cars red on
CarsRedEnable();
// wait for 5 secs then check for reset
TIMER0_Delay(5000);
if (resetFlag == 1)
{
TurnCarsOff();
resetFlag = 0;
break;
}
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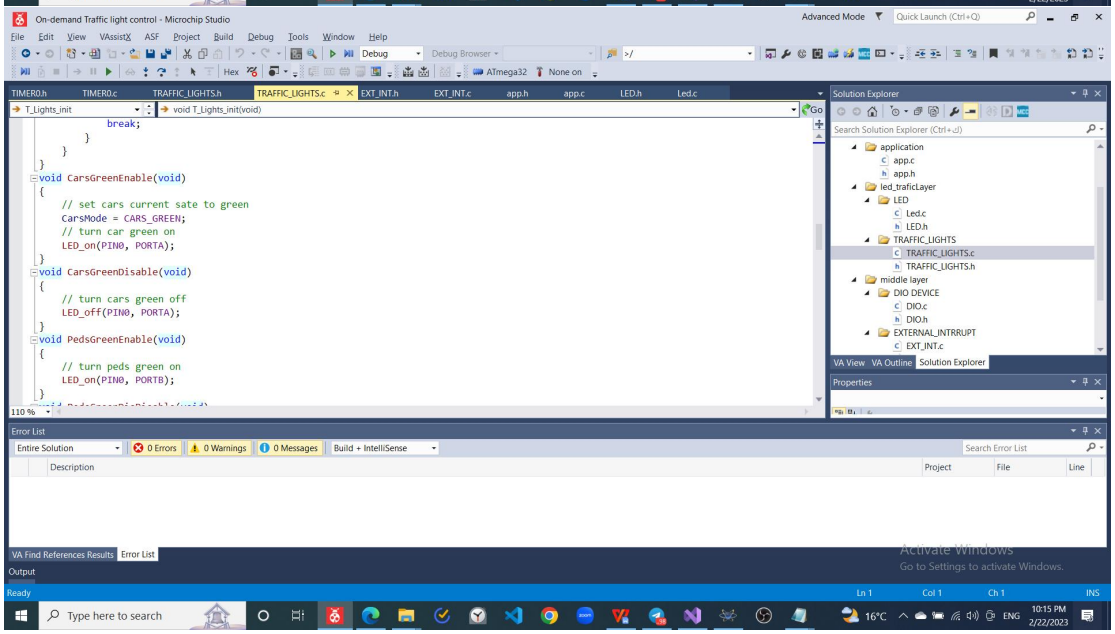
On-demand Traffic light control - Microchip Studio
break;
}
}
}
void CarsGreenEnable(void)
{
// set cars current sate to green
CarsMode = CARS_GREEN;
// turn car green on
LED_on(PIN0, PORTA);
}
void CarsGreenDisable(void)
{
// turn cars green off
LED_off(PIN0, PORTA);
}
void PedsGreenEnable(void)
{
// turn peds green on
LED_on(PIN0, PORTB);
}
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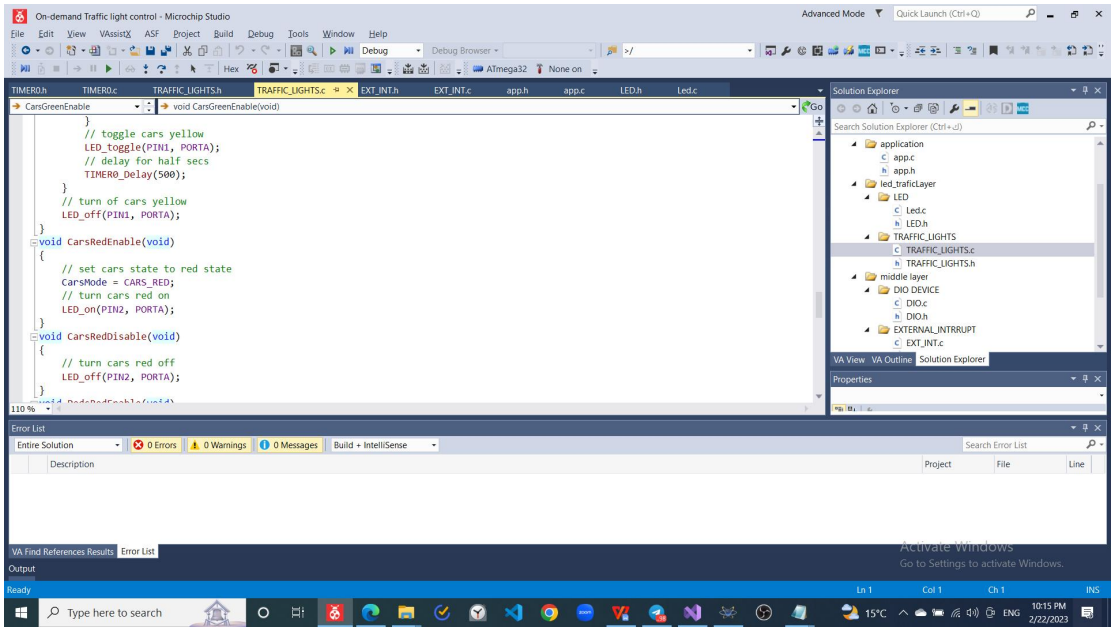
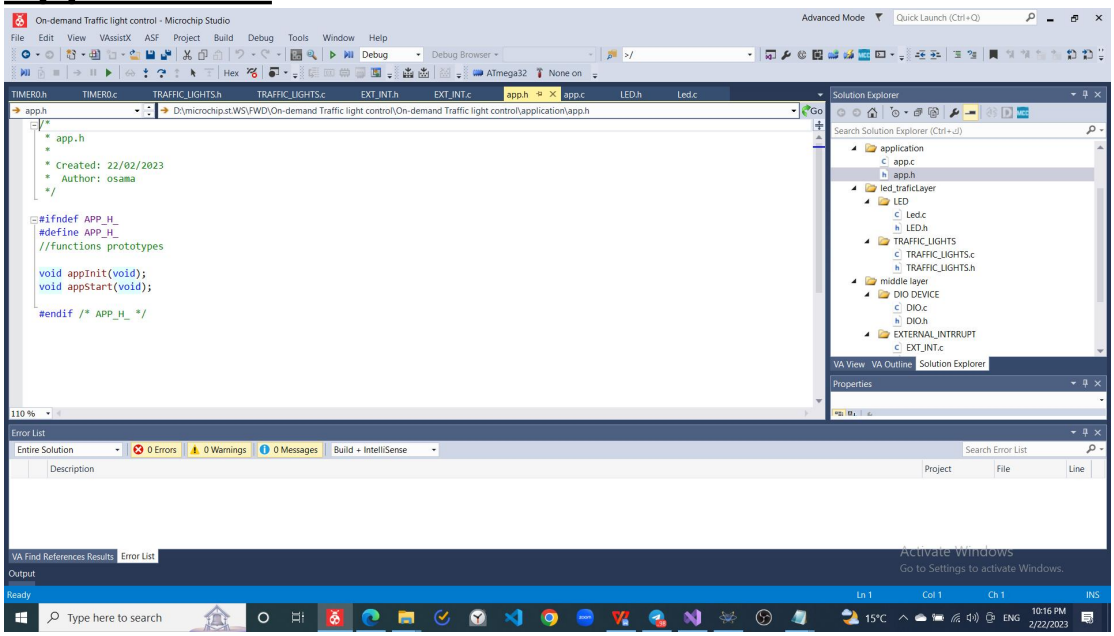
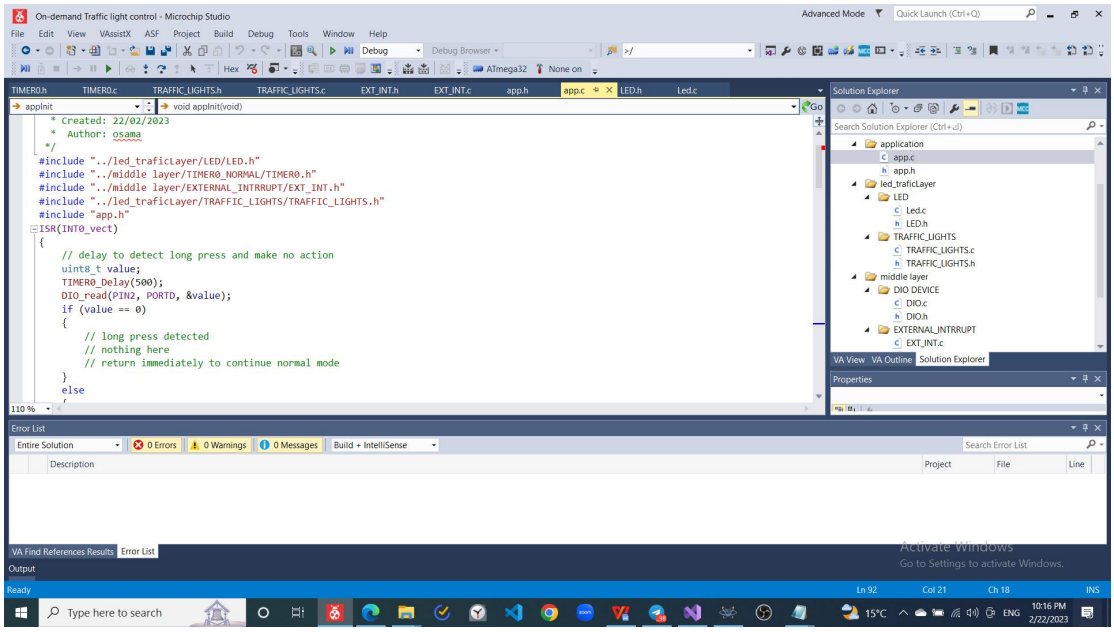


Application:




On-demand Traffic light control - Microchip Studio
Advanced Mode
Quick Launch (Ctrl+Q)
