Project Title: Led Sequence V 2.0

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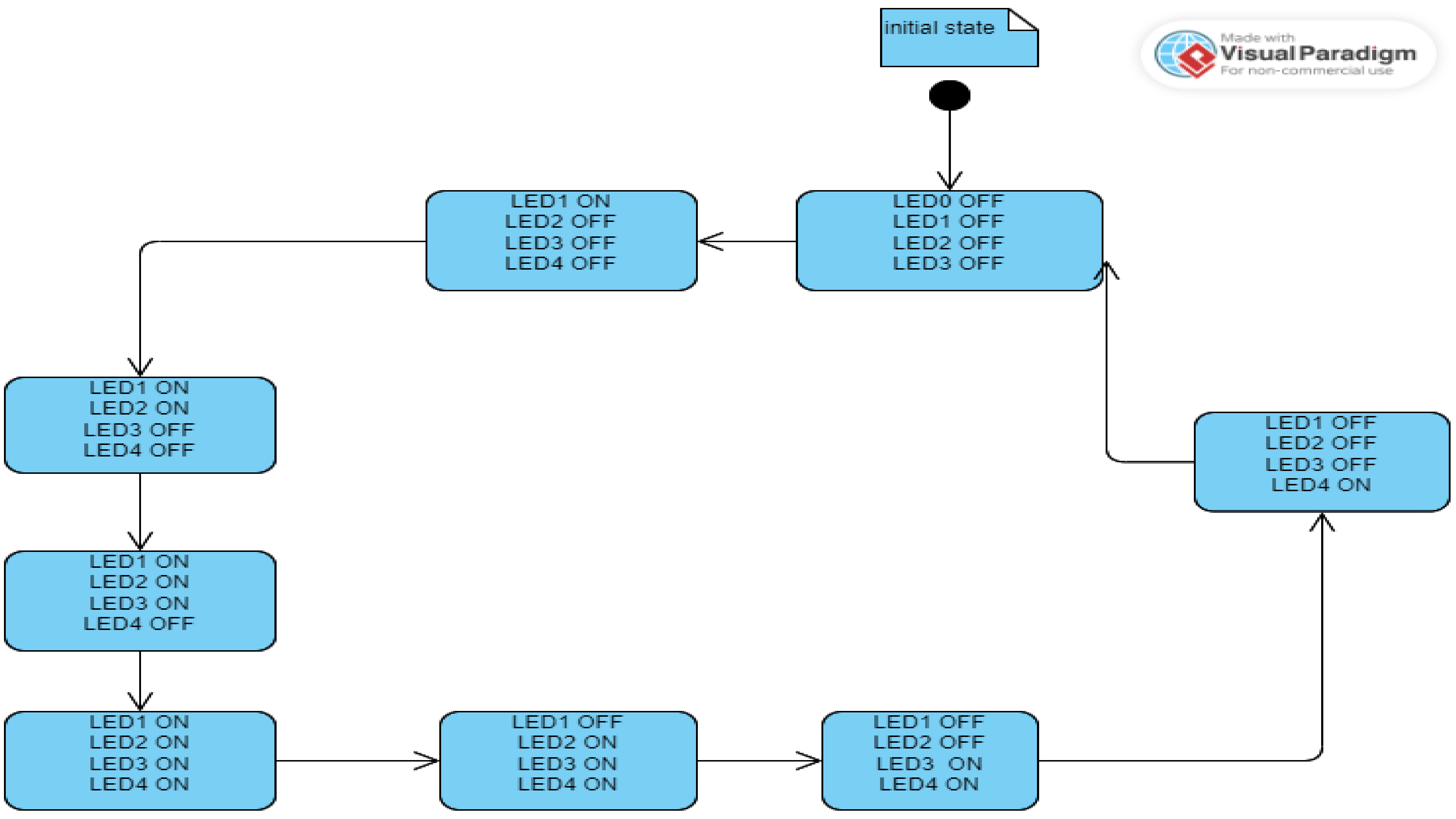
Description:

