System Layers:

- Microcontroller (AtMega32)

-MCAL (DIO, Timer , Interrupt)

-EUCAL (Led , Button)

-Utilities (Bit_Math , STD_TYPES)

MCAL:

Dio :

DIO.C :

1- void DIO_SetPinDirection (u8 u8cpy_Port , u8 u8cpy_PinNo , u8 u8cpy_Mood) ;

Input : The port , The Pin , The mood (Output , Input)

2- void DIO_SetPinValue (u8 u8cpy_Port , u8 u8cpy_PinNo , u8 u8cpy_Value) ;

Input : The port , The pin , The value (Hight or low)

3- void DIO_TogglePinValue (u8 u8cpy_Port , u8 u8cpy_PinNo) ;

Input : The port , The pin

This Function is used to Toggle the value.

4- u8 DIO_GetPinValue (u8 u8cpy_Port , u8 u8cpy_PinNo) ;

Input : The port , The pin

Output : Returns the pin value in integer u8

5- u8 DIO_GetPortValue (u8 u8cpy_Port)

Input : Port name

Output: Returns port value.

6- void DIO_Int (void) ;
input: void

Output: void

It initializes the dio direction ports .

DIO_Config.h :

#define of the ports used in function DIO_INT to be able to set direction more easily.

Timer:

Timer.c:

1- void TimerNormalModeStart (void) ;

this function intlizes the registers needed in timer

2- void Timer0_stop(void) ;

setting the registers to stop the timer

3- void Timer0Genaral (u16 ChoosenPrescaler, u32 OverFlowsNumber) ;

input : the prescaler , number of overflows

4- void DelayingFor5Sec(void) ;

the function is used to delay for 5 seconds

Interrupt :

- void Interrupt_Init(void) ;

Used to initializes the interrupt .

EUCAL :

Button.c :

- En_ButtonRead ButtonRead (u8 ButtonPort , u8 Buttonpin) ;

Returns : Pressed or Not

Input : Port , Pin
- it checks the DIO Pin Value to see it it's pressed or not
this DIO pin is used as input

LED.c :

1- void Led_On (u8 LedPort , u8 LedPin) ;

input : led port and led pin

this function turns the led on

2- void Led_Off (u8 LedPort , u8 LedPin) ;

input : led port and led pin

this function turns the led off

3- void Led_Toggle (u8 LedPort , u8 LedPin) ;

input : led port and led pin

Description : used to toggle the value in DIO

4- void Led_Blink5Sec (u8 LedPort , u8 LedPin) ;

Description: this function is used to blink led for 5 sec

input : led port and led pin

outputs: the blinking

return: none

5- void TwoLeds_Blink5Sec (u8 LedPort , u8 LedPin , u8 Led2Port , u8 Led2Pin) ;

input : 2 leds port , 2 leds pins

this function is used to blink 2 leds for 5 secs

6- void LedsOff (void) ;

this function is used to turn all leds off

Application:

1- void App_Int (void) ;

initializes the DIO, Timer, Interrupt

2- void NormalMode (void) ;

Cars' LEDs will be changed every five seconds starting from Green then yellow then red then yellow then Green.

The Yellow LED will blink for five seconds before moving to Green or Red LEDs

3- void PasMode (void) ;

this function sees if the interrupt was during the green , yellow or red light .

if during red , it calls back PasRed .

if during Green/Yellow , it calls Back the green/Yellow function

at the end :
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.

4- void PasRed (void) ;

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.

5- void PasGreenOrYellow (void) ;

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.

6- void App_Start (void) ;

Starts the application’s normal mode ,

All includes files :

1- It has function prototypes

2- The registers addresses

3- It has the #defines of any value used (No magic numbers)

Lights On demand

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