CPE301 – SPRING 2019

Design Assignment 6

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Primary Github address: https://github.com/regis-shaquille/submissions-SR
Directory: https://github.com/regis-shaquille/submissions-SR/tree/master/Design%20Assignments

Submit the following for all Labs:

1. In the document, for each task submit the modified or included code (only) with highlights and justifications of the modifications. Also, include the comments.
2. Use the previously create a Github repository with a random name (no CPE/301, Lastname, Firstname). Place all labs under the root folder ESD301/DA, sub-folder named LABXX, with one document and one video link file for each lab, place modified asm/c files named as LabXX-TYY.asm/c.
3. If multiple asm/c files or other libraries are used, create a folder LabXX-TYY and place these files inside the folder.
4. The folder should have a) Word document (see template), b) source code file(s) and other include files, c) text file with youtube video links (see template).

1. COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS

List of Components used
ATMega328P Xplained Mini Microcontroller
MPU-6050 6DOF IMU Sensor

2. INITIAL/MODIFIED/DEVELOPED CODE OF TASK 1/A

```
Insert initial code here
/*
 * GccApplication1.c
 *
 * Created: 5/5/2019 3:00:55 PM
 * Author : regis
 */

#include <avr/io.h>

void i2c_write(unsighned char data)
{
	TWDR = data;
	TWCR = (1<<TWINT)|(1<<TWEN);
	while((TWCR & (1<<TWINT)) == 0);
}

void i2c_start(void)
{
	TWCR = (1<<TWINT)|(1<<TWSTA)|(1<<TWEN);
	while((TWCR & (TWINT)) == 0);
}

void i2c_stop()
{
	TWCR = (1<<TWINT)|(1<<TWEN)|(1<<TWSTO);
}

void i2c_init(void)
{
	TWSR = 0x00;
	TWBR = 0x47;
	TWCR = 0x04;
}

unsigned char i2c_read(unsigned char isLast)
{
	if(isLast == 0)
		TWCR = (1<<TWINT|)|(1<<TWEN)|(1<<TWEA);
	else
		TWCR = (1<<TWINT)|(1<<TWEN);
	while((TWCR & (1<<TWINT)) == 0);

	return TWDR;
}
```

```
void MPU_Start_Loc()
{
	I2C_Start_Wait(0xD0);/* I2C start with device write address */
	I2C_Write(ACCEL_XOUT_H);/* Write start location address from where to read */
	I2C_Repeated_Start(0xD1);/* I2C start with device read address */
}

void Read_RawValue()
{
	MPU_Start_Loc();/* Read Gyro values */
	Acc_x = (((int)I2C_Read_Ack()<<8) | (int)I2C_Read_Ack());
	//.. Read other registers
	i2c_stop();
}

int main(void)
{
    char buffer[20], float_[10];
    float Xa;
    I2C_Init();/* Initialize I2C */
    MPU6050_Init();/* Initialize MPU6050 */
    USART_Init(9600);/* Initialize USART with 9600 baud rate */
    while(1)
    {
		Read_RawValue();
		/* Divide raw value by sensitivity scale factor to get real values */
		Xa = Acc_x/16384.0;
		/* Take values in buffer to send all parameters over USART */
		dtostrf( Xa, 3, 2, float_ );
		sprintf(buffer," Ax = %s g\t",float_);
		USART_SendString(buffer);
    }

}
```

3. SCHEMATICS

Use fritzing.org

4. SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)

5. SCREENSHOT OF EACH DEMO (BOARD SETUP)

6. VIDEO LINKS OF EACH DEMO

7. GITHUB LINK OF THIS DA

https://github.com/regis-shaquille/submissions-SR/tree/master/Design%20Assignments/DA6

Student Academic Misconduct Policy
http://studentconduct.unlv.edu/misconduct/policy.html

"*This assignment submission is my own, original work*".
Shaquille Regis