File Edit View VAssistX ASF Project Build Debug Tools Window Help
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Debug Browser
ATmega32
None on
TIMER0.h TIMER0.c TRAFFIC_LIGHTS.h TRAFFIC_LIGHTS.c EXT_INT.h EXT_INT.c app.h app.c LED.h Led.c
appInit
void appInit(void)
* Created: 22/02/2023
* Author: osama
*/
#include "../led_traficLayer/LED/LED.h"
#include "../middle layer/TIMER0_NORMAL/TIMER0.h"
#include "../middle layer/EXTERNAL_INTRRUPT/EXT_INT.h"
#include "../led_traficLayer/TRAFFIC_LIGHTS/TRAFFIC_LIGHTS.h"
#include "app.h"
ISR(INT0_vect)
{
// delay to detect long press and make no action
uint8_t value;
TIMER0_Delay(500);
DIO_read(PIN2, PORTD, &value);
if (value == 0)
{
// long press detected
// nothing here
// return immediately to continue normal mode
}
else
Solution Explorer
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0 Warnings
0 Messages
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Ready
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Ch 18
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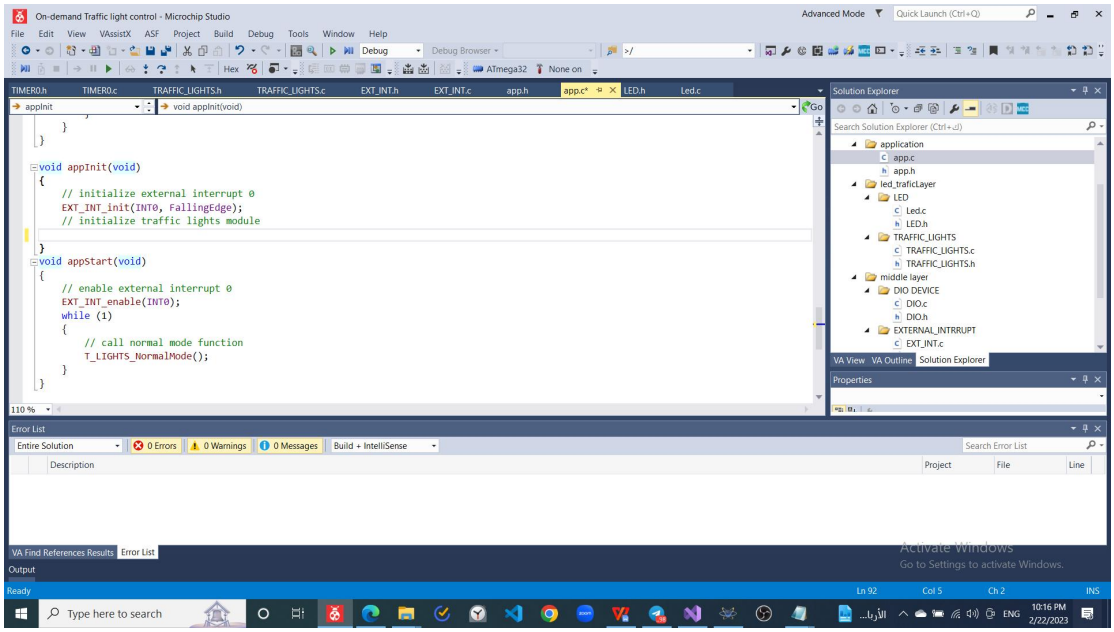
ENG
10:16 PM
2/22/2023


On-demand Traffic light control - Microchip Studio
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None on
TIMER0.h TIMER0.c TRAFFIC_LIGHTS.h TRAFFIC_LIGHTS.c EXT_INT.h EXT_INT.c app.h app.c* LED.h Led.c
appInit
void appInit(void)
}
}
void appInit(void)
{
// initialize external interrupt 0
EXT_INT_init(INT0, FallingEdge);
// initialize traffic lights module
}
void appStart(void)
{
// enable external interrupt 0
EXT_INT_enable(INT0);
while (1)
{
// call normal mode function
T_LIGHTS_NormalMode();
}
}
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Ready
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Col 5
Ch 2
INS
Type here to search
ENG
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