KPIT

Lab Activity-I
GPIO

Module Name- Embedded C

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Lab activity 1– GPIO

Write modular program to read the status of the switch and write high/low status to GPIO output pin as per below table based upon API's mentioned.

Switch-I	Switch-II	LED 1 state	LED 2 state
open	open	LOW	LOW
open	close	LOW	HIGH
close	open	HIGH	LOW
close	close	Toggle LED for every 1 sec	Toggle LED for every 1 sec

Below API or functions need to be designed to test application.

GPIOConfig(Pin, mode)
Purpose: The function is used to configure the mode of the pin.
Pin: The Atmega328P port pin which need to be configured.
Mode: direction of the pin in INPUT or OUTPUT. In case of INPUT, the mode is required to be configured for PULLUP configuration along with INPUT.

GPIOPinRead(Pin)
Purpose: The function returns the state (0 or 1) of the input pin.
Pin: The Atmega328P port pin which need to be read.
Return value: 0 or 1

GPIOPinWrite(pin, state)
Purpose: The function is used to write LOW or HIGH state to GPIO pin.
Pin: The Atmega328P pin used to write LOW or HIGH state.
State: LOW or HIGH

Modular program guidelines:
GPIO.h: This file contains
function prototype declarations
defined macro
extern variable declaration if any
typedef for variables

GPIO.c: This file contains
Function definitions, variable definitions
Static functions declaration and definitions
Static variables, macros

The files need to be submitted in the zip folder having unique ID:

- Module Implementation files [.c files] and corresponding header files [.h files]
- Main program [.c file] to test as per problem statement
- .HEX file
- Simulation circuit [.simu file]

References and links:

https://nongnu.org/avr-libc/user-manual/group__demo__project.html

GPIO.h Header file template

```
/*****************************************************************************
* File Name: GPIO.h
* Description:  This file contains function Prototypes of GPIO.c
* Tool-Chain: AVR GCC
*
* Modification History:
*  Created by:      username    V1.0      27/Jul/15
*  Description:     V1.0
*
*****************************************************************************/
#ifndef GPIO_H
#define GPIO_H

/*****************************************************************************
*                       Includes
*****************************************************************************/
#include "TCD_Types.h"
/*****************************************************************************
*                       Defines and data types
*****************************************************************************/
/*****************************************************************************
*                       Global variables
*****************************************************************************/

/*****************************************************************************
*                       Public function prototypes
*****************************************************************************/
#endif
/*****************************************************************************
*                       End of File
*****************************************************************************/
```

GPIO.c implementation file template

```
/*****************************************************************************
* File Name: GPIO.c
* Description:  This file contains API definitions for GPIO functionality
* Tool-Chain: AVR GCC
*
*  Modification History:
*  Created by:      Username    V1.0      27/Jul/15
*  Description:     V1.0
*****************************************************************************/

/*****************************************************************************
*                       Includes
*****************************************************************************/
#include "GPIO.h"

/*****************************************************************************
*                       Defines and data types
*****************************************************************************/

/*****************************************************************************
*                       Global variables
*****************************************************************************/

/*****************************************************************************
*                       Static variables
*****************************************************************************/

/*****************************************************************************
*                       Internal function prototypes
*****************************************************************************/
/*****************************************************************************
*                       Public functions definitions
*****************************************************************************/
/*****************************************************************************
* Name: GPIOConfig (pin, mode)
* Description:  Configures the mode of the pin as INPUT/PULLUP or OUTPUT

* Arguments: pin and mode
* Returns: None
*****************************************************************************/
/*****************************************************************************
*                       Internal functions
*****************************************************************************/
/*****************************************************************************
* Name:
* Description:
*****************************************************************************/
/*****************************************************************************

/*****************************************************************************
*                       End of File
*****************************************************************************/
```