DT228-2 Micros Lab. Dungeons and Dragons

Key topics: Serial data communications, data structures and encoding, working with programs containing several modules, dealing with user input/output.

Introduction

In this lab you will develop a version of the text based role playing game "Dungeons and Dragons". The program will run on the LPC1114 and the user interface will consist of a dumb terminal serial communications program (hyperterminal) running on a PC. The starting point is a partially complete game which requires a number of refinements. The "game play" code is also absent.

Initial program skeleton

The support files for this laboratory consists of three modules described in pairs of C source and header files. The **uart** module (uart.c/uart.h) handles low level communications over the serial port. It also provides some high level functions such as printString and printHex. The **dnd** module (dnd.c/dnd.h) partially implements the game. The **main** module (main.c) is used merely to start the LPC1114 up and then call the RunGame function in the **dnd** module. Most of the action takes place in the **dnd** module.

Program operation

After boot up, the program waits for the user to press 'S' or 's'. It then uses a pseudo random number generator to create a "dungeon". The dungeon consists of an array of 20x20 characters. Different characters signify different items in the space. A dot indicates an empty space, lower case letters indicate "good things" to find and upper case letters indicate evil characters. It is possible to adjust the percentage of good/bad stuff in the code.

The next thing that happens is character creation. You are prompted for a name and your character attributes are initialized to random levels (although health is 100% to start with).

Once the game has started, you press keys to move around (you must implement this). As you move around you encounter good/bad stuff – you must code this too.

A debug function ShowDungeon is available which displays the location of all items in the dungeon. During normal game-play this map is not available.

Hardware requirements.

The basic LPC1114 breadboard circuit used in lab 2 (Blinky) is sufficient for this game.

Tasks.

(1) Study the modules, in particular the header files to acquaint yourself with the layout and capabilities of the code.

(2) Add a function printDecimal that sends the decimal string representation of a value to the serial interface. You should try to get the function to remove/not send leading zeros.

(3) Add in code to handle character movement. Use the debug ShowDungeon function to verify

that the character moves around the dungeon properly (press the # key)

(4) Plan the actual game play. How do characters “fight”? What is the effect of a character's attributes on a fight? How would you add other components to the games (potions, weapons, torch etc.)? What happens when a character finds the exit? What happens when a character dies?