

# Design a Small OS

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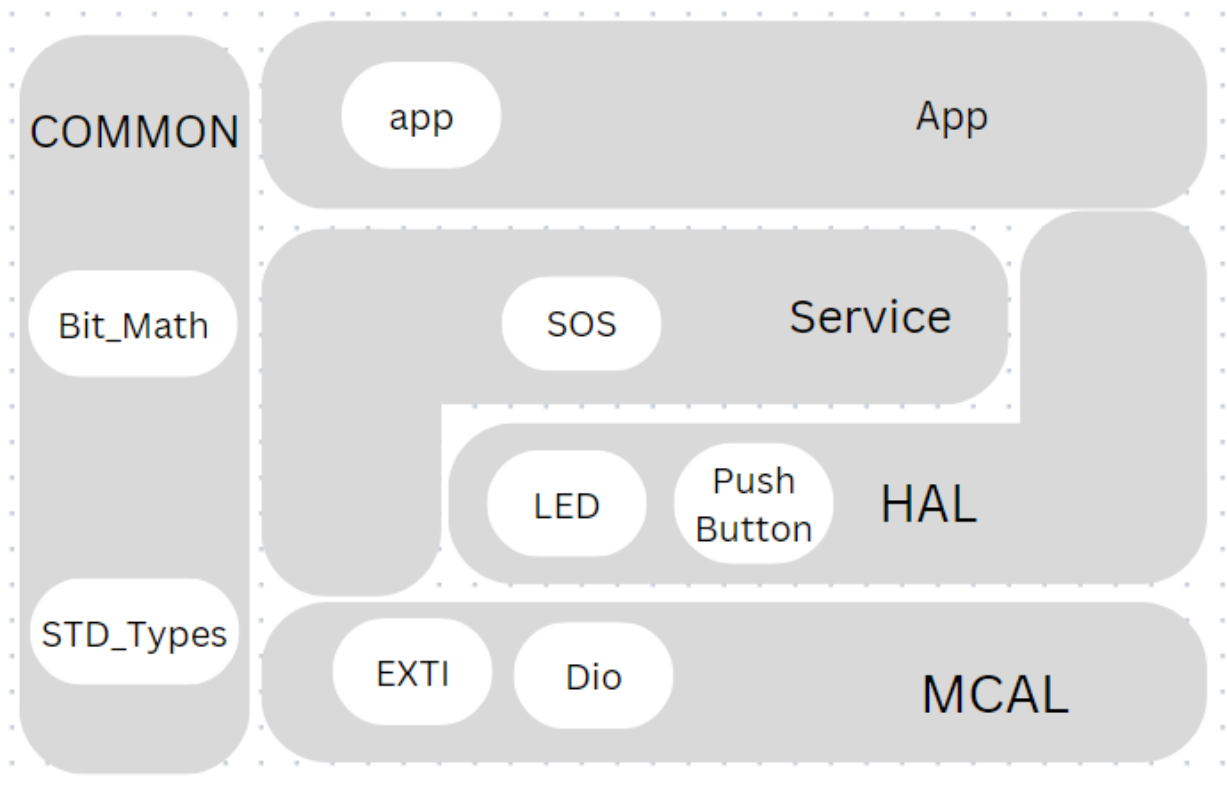
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## 1. Introduction:

This project aims to create a small and efficient RTOS tailored for resource-constrained systems. SOS is designed to be flexible, easy to use, and well-optimized for embedded applications where real-time task management is crucial. The system employs a preemptive priority-based scheduling algorithm to ensure efficient and deterministic task execution.

## 2. High Level Design:

### 2.1 Layered Architecture:



### 2.2 Modules Description:

- **DIO:**  
controls GPIO pins.
- **Timer:**  
controls timing of the tasks in the program .
- **EXTI:**  
triggered by the push button to start or stop the scheduler.

- LED:  
controls led state in the program.
- Button:  
controls start and stop of the system.
- SOS:  
operating system that manages application process.
- App:  
Contains main logic of the code.

## 2.3 Drivers' Documentation:

### 2.3.1 DIO:

```

/*
 * Initializes a specific digital pin based on the provided configuration.
 * @param config_ptr: Pointer to the configuration structure for the pin.
 * @return: function error state.
 */
EN_dioError_t DIO_Initpin(ST_DIO_ConfigType *config_ptr);

/*
 * Writes a digital value (HIGH or LOW) to a specific digital pin on a given port.
 * @param port: Port to which the pin belongs.
 * @param pin: Specific pin to write to.
 * @param value: Value to be written (HIGH or LOW).
 * @return: function error state.
 */
EN_dioError_t DIO_WritePin(EN_dio_port_t port, EN_dio_pin_t pin, EN_dio_value_t value);

/*
 * Reads the digital value from a specific digital pin on a given port and stores it in the specified location.
 * @param port: Port from which the pin should be read.
 * @param pin: Specific pin to read.
 * @param value: Pointer to store the read value.
 * @return: function error state.
 */
EN_dioError_t DIO_read(EN_dio_port_t port, EN_dio_pin_t pin, u8 *value);

/*
 * Toggles the state of a specific digital pin on a given port.
 * @param port: Port to which the pin belongs.
 * @param pin: Specific pin to toggle.
 * @return: function error state.
 */
EN_dioError_t DIO_toggle(EN_dio_port_t port, EN_dio_pin_t pin);

```

## 2.3.2 Timer:

```

/**
 * @brief Initializes TIMER0 in Normal mode and optionally enables interrupts.
 * This function initializes TIMER0 in Normal mode. If the 'en_a_interrputEnable' parameter
 * is set to EN_TIMER_INTERRUPT_ENABLE, it enables TIMER0 interrupt. If set to
 * EN_TIMER_INTERRUPT_DISABLE, interrupts are not enabled.
 * @param en_a_interrputEnable: Specifies whether to enable TIMER0 interrupts or not.
 * @return EN_TIMER_ERROR_T: An error code indicating the success or failure of the initialization.
 */

EN_TIMER_ERROR_T TIMER_timer0NormalModeInit(EN_TIMER_INTERRUPT_T en_a_interrputEnable);

/**
 * @brief Starts TIMER0 with the specified prescaler value.
 * This function starts TIMER0 with the given prescaler value 'ul6_a_prescaler'.
 * @param ul6_a_prescaler: The prescaler value to set for TIMER0.
 * @return EN_TIMER_ERROR_T: An error code indicating the success or failure of starting TIMER0.
 */

EN_TIMER_ERROR_T TIMER_timer0Start(ul6 ul6_a_prescaler);

/**
 * @brief Stops TIMER0.
 * This function stops TIMER0.
 * @param None.
 * @return None.
 */

void TIMER_timer0Stop(void);

/**
 * @brief Sets an overflow (OVF) callback function for TIMER2.
 * This function allows you to specify a custom callback function 'void_a_pfOvfInterruptAction'
 * that will be executed when TIMER2 overflows.
 * @param void_a_pfOvfInterruptAction: A function pointer to the custom overflow callback function.
 * @return EN_TIMER_ERROR_T: An error code indicating the success or failure of setting the callback.
 */

EN_TIMER_ERROR_T TMR_ovfSetCallback(void (*void_a_pfOvfInterruptAction)(void));

```

### 2.3.3 LED:

```

    /*struct to store led attributes*/
typedef struct LEDS{
    u8 port;
    u8 pin;
    u8 state;
}LEDS;

/*initializes led according to given arguments */
EN_ledError_t HLED_init(LEDS *led);

/*function to turn the LED on*/
EN_ledError_t HLED_on(LEDS *led);

/*function to turn the LED off*/
EN_ledError_t HLED_off(LEDS *led);

/*function to toggle the LED state*/
EN_ledError_t HLED_toggle(LEDS *led);

```

### 2.3.4 Push Button:

```

/*
Function: PUSH_BTN_initialize
Description: Initializes a push button based on the configuration settings specified in the input parameter.
Overall, the PUSH_BTN_initialize function provides a way to initialize a push button based on the specified
configuration settings. By using this function, the software can ensure that the pin used by the push button
is configured correctly and the push button is ready for use.
*/
EN_pushBTNErr_t PUSH_BTN_initialize();

/*
Function      : PUSH_BTN_read_state
Description   : Reads the current en_g_state of a push button and returns its value.

Parameters:
- btn        : A pointer to an ST_PUSH_BTN_t struct that contains the configuration settings and current en_g_state
               information for the push button.
- btn_state  : A pointer to an EN_PUSH_BTN_state_t enum where the current en_g_state of the push button
               will be stored.

Overall, the PUSH_BTN_read_state function provides a way to read the current en_g_state of a push button and return
its value. By using this function, the software can determine whether the push button is currently pressed or
released and take appropriate action based on its en_g_state.
*/
EN_pushBTNErr_t PUSH_BTN_read_state(u8 btnNumber, EN_PUSH_BTN_state_t *btn_state);

```

## 2.3.5 External Interrupt:

```

/*
Function: EXT_vINTERRUPT_Init
Description: Initializes an external interrupt on a micro-controller with the
            specified configuration settings.

Parameters:
- EXT_INTx : A pointer to an ST_EXT_INTERRUPTS_CFG struct that contains the configuration settings
            for the external interrupt.

Overall, the EXT_vINTERRUPT_Init function provides a way to initialize an external interrupt on a
micro-controller with the desired configuration settings. By using this function, the software can set
up and handle external interrupts based on the specific interrupt number and sense control mode, and
execute the appropriate ISR when the interrupt is triggered.
*/
EXT_INTERRUPT_ErrorCode EXT_vINTERRUPT_Init(void);

/*
Function: EXT_vINTERRUPT_Denit
Description: Deinitializes an external interrupt on a micro-controller with
            the specified configuration settings.

Parameters:
- EXT_INTx : A pointer to an ST_EXT_INTERRUPTS_CFG struct that contains the configuration
            settings for the external interrupt.

Overall, the EXT_vINTERRUPT_Denit function provides a way to deinitialize an external
interrupt on a micro-controller with the desired configuration settings. By using this
function, the software can remove the interrupt and associated ISR, freeing up resources
and ensuring proper operation of the micro-controller.
*/
EXT_INTERRUPT_ErrorCode EXT_vINTERRUPT_Denit(void);

/*function used to set the sense control of the interrupt -ex:rising/falling edge-*/
EXT_INTERRUPT_ErrorCode EXT_vINTERRUPT_setSenseControl(void);

/*function to set up the external interrupt*/
EXT_INTERRUPT_ErrorCode EXT_INTERRUPT_SetInterruptHandler(void);

```

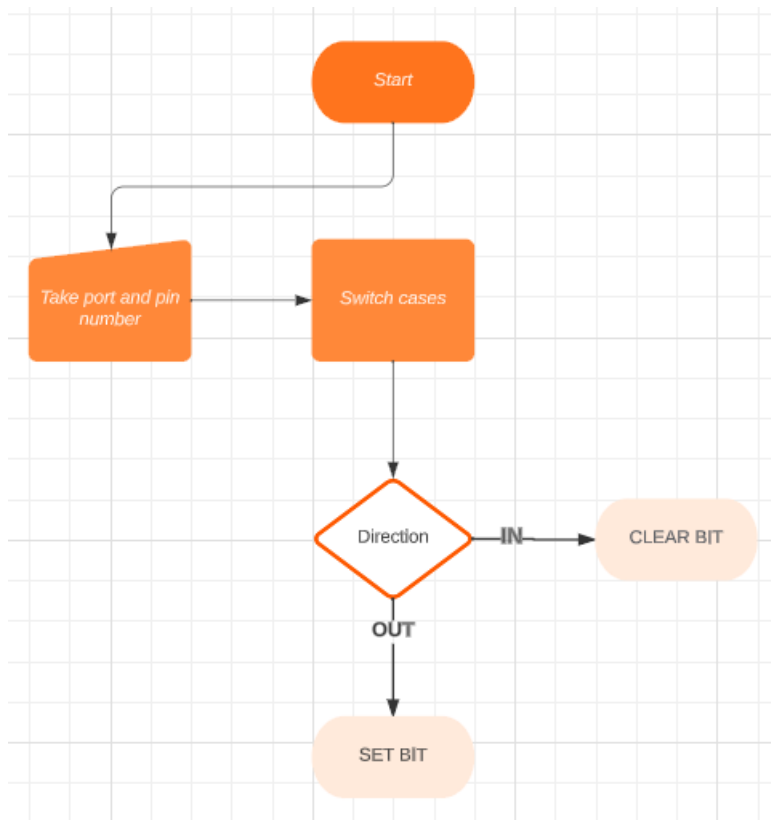


## 3. Low Level Design:

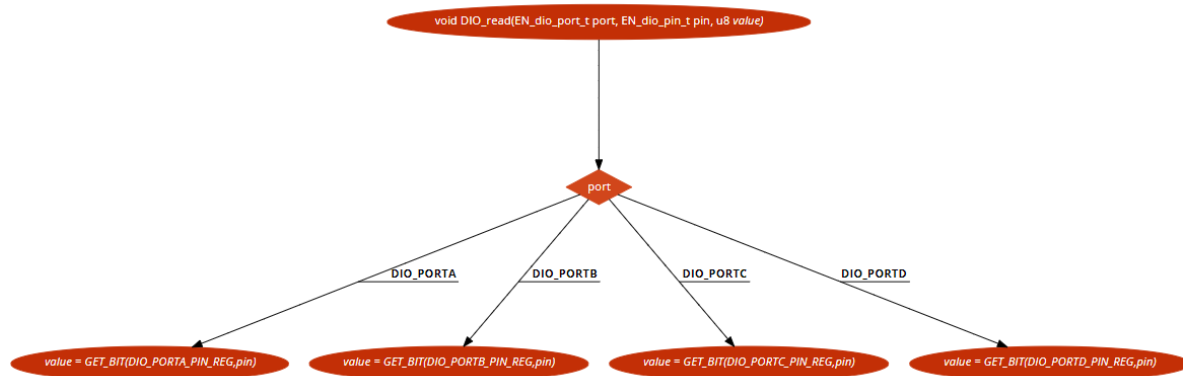
### 3.1 Flowcharts:

#### 3.1.1 DIO:

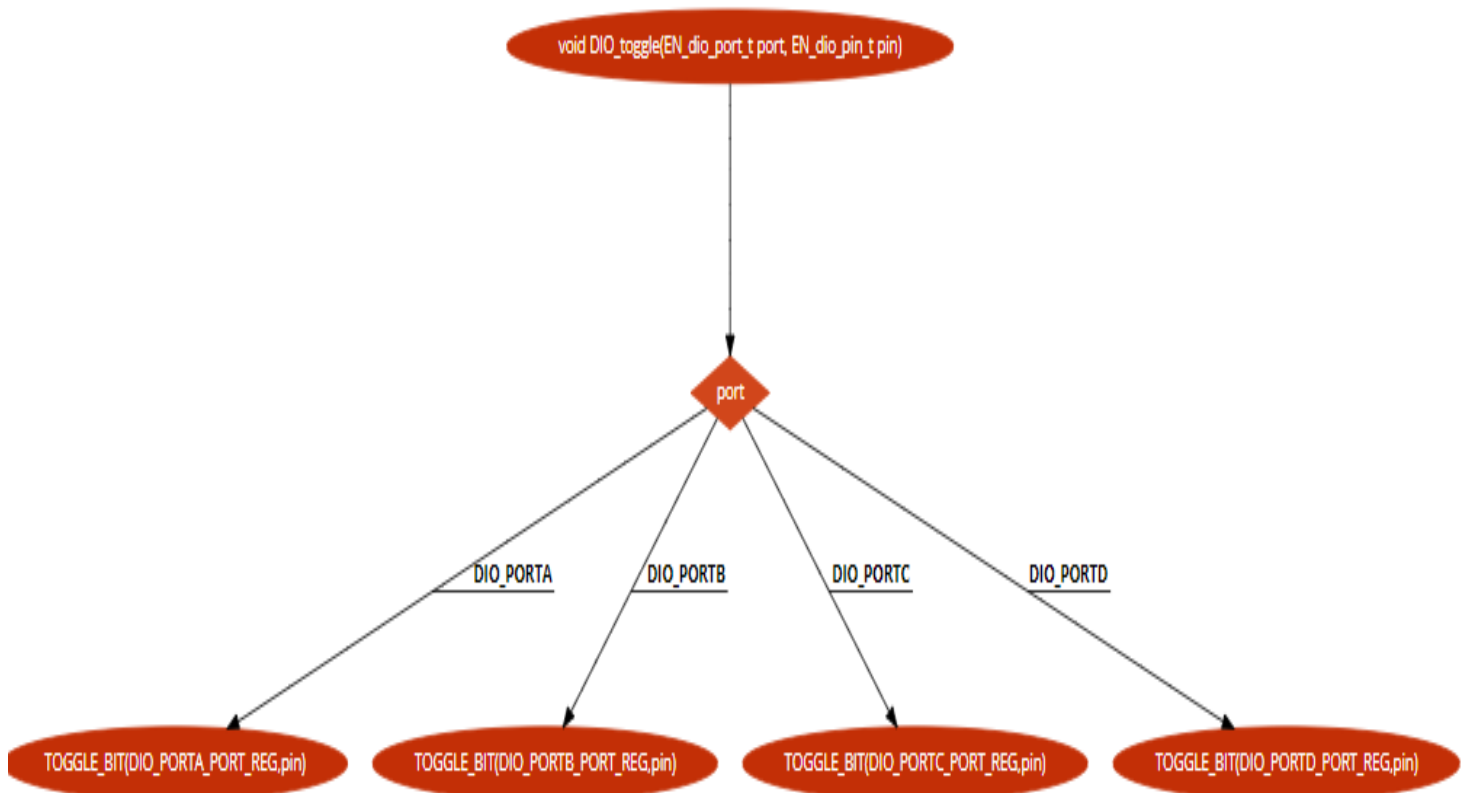
EN\_dioError\_t DIO\_WritePin(EN\_dio\_port\_t port, EN\_dio\_pin\_t pin, EN\_dio\_value\_t value)



EN\_dioError\_t DIO\_read(EN\_dio\_port\_t port, EN\_dio\_pin\_t pin, u8 \*value)

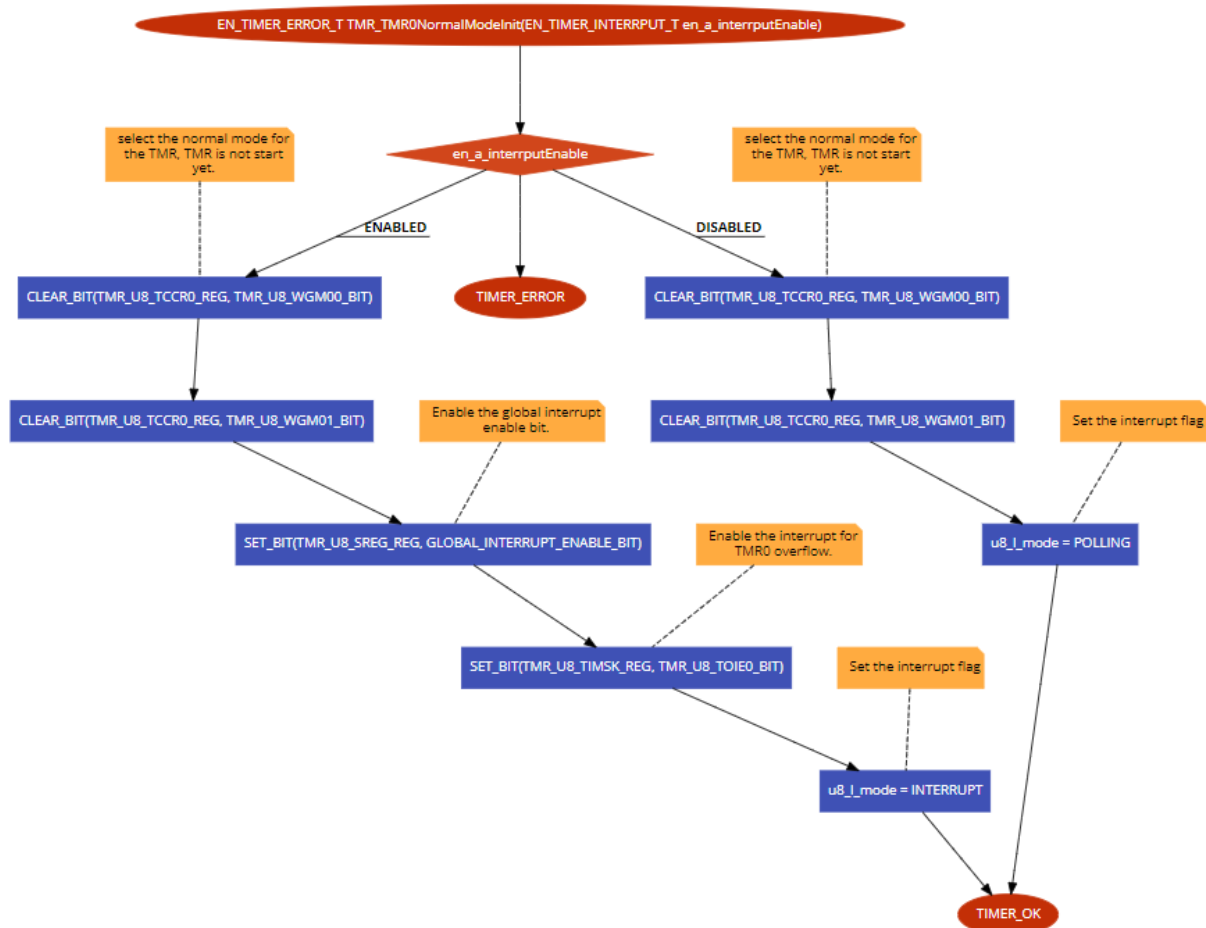


EN\_dioError\_t DIO\_toggle(EN\_dio\_port\_t port, EN\_dio\_pin\_t pin)

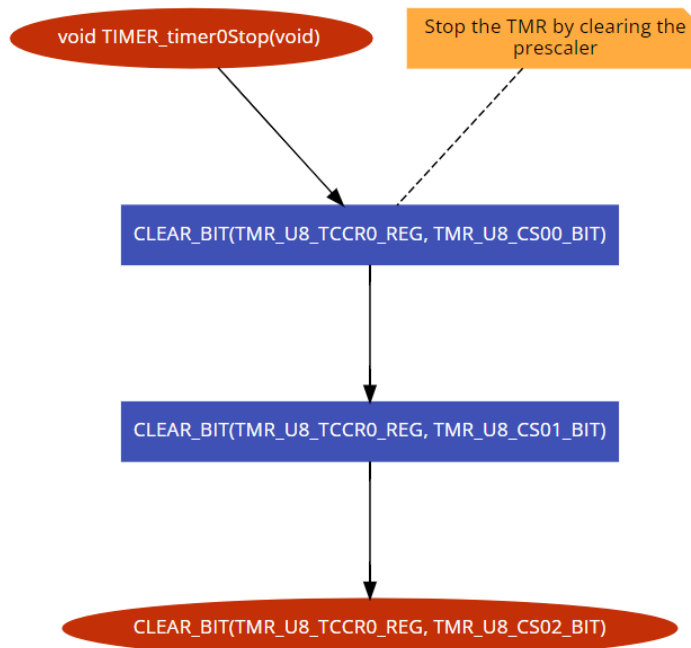


### 3.1.2 Timer:

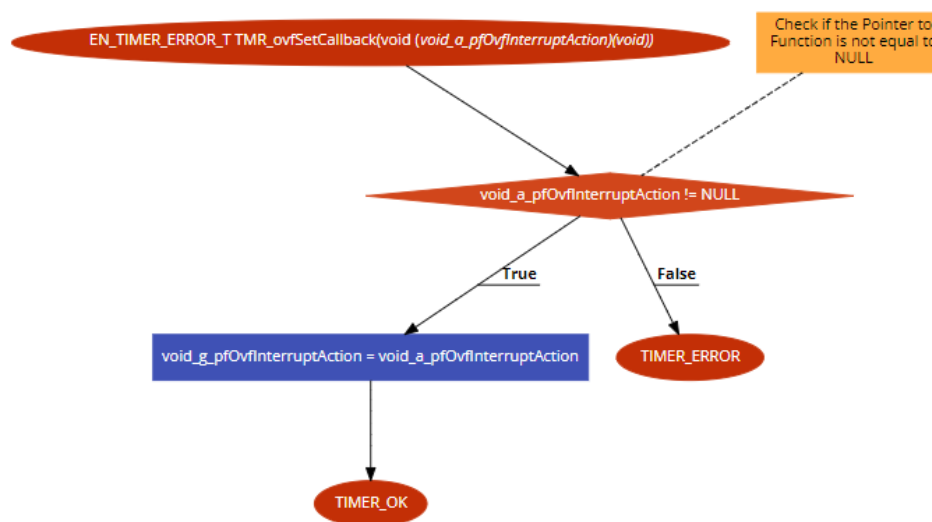
EN\_TIMER\_ERROR\_T TMR\_TMR0NormalModelInit(EN\_TIMER\_INTERRUPT\_T en\_a\_interruptEnable)



EN\_TIMER\_ERROR\_T TIMER\_timer0Stop(void)

