Maynooth University
National University of Ireland Maynooth

Project Lab Report

Cactus Game

EE302 – Realtime & Embedded Systems

Name: Nathan Ewnetu & Markel Biain
Student Numbers: 21483214 & 21723801

How the game works:

The character moves up and down the two lanes and cacti move across the lanes randomly. The character gains a score for every cactus it avoids. The high score will be saved into a global variable and the initial of the player who got the high score will be saved onto the EEprom. The game has 3 difficulty settings, easy, medium, and hard. Depending on this difficulty, the speed at which the cactuses move will increase or decrease. The difficulty settings screen is displayed every time you die and at the start of the game. If the character hits a cactus the game will end, and the score and high score will be displayed onto the screen.

Basic I/O:

SW1 used to toggle characters position. Also allows you to begin the game.

ADC:

Potentiometer is used to change the difficulty of the game.

Figure 1

Figure 2

Figure 3

LCD:

Used to display all the game stages such as the title screen, the difficulty screen, the game screen, and the end game screen.

Figure 4 - Title Screen

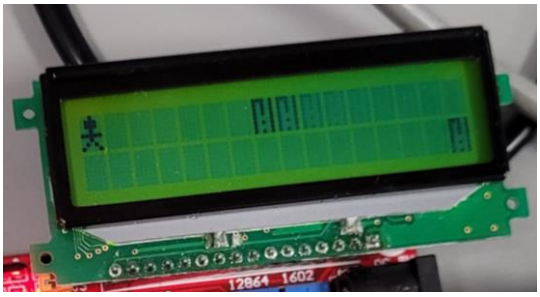

Figure 5 - In game screen

Figure 6 - End game screen with high score and initial

UART:

Is used to input the initial of your first name and from the keyboard. PUTTY is used as the serial monitor.

I2C:

If the high score was obtained on the run, the initial will be stored into the EEprom. We read from the EEprom after every run to display this name onto the LCD screen.

Interrupt & Timers

An interrupt-based timer was used to allow our cacti to move across the LCD. The speed of the cacti can be determined by changing the difficulty settings.

Realtime Aspect:

The real-time aspect of this game was that once the button is pressed, the character must respond and move to the other lane. This gives us the real-time aspect as the button must respond within a certain time to otherwise the game ends.

Block Diagram:

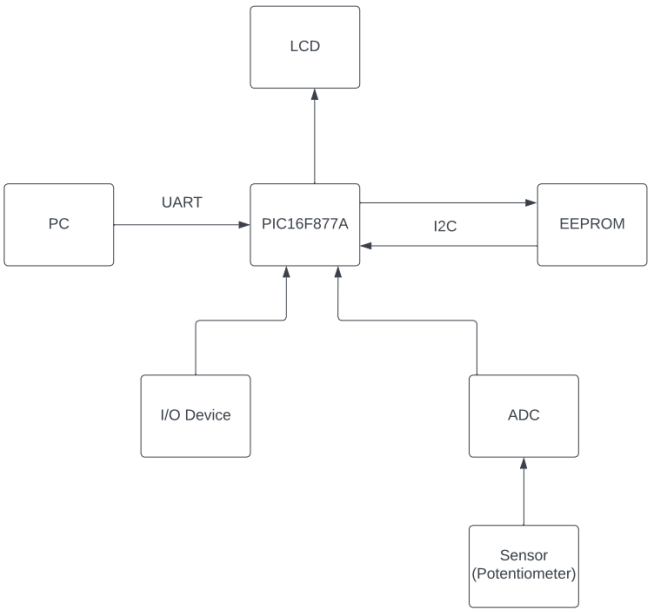

Figure 7 - Block Diagram