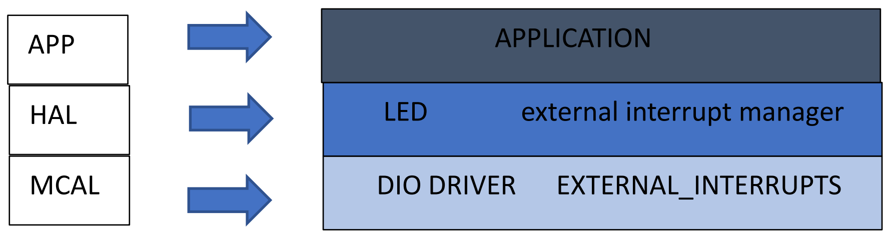
1. ***Hardware Requirements***
    1. Four LEDs (**LED0**, **LED1**, **LED2**, **LED3**)
    2. One button (**BUTTON1**)
2. ***Software Requirements***
    1. Initially, all LEDs are OFF
    2. Once **BUTTON1** is pressed, **LED0** will be **ON**
    3. Each press further will make another LED is **ON**
    4. At the **fifth press**, **LED0** will changed to be **OFF**
    5. Each **press further** will make only one LED is **OFF**
    6. This will be repeated forever
    7. The sequence is described below
        1. Initially (OFF, OFF, OFF, OFF)
        2. Press 1 (ON, OFF, OFF, OFF)
        3. Press 2 (ON, ON, OFF, OFF)
        4. Press 3 (ON, ON, ON, OFF)
        5. Press 4 (ON, ON, ON, ON)
        6. Press 5 (OFF, ON, ON, ON)
        7. Press 6 (OFF, OFF, ON, ON)
        8. Press 7 (OFF, OFF, OFF, ON)
        9. Press 8 (OFF, OFF, OFF, OFF)
        10. Press 9 (ON, OFF, OFF, OFF)
    8. **USE EXTERNAL INTERRUPTS**

State machine:



initial state
LED0 OFF LED1 OFF LED2 OFF LED3 OFF
LED1 ON LED2 OFF LED3 OFF LED4 OFF
LED1 ON LED2 ON LED3 OFF LED4 OFF
LED1 ON LED2 ON LED3 ON LED4 OFF
LED1 ON LED2 ON LED3 ON LED4 ON
LED1 OFF LED2 ON LED3 ON LED4 ON
LED1 OFF LED2 OFF LED3 ON LED4 ON
LED1 OFF LED2 OFF LED3 OFF LED4 ON
Made with Visual Paradigm For non-commercial use

Layered architecture:



Project Modules APIs:

DIO DRIVER:

```
/*typedef*/
typedef enum DIO_PORTS
{
        porta, portb, portc, portd
} DIO_PORTS;
typedef enum DIO_PINS
{
        pin0, pin1, pin2, pin3, pin4, pin5, pin6, pin7
} DIO_PINS;
typedef enum PIN_DIRECTION
{
        INPUT,
        OUTPUT
} PIN_DIRECTION;

typedef enum PIN_STATE
{
        LOW,
        HIGH
} PIN_STATE;

/*****************************************    APIs PROTOTYPES    *****************************************************************/
STD_return DIO_INIT (DIO_PORTS port, DIO_PINS pin, PIN_DIRECTION direction);
STD_return DIO_WRITE_PIN (DIO_PORTS port, DIO_PINS pin, PIN_STATE state);
STD_return DIO_READ_PIN (DIO_PORTS port, DIO_PINS pin, uint8_t* vale);
```

EXTERNAL_INTERRUPTS APIs:

```
typedef enum INT_NUM {int0, int1, int2} INT_NUM;
typedef enum EDGE {rising,falling} EDGE;
STD_return EDGE_SELECET (EDGE edge,INT_NUM ext_int);
STD_return EXT_INTERRUPT_ENABLE (INT_NUM ext_int);
STD_return SETCALLBACK_FUN_INT0(void (*ptr_int0) (void));
STD_return SETCALLBACK_FUN_INT1(void (*ptr_int1) (void));
STD_return SETCALLBACK_FUN_INT2(void (*ptr_int2) (void));
```

LED APIs:

```
typedef struct LED

{

  DIO_PORTS port;

DIO_PINS pin;

} LED;
```

```
/*****************************************   APIs PROTOTYPES   *****************************************************************/

STD_return LED_INIT (LED* led);

STD_return LED_ON (DIO_PORTS, DIO_PINS);

STD_return LED_OFF (DIO_PORTS,DIO_PINS);
```

External interrupt manager APIs:

```
/*typedefs*/
typedef void (*func_ptr)(void);
typedef struct ST_EXT_INT_HANDLER_t
{
EN_INT_NUM_t ext_int;
EN_EDGE_t edge_select;
func_ptr function_ptr;
}ST_EXT_INT_HANDLER_t;


STD_return EXT_INT_HANDLER(ST_EXT_INT_HANDLER_t* handler);
```