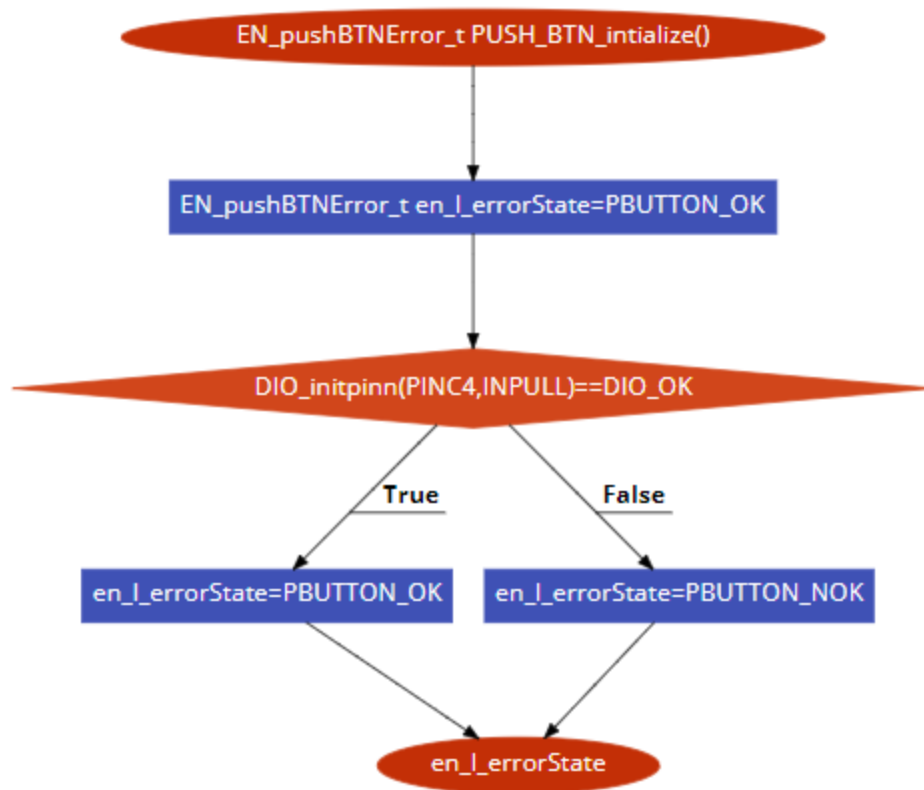


EN\_TIMER\_ERROR\_T TMR\_ovfSetCallback(void (\*void\_a\_pfOvfInterruptAction)(void))

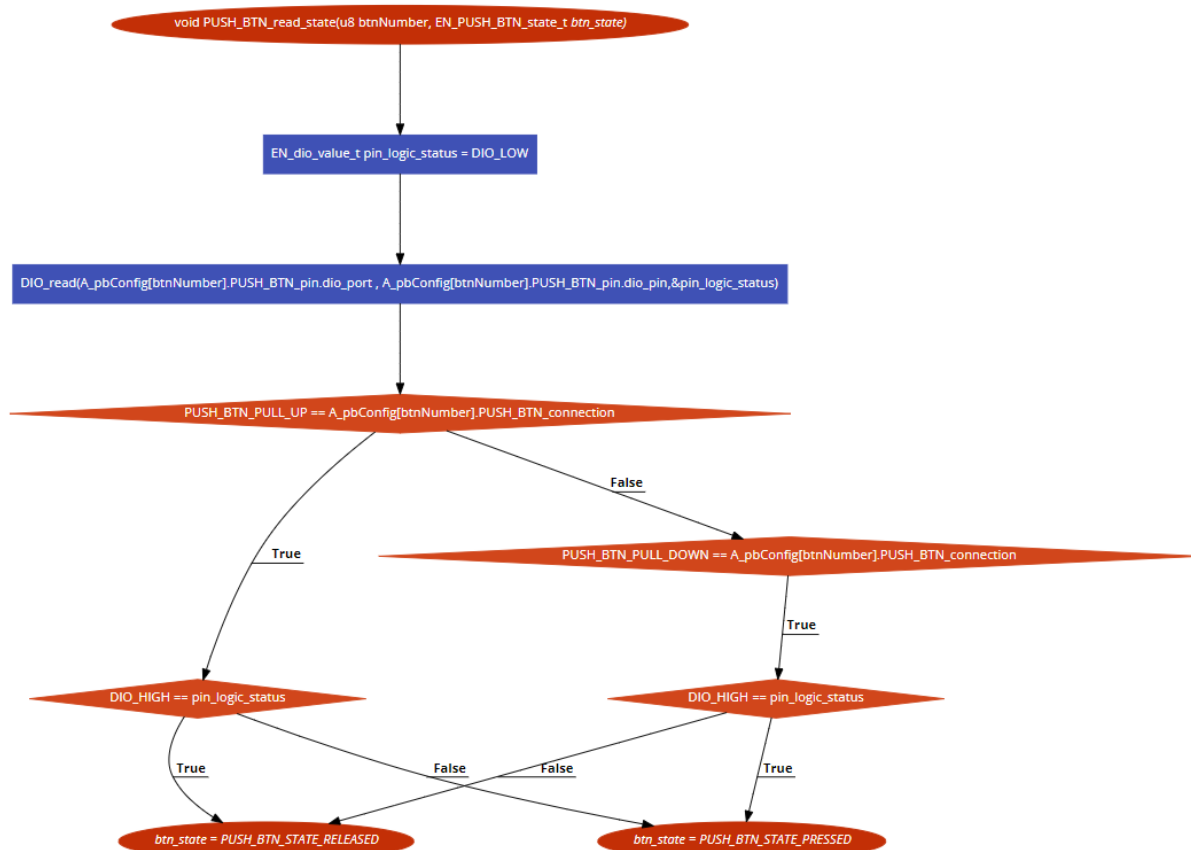


### 3.1.3 Push Button:

EN\_pushBTNErrort PUSH\_BTN\_initialize()

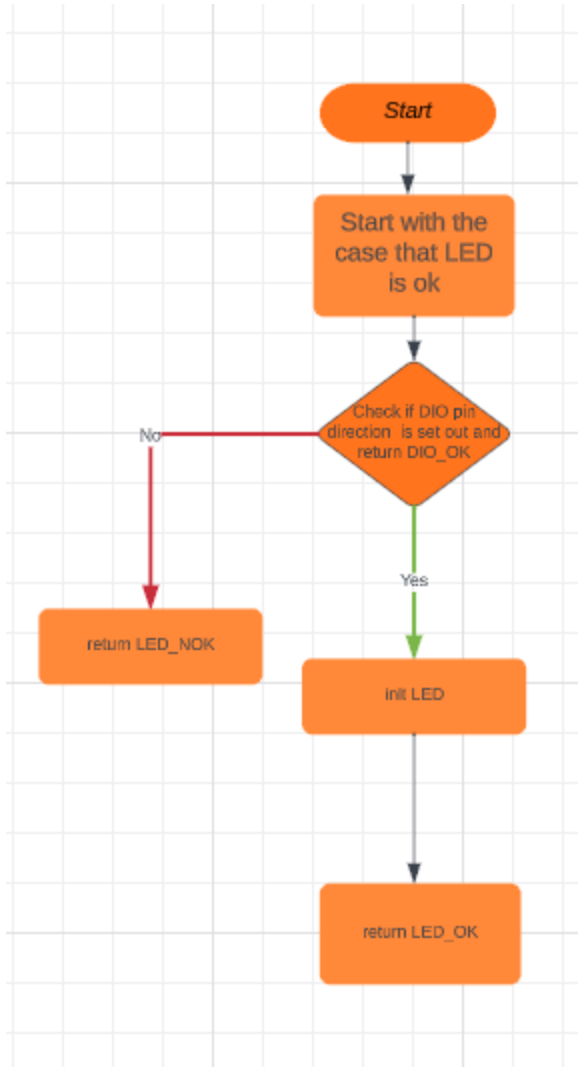


EN\_pushBTNErrort\_t PUSH\_BTN\_read\_state(u8 btnNumber, EN\_PUSH\_BTN\_state\_t \*btn\_state)

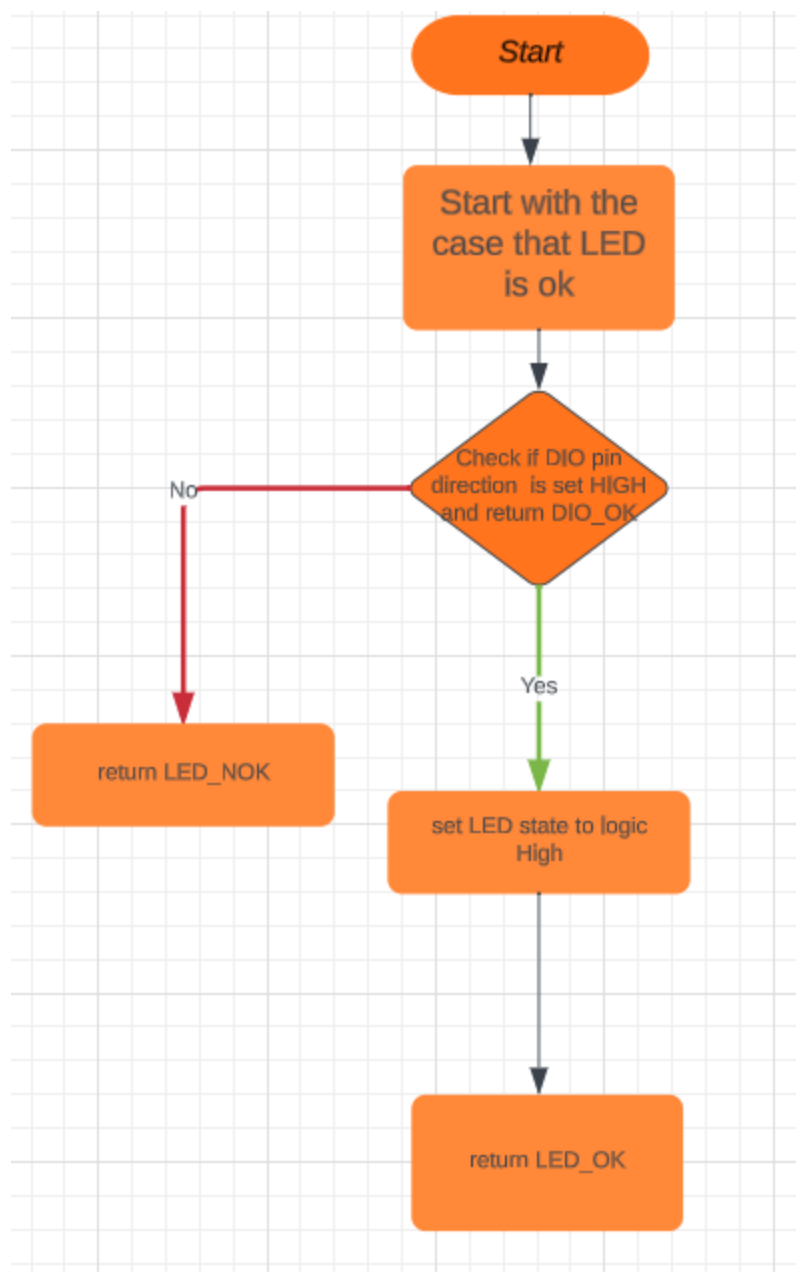


### 3.1.4 LED:

EN\_ledError\_t HLED\_init(LEDs \*led)

