CS 120B

Custom Project: Bit Dodge

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(High Level Description)

Rules and Guide to Game

The game is played by moving the player controlled character in between the gap of each falling wall. In the middle of the gap is an item that you can catch. Each item collected awards 1 point. If the player-controlled character is hit by the walls the game is reset and you are set back to the start screen. If you survive all of the walls that fall from the top of the screen you win the game.

Controls
-joystick: for moving right or left
-start button: for starting the game or selecting

Components (Pin-out)

- **Inputs**
  - PS2 joystick
  - select and start button
- **Outputs**
  - Lab kit LCD screen. This will be used to display the game.

Complexities/Build-upons

1. (1) using usart for communicating between the LCD-microcontroller and the
_ Joystick-microcontroller

2. (½) using the lab kits lcd to write each individual pixel to the screen

3. (½) using the EEPROM to save the high score of the player

4. (1) connecting an ATmega1284 pin to the analog signal from the ps2 joystick

Technology Used
-Atmel Studio 7.0
-ATmega1284
-16x2 LCD (1602A)
-USART
-1 button
-PS2 Joystick
https://www.amazon.com/gp/product/B01N59MK0U/ref=ppx_yo_dt_b_asin_image_o00_s00?ie=UTF8&psc=1

Video (Demo)
https://www.youtube.com/watch?v=6ZpMhjRDJN4

Sources

-IEEE

-UCR EE/CS 120B Labs

-(code from this website was used for lcd commands)
https://www.electronicwings.com/avr-atmega/lcd-custom-character-display-using-atmega-16-32-

(I used 2 microcontrollers so i divided the .c and .h files into 2 categories based on this)

First Links to Files-*LCD ATmega1284*

-Project_Alpha.c
https://github.com/gbeat002/CS120B-Labs/blob/master/Project_Alpha/Project_Alpha/Project_Alpha.c
This file contained the main logic for the game. It has the code for the character, walls, start menu, and end screens.

-io.c & io.h
https://github.com/gbeat002/CS120B-Labs/blob/master/Project_Alpha/Project_Alpha/io.c
https://github.com/gbeat002/CS120B-Labs/blob/master/Project_Alpha/Project_Alpha/io.h
These header files contained the code for the LCD screen commands. I also added code for the timer into io.c.

-usart_ATmega1284.h
https://github.com/gbeat002/CS120B-Labs/blob/master/Project_Alpha/Project_Alpha/usart_ATmega1284.h
This is the header file that allowed me to use usart to communicate between microcontrollers.

Second Links to Files-*Joystick ATmeg1284*

-Joystick.c
https://github.com/gbeat002/CS120B-Labs/blob/master/Joystick/Joystick/Joystick.c
This was the file used to program the microcontroller that receives input from the joystick. The joystick microcontroller communicates with the LED microcontroller through usart.

-usart_ATmega1284.h
https://github.com/gbeat002/CS120B-Labs/blob/master/Joystick/Joystick/usart_ATmega1284.h
This is the header file that allowed me to use usart to communicate between microcontrollers.

Summary of skills used
-communicating between microcontrollers with usart
-using the ATmega1284 to read voltage from the joystick
-creating custom characters for the 1602A led
-concurrent synchSMs for game logic
-saving game data with the eeprom