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Section: 022

CS120B Custom Lab Report

**Description of Custom Lab:**

My custom lab is a shooting game. Basically player will control a Jet Fighter, which showed in the LCD screen, to pass through the stream of asteroids, meet and destroy the enemy aircraft. In this game, play will going to use the keypad to control fighter. Play can move the Jet Fighter up, down, forward and backward. Play can also shoot the bullet to attack the enemy aircraft or to destroy the asteroids. In order to win the game, Player must destroy the enemy aircraft. However, the Jet Fighter Player controlled was super fragile. If the Jet Fighter was hit by the asteroid, or was shot by the laser gun from enemy craft, the Jet Fighter will be immediately destroyed and lose the game. Therefore, play must dodge the attack from the asteroid or aircraft in order to survive. The enemy aircraft has 10 health point, which means player need shoot the bullet to attack it 10 times, and win the game. The health point will showed on a LED bar, which contains exactly 10 LEDs.

**Control Guild:**

To move the Jet Fighter, we have 4 button that can be found on the Keypad, which is 5, 7, 8, 9.

Press ‘5’ to move up, ‘8’ to move down, ‘7’ to move backward and 9 to move forward. Also to shoot the bullet, play can press ‘C’, which is beside the button ‘9’; it is very easy and simple. All player need to care of is to not that anything hit your Jet Fighter, and shoot the bullet to win the game.

**Technologies and Components:**

I used the Atmel studio 6.2 to program my games. I used the task scheduler to order the different tasks with different time period.

The Components I used is two Atmega1284 microcontrollers, one LED bar, one LCD screen and one Keypad.

One technology I used is the Usart, to communicated between two microcontrollers. To achieve it, I made a header file called usart\_atmega1284.h, and included it to my code and used the function to transmit and receive data between two microcontrollers.

The other technology I used is Custom Character on LCD. I put a function called the LCD\_Build(unsigned char location, unsigned char \*ptr) into io.c file and used it to create the custom characters.

Last technology is the game logic which is idea of how I implement the game.

**Link to the Video:**

https://www.youtube.com/watch?v=3fE63cVXhrk&feature=youtu.be

**Link to the source file:**

<https://drive.google.com/file/d/0B-2Q0ANtXAPfcHBDSDhLYzdYVG8/edit?usp=sharing>

//This is the code for the first microcontroller, it includes the logic design of game, it display the //LCD Screen, and it also receive input from the keypad.

<https://drive.google.com/file/d/0B-2Q0ANtXAPfUnVMaDNDczZSS3M/edit?usp=sharing>

//This link is the code for the second microcontroller, it received the data from the first //microcontroller through the Usart variable, and display the LED bar using the data that was //received.

**Link to the header files that were necessary:**

<https://drive.google.com/file/d/0B-2Q0ANtXAPfYmQteGY5OFo2NzA/edit?usp=sharing>

//This is the usart\_atmega1284.h file, it is needed to perform the USART between 2 //microcontrollers.

<https://drive.google.com/file/d/0B-2Q0ANtXAPfZGZfQU92YmRjNEU/edit?usp=sharing>

<https://drive.google.com/file/d/0B-2Q0ANtXAPfTWRuS2hDMzFWUUE/edit?usp=sharing>

//io.h and io.c . They are used to display the LCD screen and also build on the custom character

<https://drive.google.com/file/d/0B-2Q0ANtXAPfekVHR3h4cEswQTQ/edit?usp=sharing>

//timer.h , used to set up the timer, to make the finite state machine work.

<https://drive.google.com/file/d/0B-2Q0ANtXAPfMTJlN2xRNnAyZ0U/edit?usp=sharing>

//bit.h , it has 2 functions to which set a single bit or get a single bit.