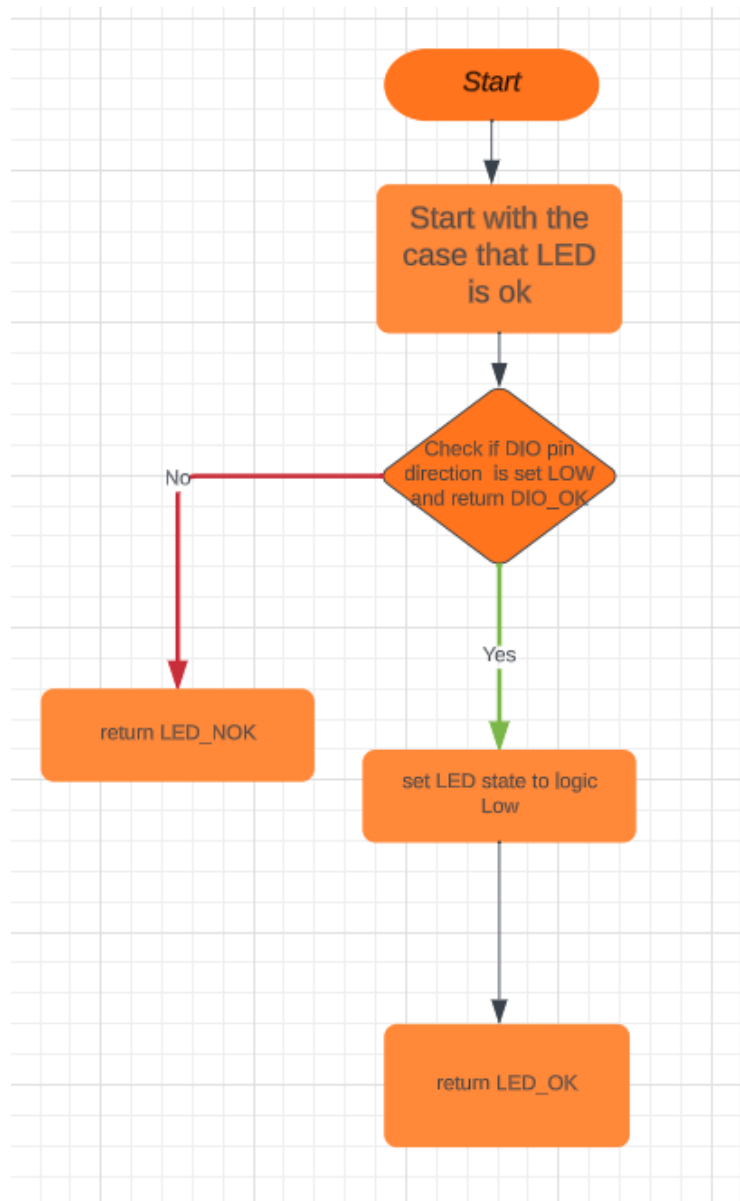


EN\_ledError\_t HLED\_on(LEDs \*led)

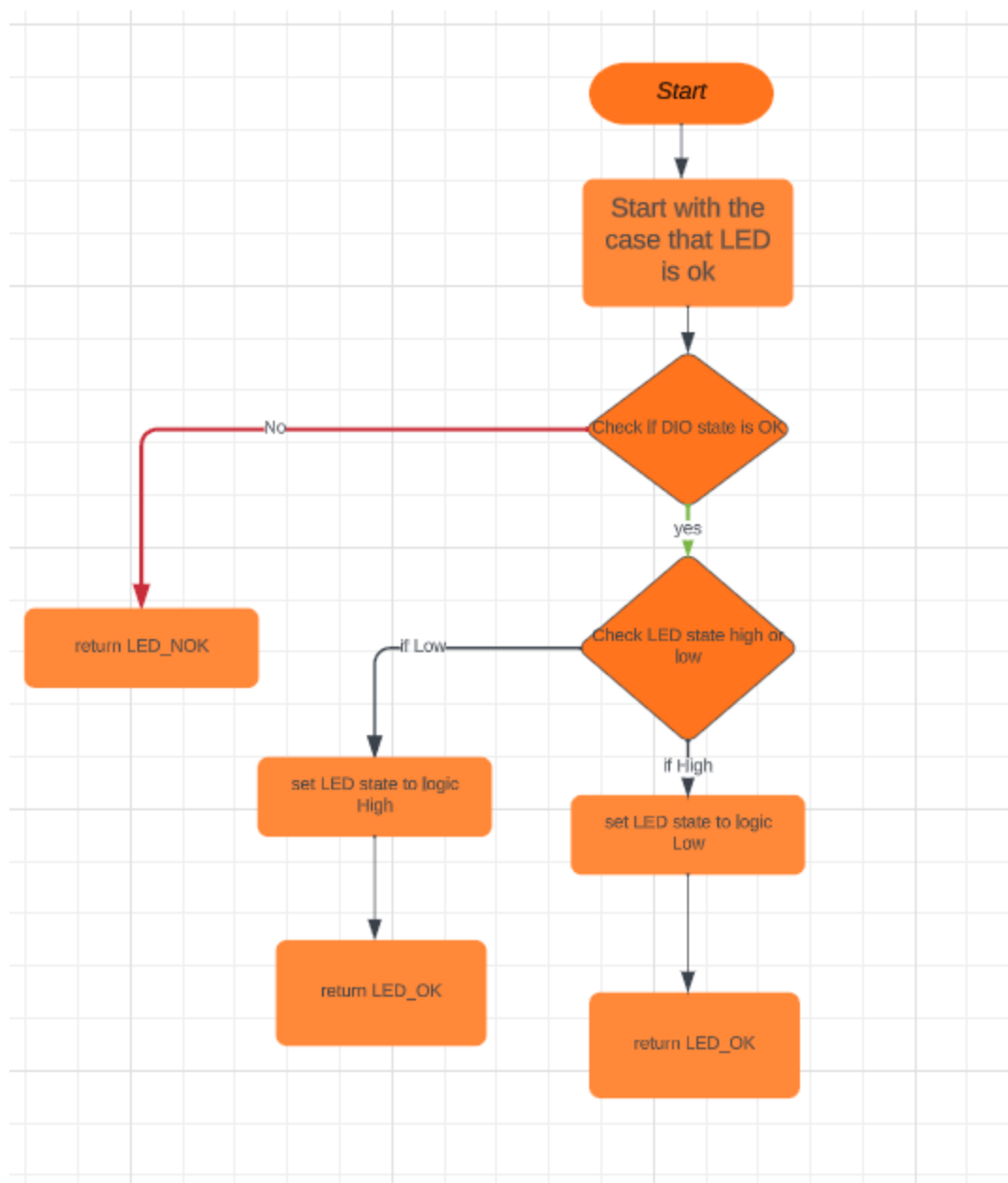




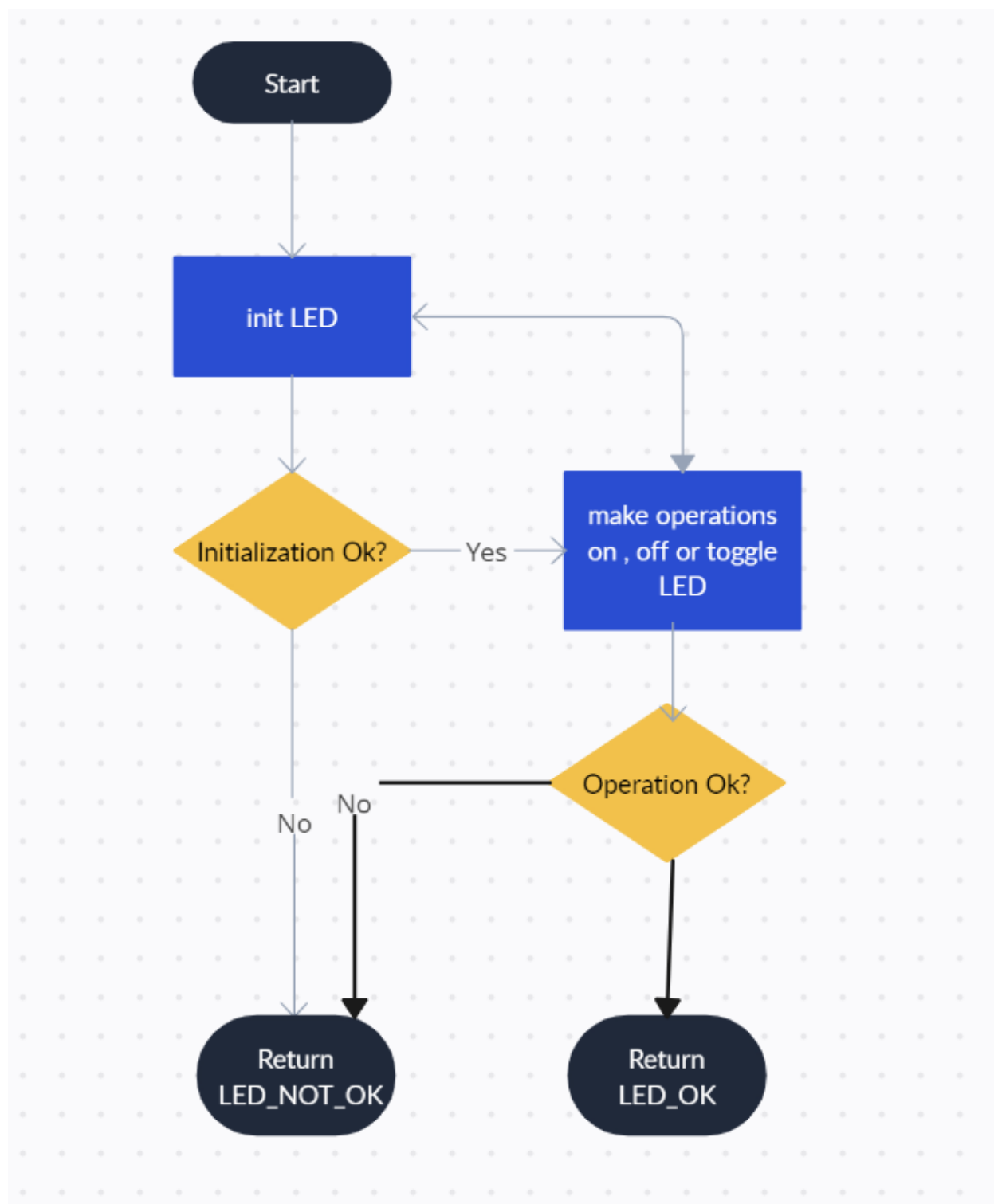
EN\_ledError\_t HLED\_off(LEDs \*led)



EN\_ledError\_t HLED\_toggle(LEDs \*led)

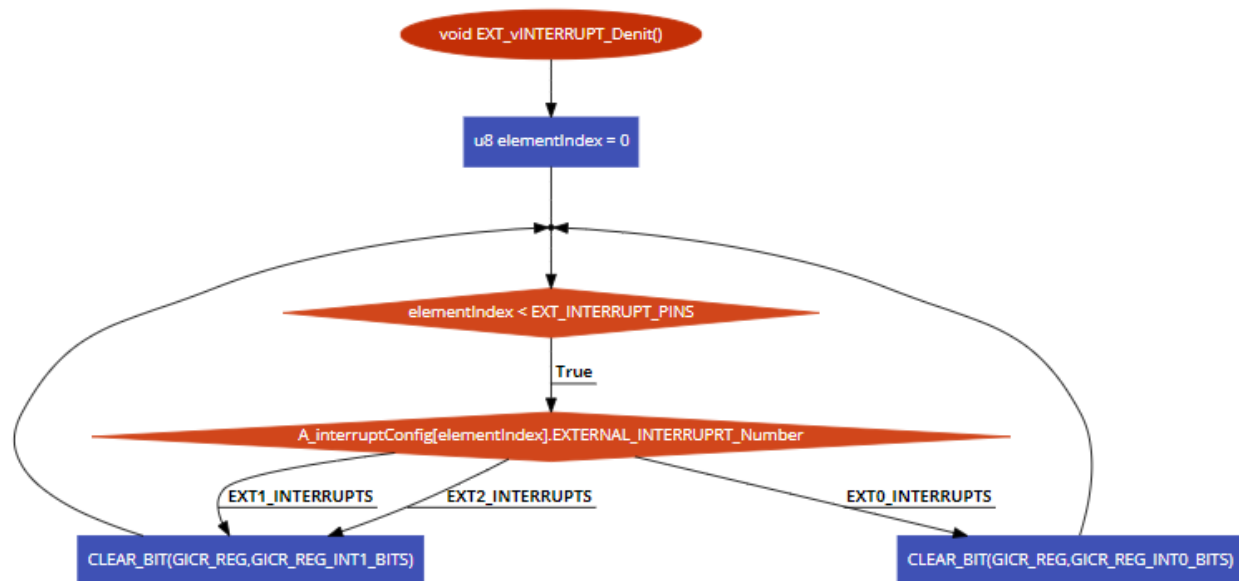


Flowchart for the whole driver:

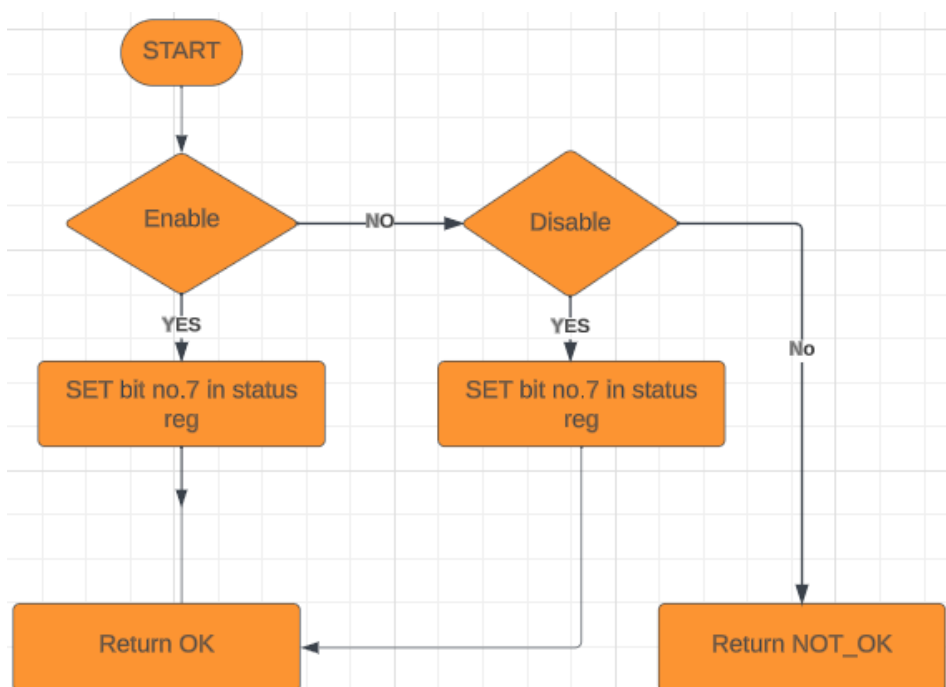


### 3.1.5 External Interrupt:

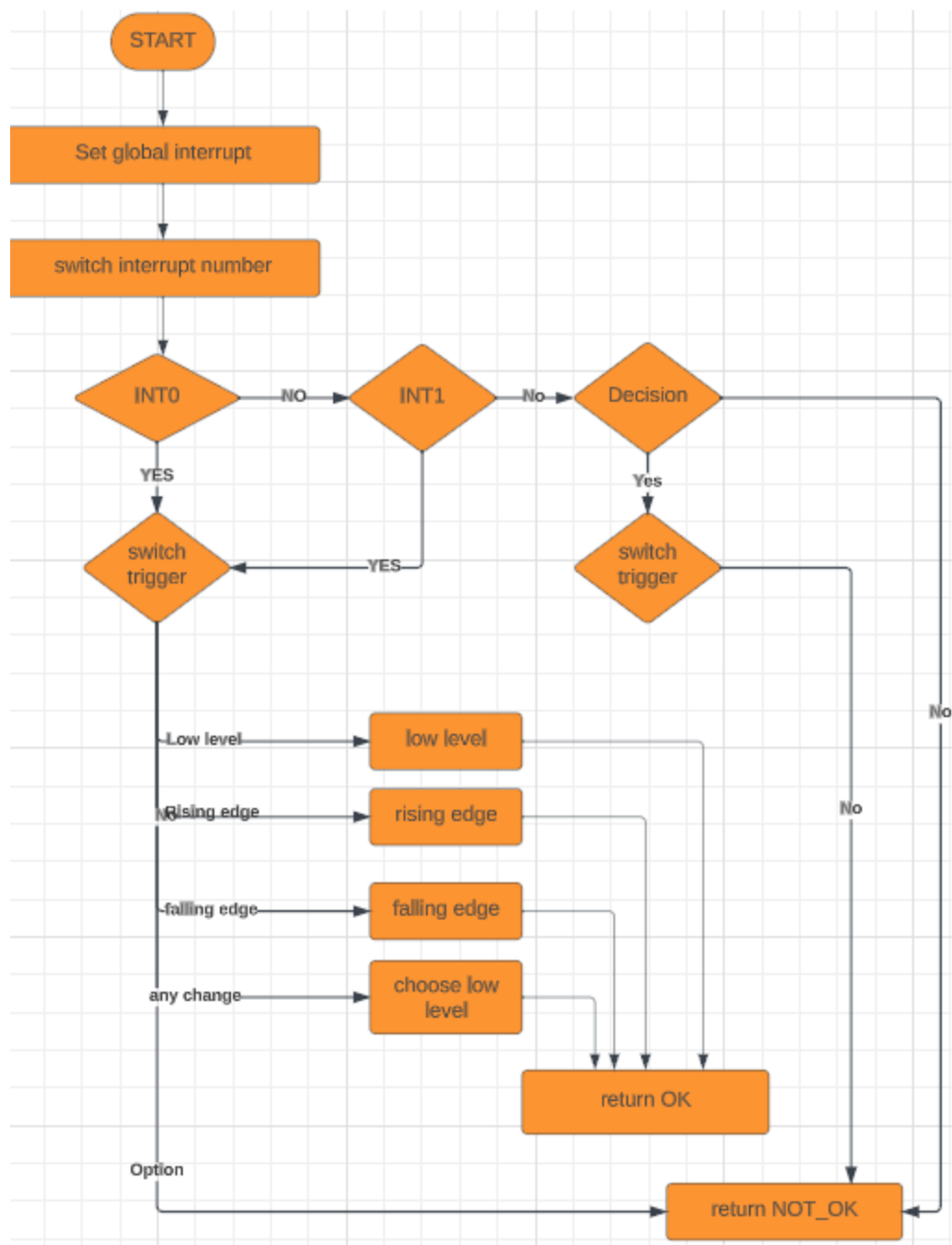
EN\_EXTINT\_ERROR EXT\_vINTERRUPT\_Denit()



EN\_EXTINT\_ERROR EXT\_vINTERRUPT\_Init()

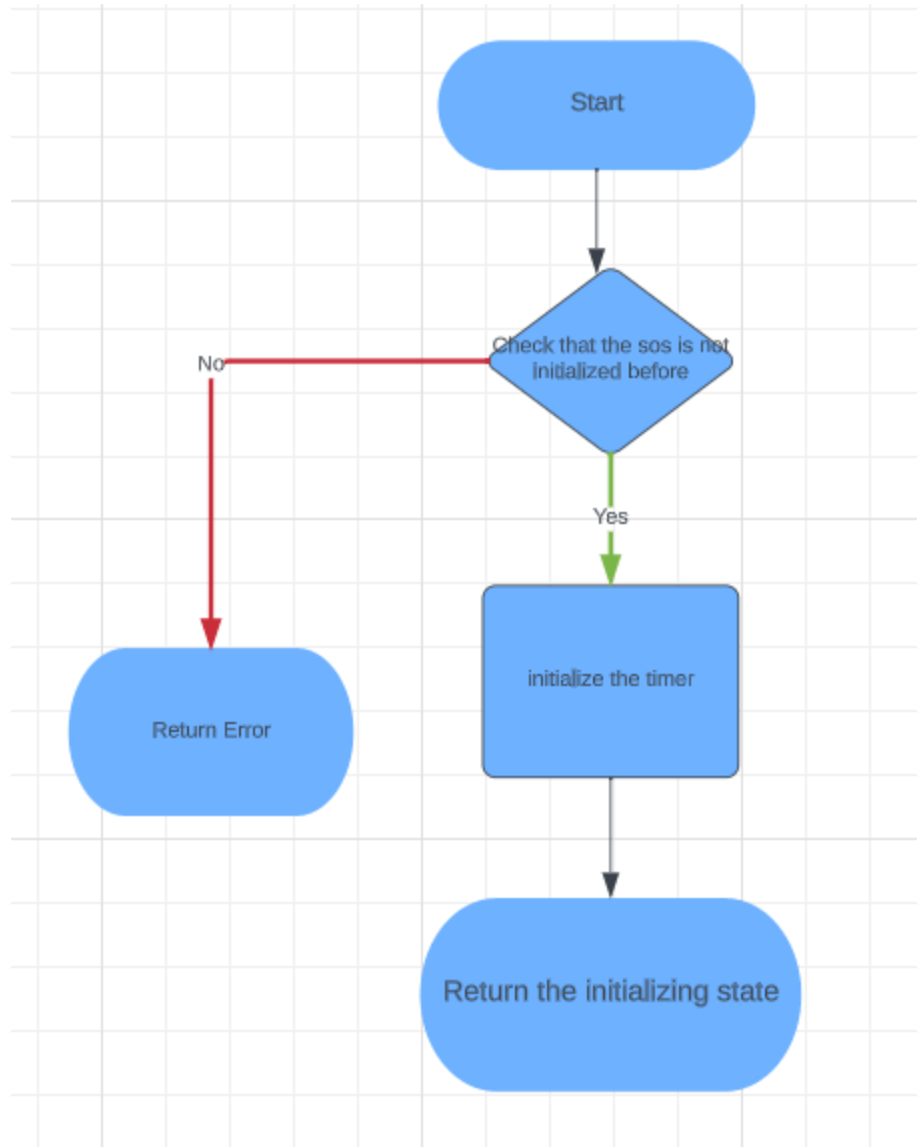


EN\_EXTINT\_ERROR EXTINT\_init(EN\_EXINT\_NUMBER INTx ,EN\_Sense\_Control INTxSense)

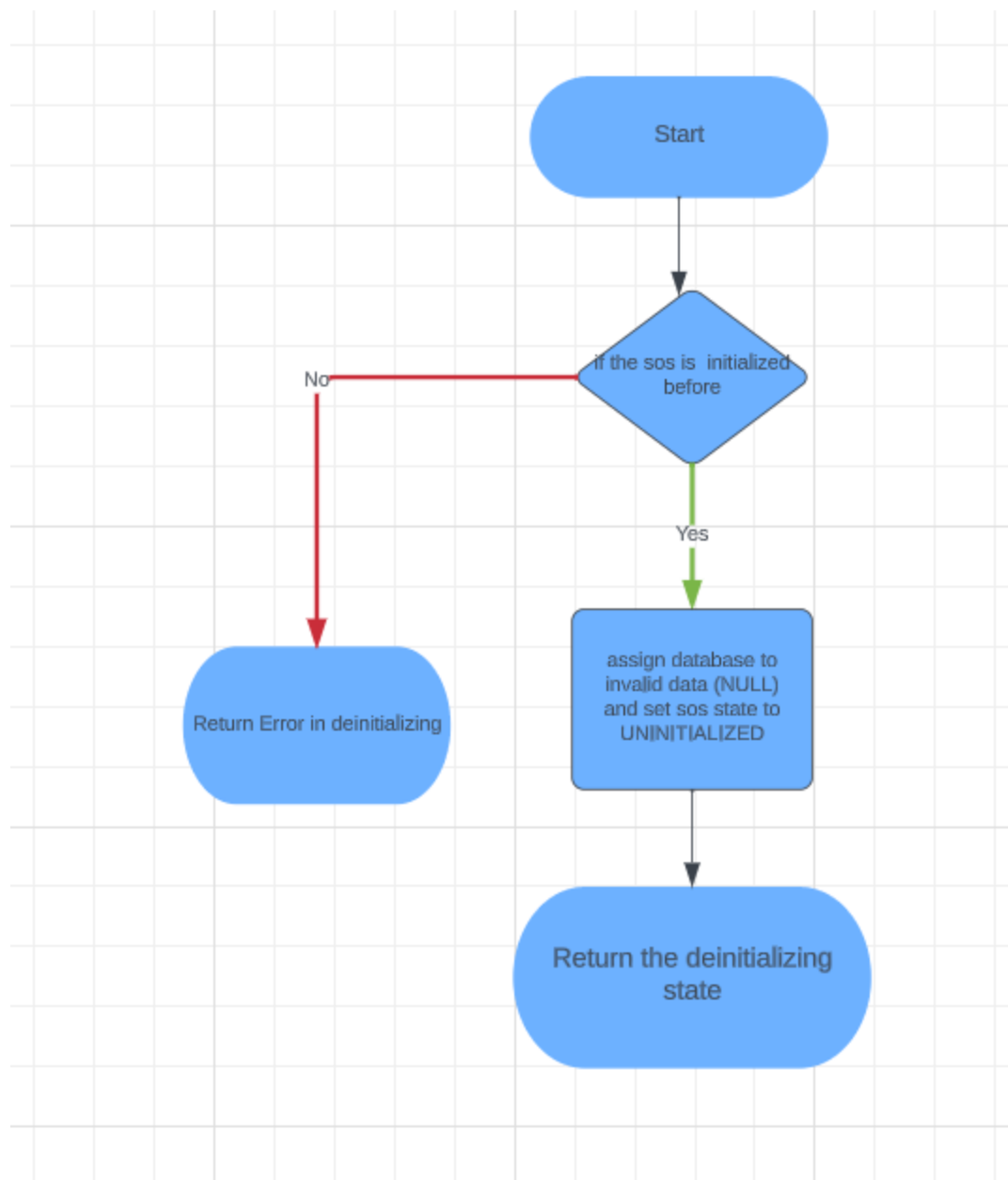


### 3.1.6 SOS:

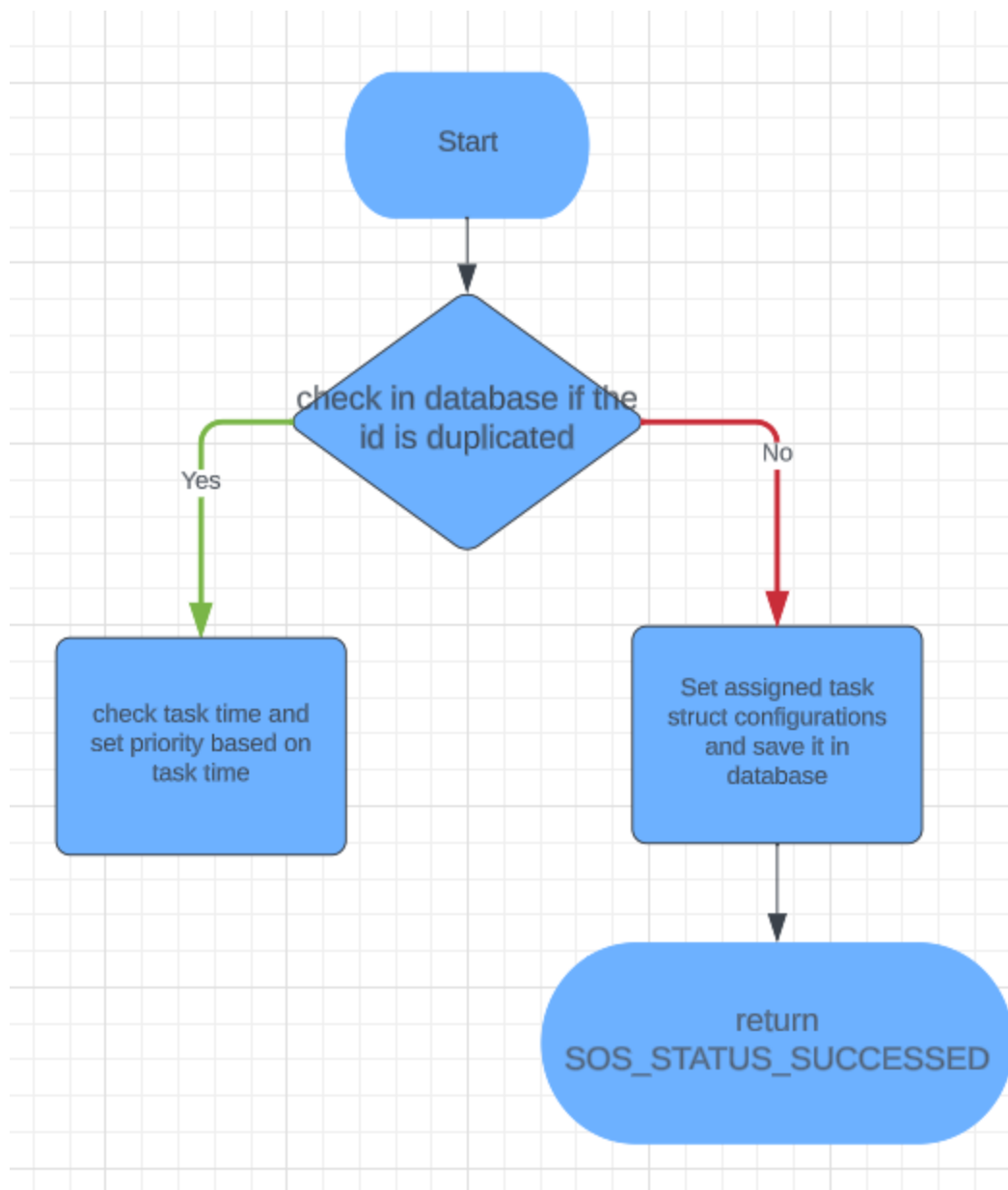
`enu_sosErrorState_t sos_init (void);`



```
enu_sosErrorState_t sos_deinit (void);
```

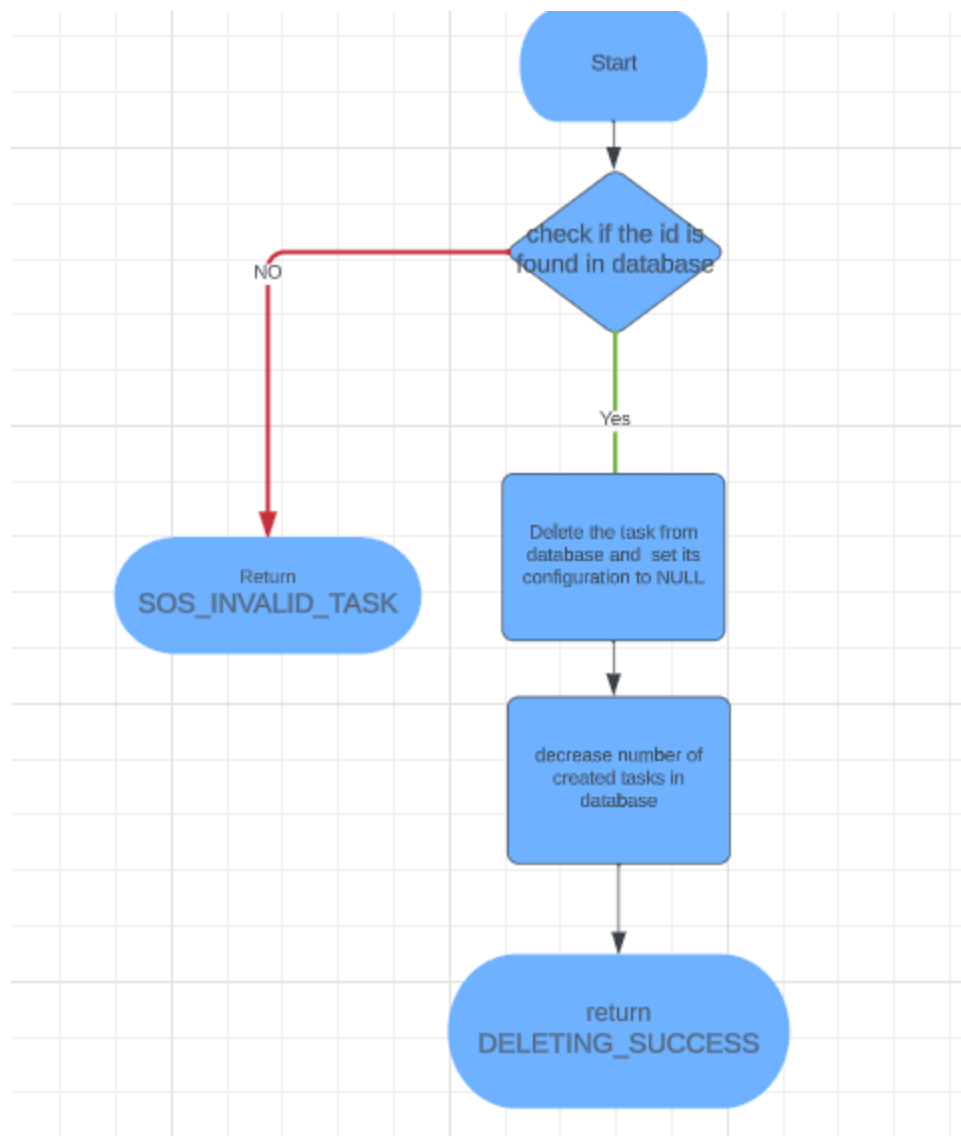


```
enu_sosErrorState_t sos_create_task(str_sosTask_t *ptr_str_sosTask);
```

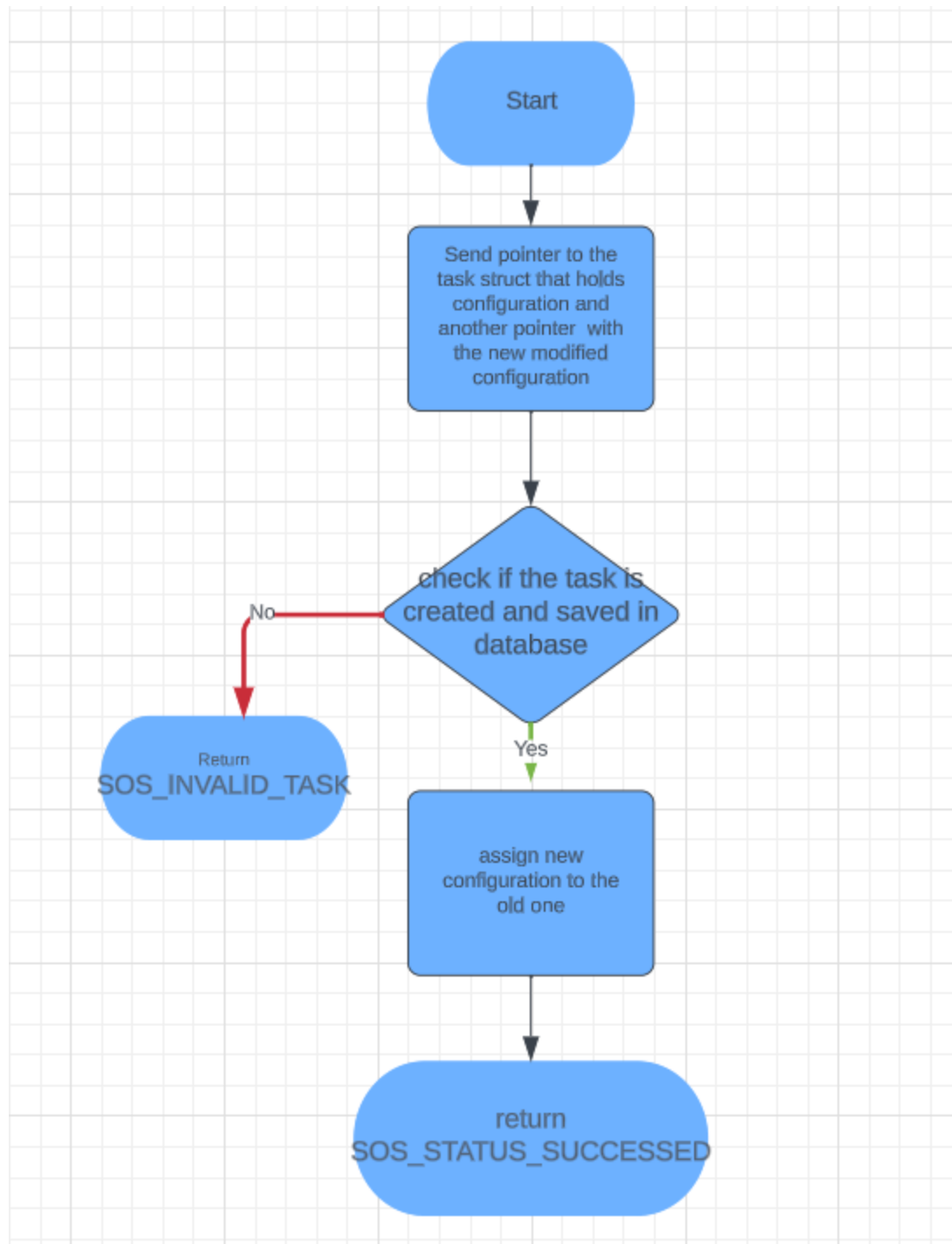




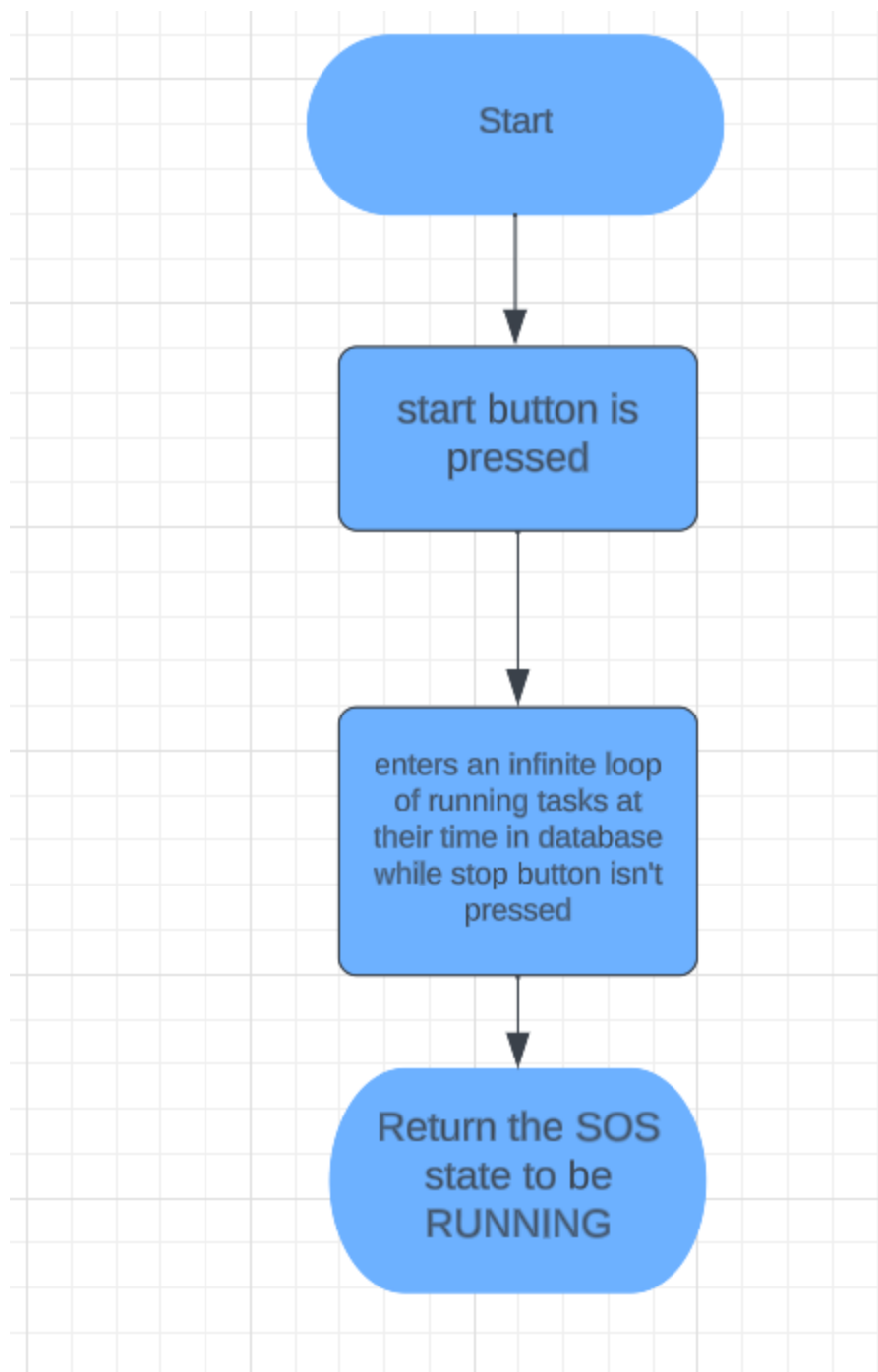
```
enu_sosErrorState_t sos_delete_task (uint8_t u8_a_task_id);
```



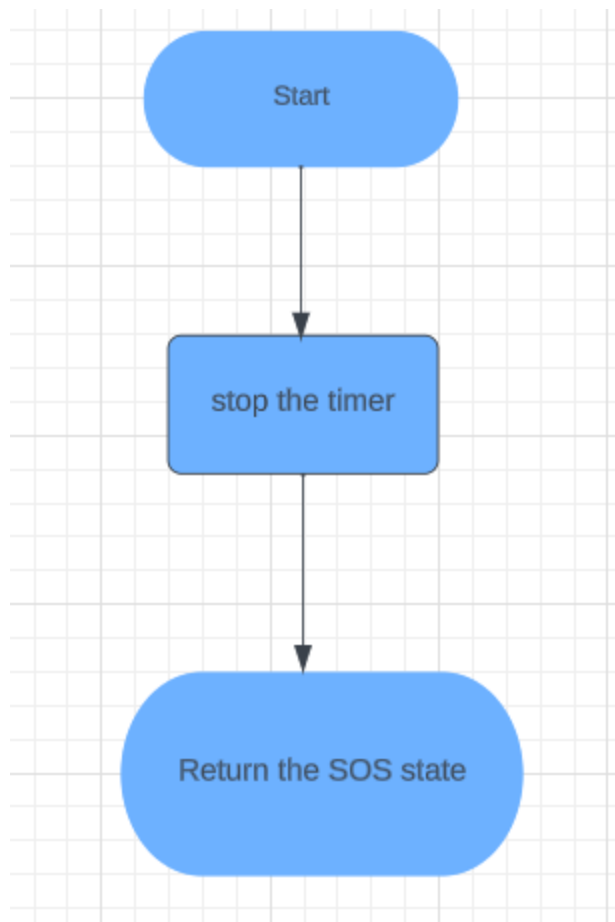
```
enu_sosErrorState_t sos_modify_task (str_sosTask_t *ptr_str_sosTask, str_sosTask_t  
*ptr_str_sosModTask );
```



```
enu_sosErrorState_t sos_run(void);
```



```
enu_sosErrorState_t sos_disable(void);
```



## 3.2 Configurations:

### 3.2.1 DIO:

```

/ ..... /
typedef struct{
    EN_dio_port_t    dio_port;
    EN_dio_pin_t     dio_pin;
    EN_dio_mode_t    dio_mode;
    EN_dio_value_t   dio_initial_value;
    EN_dio_pullup_t  dio_pullup_resistor;
}ST_DIO_ConfigType;

ST_DIO_ConfigType DIO_ConfigArray[];

/*****
/*          ENUMS DIO PRECOMPILED          */
*****/
typedef enum{
    PA=0,
    PB,
    PC,
    PD
}EN_DIO_Port_type;

typedef enum{
    OUTPUT,
    INFREE,
    INPULL
}EN_DIO_PinStatus_type;

typedef enum{
    LOW=0,
    HIGH,
}EN_DIO_PinVoltage_type;

```

```

/*****
/*          Pin modes          */
*****/
#define DIOMODE_INPUT    0
#define DIOMODE_OUTPUT   1

/*****
/*          Pin Direction Setting          */
*****/
#define DIOOUTPUT_LOW    0
#define DIOOUTPUT_HIGH   1

/*****
/*          Pin Pull Up Value          */
*****/
#define DIOINPUT_FLOATING 0
#define DIOINPUT_PULLUP   1

/*****
/*          Pin Pull Up Configuration          */
*****/
#define DIOPULLUP_DISABLED 0
#define DIOPULLUP_ENABLED  1

```

```

typedef enum{
    DIO_PORTA,
    DIO_PORTB,
    DIO_PORTC,
    DIO_PORTD
}EN_dio_port_t;

/*****
/*          DIO PINS          */
*****/

typedef enum{
    DIO_PIN0,
    DIO_PIN1,
    DIO_PIN2,
    DIO_PIN3,
    DIO_PIN4,
    DIO_PIN5,
    DIO_PIN6,
    DIO_PIN7
}EN_dio_pin_t;

/*****
/*          DIO PIN MODE DIRECTION          */
*****/

typedef enum{
    DIO_MODE_INPUT,
    DIO_MODE_OUTPUT
}EN_dio_mode_t;

/*****
/*          DIO PIN VALUE          */
*****/

typedef enum{
    DIO_HIGH,
    DIO_LOW
}EN_dio_value_t;

/*****
/*          DIO PIN PULL UP CONFIG          */
*****/

typedef enum{
    DIO_PULLUP_DISABLED,
    DIO_PULLUP_ENABLED
}EN_dio_pullup_t;

```

### 3.2.2 Timer:

```

/
typedef enum
{
    TMR_OVERFLOW_MODE,
    TMR_CTC_MODE,
    TMR_PWM_MODE,
    TMR_COUNTER_MODE,
    TMR_MAX_TIMERMODES
}EN_TimerMode_t;

typedef enum
{
    TMR_INTERNAL,
    TMR_EXTERNAL
}EN_TimerClockSource_t;
typedef enum {
    TMR_ENABLED,
    TMR_DISABLED
}EN_TimerEnable_t;

typedef enum {
    TMR_ISR_ENABLED,
    TMR_ISR_DISABLED
}EN_TimerISREnable_t;

typedef enum {
    TMR_MODULE_CLK,
    TMR_RISING_EDGE,
    TMR_FALLING_EDGE,
}EN_TimerClockMode_t;

typedef enum {
    TMR_NORMAL_PORT_OPERATION_OC_PIN_DISCONNECTED,
    TMR_TOGGLE_OC_PIN_ON_COMPARE_MATCH,
    TMR_CLEAR_OC_PIN_ON_COMPARE_MATCH,
    TMR_SET_OC_PIN_ON_COMPARE_MATCH
}EN_TimerCompMatchOutputMode_t;

```



### 3.2.3 Push Button:

```

/*****
/*          PUSH_BTN_state_t          */
*****/
/*
Enum: EN_PUSH_BTN_state_t
Description : An enumeration that defines two possible states for a push button: pressed or released.
Members:
- PUSH_BTN_STATE_PRESSED : Represents the en_g_state of a push button when it is pressed down or activated.
- PUSH_BTN_STATE_RELEASED : Represents the en_g_state of a push button when it is not pressed or deactivated.

Overall, the EN_PUSH_BTN_state_t enumeration provides a way to represent the two possible states of a push
button in a standardized and easy-to-understand manner. By using this enumeration, the software can check the
en_g_state of a push button and take appropriate action based on whether it is pressed or released.
*/
typedef enum
{
    PUSH_BTN_STATE_PRESSED = 0,
    PUSH_BTN_STATE_RELEASED
}EN_PUSH_BTN_state_t;

/*****
/*          PUSH_BTN_active_t          */
*****/
/*
Enum: EN_PUSH_BTN_active_t
Description: An enumeration that defines two possible active states for a push button: pull-up or pull-down.

Members:
- PUSH_BTN_PULL_UP : Represents the active en_g_state of a push button when it is connected to a pull-up resistor.
                    In this en_g_state, the button is normally open and the pull-up resistor pulls the voltage of
                    the pin to a high en_g_state.
- PUSH_BTN_PULL_DOWN : Represents the active en_g_state of a push button when it is connected to a pull-down resistor.
                    In this en_g_state, the button is normally closed and the pull-down resistor pulls the voltage
                    of the pin to a low en_g_state.

Overall, the EN_PUSH_BTN_active_t enumeration provides a way to represent the two possible active states of a
push button in a standardized and easy-to-understand manner. By using this enumeration, the software can
determine the active en_g_state of a push button and configure the pin accordingly.
*/
typedef enum
{
    PUSH_BTN_PULL_UP = 0,
    PUSH_BTN_PULL_DOWN
}EN_PUSH_BTN_active_t;

/*****
/*          PUSH_BTN_STRUCT CONFIG          */
*****/
/*
Struct          : ST_PUSH_BTN_t
Description      : A structure that contains the configuration and current en_g_state information for a
                  push button.

Members:
- PUSH_BTN_pin      : An instance of the ST_pin_config_t struct that contains the configuration settings
                    for the pin used by the push button.
- PUSH_BTN_state     : An instance of the EN_PUSH_BTN_state_t enum that represents the current en_g_state of
                    the push button (pressed or released).
- PUSH_BTN_connection : An instance of the EN_PUSH_BTN_active_t enum that represents the active en_g_state of
                    the push button (pull-up or pull-down).

Overall, the ST_PUSH_BTN_t structure provides a standardized way to represent and manage the configuration
and en_g_state information for a push button on a micro-controller. By using this structure, the software can easily
read the current en_g_state of the push button and take appropriate action based on its configuration and
connection type. The use of enums for the en_g_state and connection fields allows for consistent and
easy-to-understand representation of these values.
*/
typedef struct
{
    ST_DIO_ConfigType PUSH_BTN_pin;
    EN_PUSH_BTN_state_t PUSH_BTN_state;
    EN_PUSH_BTN_active_t PUSH_BTN_connection;
}ST_PUSH_BTN_t;

```

### 3.2.4 LED:

```

/*****
 *
 *                               Typedefs
 *
 *****/
/*Enum for error state*/
typedef enum
{
    LED_OK,
    LED_NOK
}EN_ledError_t;

/*struct to store led attributes*/
typedef struct LEDS{
    u8 port;
    u8 pin;
    u8 state;
}LEDS;

```

### 3.2.5 External Interrupt:

```

/*****
/*
 *                               MCUCR register Bits
 *
 *****/
/*
Enum: EN_MCUCR_REG_BITS
Description: An enumeration that defines the bit fields for the `MCUCR` register on a micro-controller.

Members:
- MCUCR_REG_ISC00_BITS : Represents the bit field for the `ISC00` bit of the `MCUCR` register.
- MCUCR_REG_ISC01_BITS : Represents the bit field for the `ISC01` bit of the `MCUCR` register.
- MCUCR_REG_ISC10_BITS : Represents the bit field for the `ISC10` bit of the `MCUCR` register.
- MCUCR_REG_ISC11_BITS : Represents the bit field for the `ISC11` bit of the `MCUCR` register.

Overall, the EN_MCUCR_REG_BITS enumeration provides a way to represent and manage the individual bit
fields within the `MCUCR` register on a micro-controller in a standardized and easy-to-understand manner.
By using this enumeration, the software can read and modify the individual bits within this register as
needed for interrupt configuration and other purposes.
*/
typedef enum
{
    MCUCR_REG_ISC00_BITS = 0,
    MCUCR_REG_ISC01_BITS,
    MCUCR_REG_ISC10_BITS,
    MCUCR_REG_ISC11_BITS
}EN_MCUCR_REG_BITS;

```

```

/*****
/*          MCUCSR register Bits          */
*****/
/*
Enum: EN_MCUCSR_REG_BITS
Description: An enumeration that defines the bit fields for the `MCUCSR` register on a micro-controller.

Members:
- MCUCSR_REG_ISC2_BITS : Represents the bit field for the `ISC2` bit of the `MCUCSR` register.

Overall, the EN_MCUCSR_REG_BITS enumeration provides a way to represent and manage the individual
bit fields within the `MCUCSR` register on a micro-controller in a standardized and easy-to-understand
manner. By using this enumeration, the software can read and modify the individual bits within
this register as needed for interrupt configuration and other purposes.
*/
typedef enum
{
    MCUCSR_REG_ISC2_BITS = 6,
}EN_MCUCSR_REG_BITS;

/*****
/*          GICR register Bits          */
*****/
/*
Enum: EN_GICR_REG_BITS
Description: An enumeration that defines the bit fields for the `GICR` register on a micro-controller.

Members:
- GICR_REG_INT2_BITS : Represents the bit field for the `INT2` bit of the `GICR` register.
- GICR_REG_INT0_BITS : Represents the bit field for the `INT0` bit of the `GICR` register.
- GICR_REG_INT1_BITS : Represents the bit field for the `INT1` bit of the `GICR` register.

Overall, the EN_GICR_REG_BITS enumeration provides a way to represent and manage the individual bit fields
within the `GICR` register on a micro-controller in a standardized and easy-to-understand manner.
By using this enumeration, the software can read and modify the individual bits within this register
as needed for interrupt configuration and other purposes.
*/
typedef enum
{
    GICR_REG_INT2_BITS = 5,
    GICR_REG_INT0_BITS,
    GICR_REG_INT1_BITS
}EN_GICR_REG_BITS;

/*****

```

```

typedef enum
{
    GIFR_REG_INTF2_BITS = 5,
    GIFR_REG_INTF0_BITS,
    GIFR_REG_INTF1_BITS

}EN_GIFR_REG_BITS;

/*****
/*          EXT_INTERRUPT_Sense_Control          */
*****/
/*
Members:
- LOW_LEVEL_SENSE_CONTROL      : Represents the sense control mode where the interrupt is triggered when
                                the input signal is at a low level.
- ANY_LOGICAL_SENSE_CONTROL    : Represents the sense control mode where the interrupt is triggered when
                                there is any change in the logical en_g_state of the input signal.
- FALLING_EDGE_SENSE_CONTROL   : Represents the sense control mode where the interrupt is triggered when
                                the input signal changes from a high level to a low level.
- RISING_EDGE_SENSE_CONTROL    : Represents the sense control mode where the interrupt is triggered when
                                the input signal changes from a low level to a high level.

Overall, the EN_EXT_INTERRUPT_Sense_Control enumeration provides a way to represent and manage the
different sense control modes for external interrupts on a micro-controller in a standardized and
easy-to-understand manner. By using this enumeration, the software can configure and handle external
interrupts based on the desired sense control mode for the specific input signal being used.
*/
typedef enum
{
    LOW_LEVEL_SENSE_CONTROL = 0,
    ANY_LOGICAL_SENSE_CONTROL,
    FALLING_EDGE_SENSE_CONTROL,
    RISING_EDGE_SENSE_CONTROL

}EN_EXT_INTERRUPT_Sense_Control;

typedef enum
{
    EXT0_INTERRUPTS = 0,
    EXT1_INTERRUPTS,
    EXT2_INTERRUPTS

}EN_EXT_INTERRUPTS;

```

```

/*****
/*          EXT_INTERRUPTS STRUCT CONFIG          */
*****/
/*
Struct: ST_EXT_INTERRUPTS_CFG
Description: A structure that contains the configuration settings for an external
            interrupt on a micro-controller.
Members:
- INTERRUPT_EXTERNAL_HANDLER : A function pointer to the interrupt service routine (ISR)
                                for the external interrupt(call-back function).
- EXTERNAL_INTERRUPT_Number : An instance of the EN_EXT_INTERRUPTS enum that specifies the
                                external interrupt number to be configured.
- EXTERNAL_INTERRUPT_Sense_Control : An instance of the EN_EXT_INTERRUPT_Sense_Control enum
                                    that specifies the sense control mode for the external interrupt.

Overall, the ST_EXT_INTERRUPTS_CFG structure provides a way to represent and manage the configuration
settings for an external interrupt on a micro-controller in a standardized and easy-to-understand manner.
By using this structure, the software can configure and handle external interrupts based on the desired
interrupt number and sense control mode, and execute the appropriate ISR when the interrupt is triggered.
*/
typedef struct
{
    void(*INTERRUPT_EXTERNAL_HANDLER) (void);
    EN_EXT_INTERRUPTS EXTERNAL_INTERRUPT_Number;
    EN_EXT_INTERRUPT_Sense_Control EXTERNAL_INTERRUPT_Sense_Control;
}ST_EXT_INTERRUPTS_CFG;

const ST_EXT_INTERRUPTS_CFG A_interruptConfig[EXT_INTERRUPT_PINS];

```

## OS APIs:

### sos\_init()

Function Name	sos_init
Syntax	enu_system_status_t sos_init (void);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	None
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_STATUS_INVALID_STATE: In case The SOS is already initialized

**sos\_deinit()**

Function Name	sos_deinit
Syntax	enu_system_status_t sos_deinit (void);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	None
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_STATUS_INVALID_STATE: In case The SOS is not initialized

**sos\_create\_task()**

Function Name	sos_create_task
Syntax	enu_system_status_t sos_create_task (str_sosTask_t *ptr_str_sosTask);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	*ptr_str_sosTask:holds task's configuration
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_NULL_PTR: In case of NULL pointer
	SOS_INVALID_ARG:In case of wrong arguments

**sos\_modify\_task()**

Function Name	sos_modify_task
Syntax	enu_system_status_t sos_modify_task (str_sosTask_t *ptr_str_sosTask, str_sosTask_t *ptr_str_sosModTask);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	*ptr_str_sosTask: holds task's configuration *ptr_str_sosModTask: holds task's modification configuration
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_NULL_PTR: In case of NULL pointer
	SOS_INVALID_TASK: In case of wrong task not found

**sos\_delete\_task()**

Function Name	sos_delete_task
Syntax	enu_system_status_t sos_delete_task (uint8_t task_id);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	task_id: the id of the task to be deleted
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_INVALID_TASK: In case of wrong task not found

**sos\_run()**

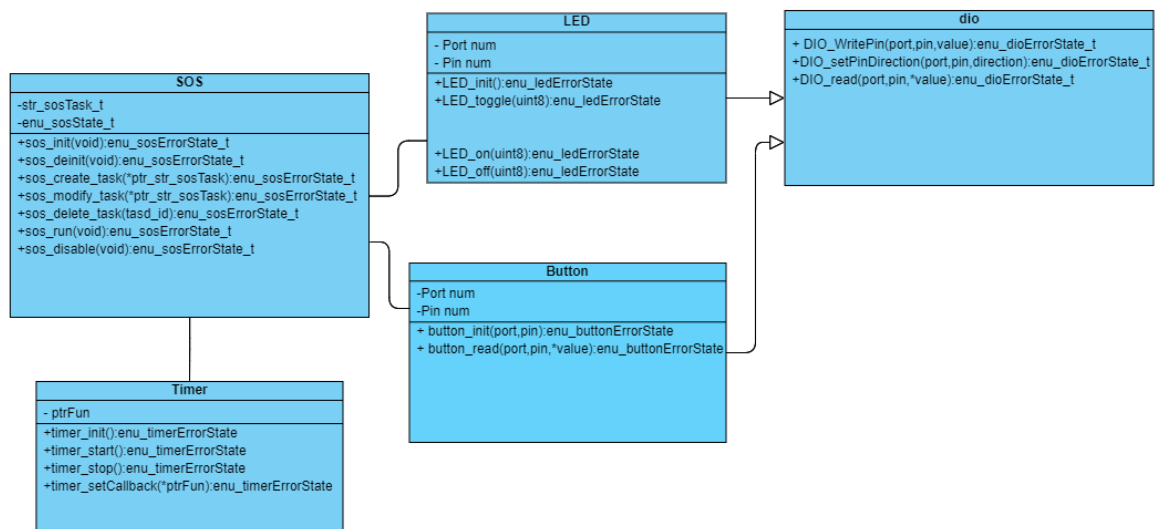
Function Name	sos_run
Syntax	enu_system_status_t sos_run (void);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	None
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_STATUS_FAILED: In case of the SOS is already running

**sos\_disable()**

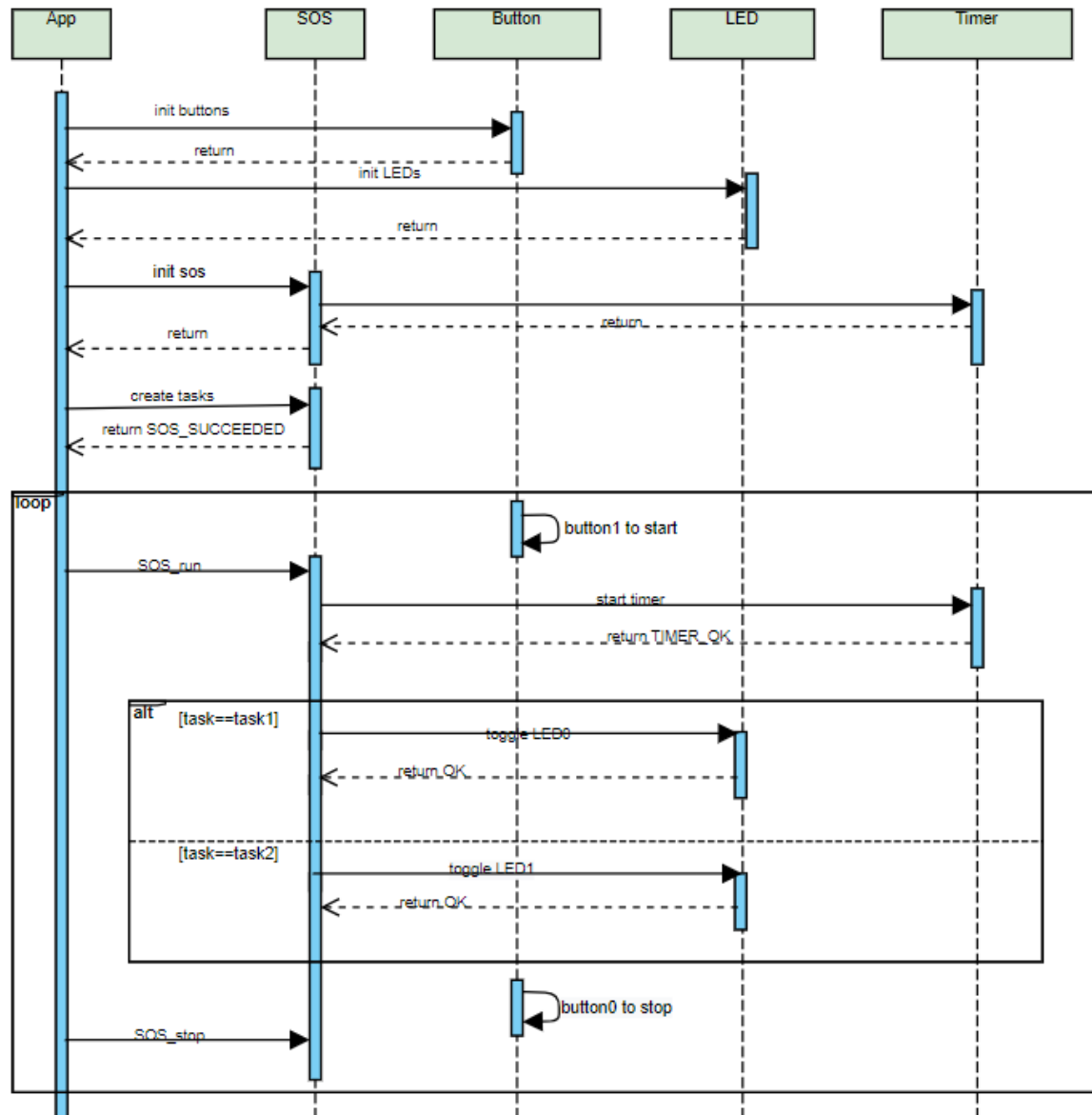
Function Name	sos_disable
Syntax	enu_system_status_t sos_disable (void);
Synch/Asynch	Synchronous
Reentrancy	Non-Reentrant
Parameters(in):	None
Parameters(out):	None
Parameters(in,out):	None
Return:	SOS_STATUS_SUCCESS: In case of Successful Operation
	SOS_STATUS_FAILED: In case of the SOS is already stopped



## SOS Class Diagram :



## System Sequence Diagram:



## SOS State Machine:

