

Implementation of Block Puzzle Game Using the Unified Training Learning Platform with Interfacing of Graphics LCD and Touch Panel

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Abstract – *Nothing beats the thrill of writing a code yourself for a game and seeing it up running. So a task of designing a game has been undertaken in which the player will be able to drag blocks as well as to move them and try to fit them all in the gray tray. But, the thing is if any game has to be developed then, as a designer one always aims to impart all his active programming skills along with innovation and creativity so as to make the game more interesting and amusing. So implementing the same logic on UTLP kit would fulfill the designer's desire as the player is provided with the combination of Graphics LCD and touch panel, the one would stay glued to the game for hours together as player has got a screen to view lot of blocks to operate with various logical features.*

Key Words: UTLP kit, UTLP Graphics LCD, UTLP Touch Panel, Eclipse, UTLP tool package.

1. Introduction

Since beginning of time, design has been a bridge between technology and its user. Hence design as a function always has to keep up with advancements in technology and it always did. It has enabled some impressive technological advances that we experiences in our day to day lives. In the field of gaming too, both technology and entertainment are getting advanced at a faster pace. Gaming and gambling, these are the areas of interest to commercial application developers working on large, enterprise wide, multiuser applications. So a task to design a block puzzle game using UTLP kit has been undertaken.

1.1 Structural design

The structural design of the game includes sequential logic, where the player will be able to drag blocks as well as to move them and try to fit them all in the gray tray. All the times the random size of blocks and same gray tray will appear on Graphics LCD. At last, the player would be successful if he placed all block in accurate positions. Player would face a challenge to fix block's position in accurate logic defined positions.

1.2 Unified Training Learning Platform

The UTLP kits provide the best platform to learn embedded systems working and their programming. These learning kits have ports for interfacing with various input-output devices i.e., starting from the keypad interfacing to the latest technology, Touchpad. Hands on training kit i.e., UTLP kit, is designed to benefit the users (Electronics engineers) and to give them an edge over others in their field. Unified Learning Kit is based on Texas Instruments OMAP3530 application processor & Spartan-6 FPGA. The Spartan-6 FPGA has number of IO interface.

2. Spartan-6 FPGA IO interfaces

The hardware platform consists of TI OMAP 3530 processor, Spartan 6 FPGA, 7 Segment LEDs, FPGA character LCD ,Processor character LCD, Graphical LCD, mike audio out, stereo out ADC, DAC, dual Ethernet dual SD interface USB and flexible IOs and Serial Port and other peripherals. The software consists of all hardware interfaced to the OMAP 3530 processor and Spartan 6 FPGA. The software runs on the OMAP 3530 board and has 128 MB flash, 128 MB DDR and 128 MB SDRAM.

It provides the state of the technologies integrated into a small form factor platform that is handy. It provides exposure to the latest technologies encourages research in emerging areas and motivates to adopt a multidisciplinary learning approach. A field-programmable gate array (FPGA) is an integrated circuit created to be configured by the customer after manufacturing—hence "field-programmable". The FPGA configuration is generally defined using a hardware description language (HDL), similar to that used for an application-specific integrated circuit (ASIC) (circuit diagrams were previously used to specify the configuration, as they were for ASICs, but this is increasingly rare). FPGAs contain programmable logic components called "logic blocks", and a hierarchy of reconfigurable interconnects that allow the blocks to be "connected together"—somewhat like a one-chip programmable breadboard. Logic blocks can be configured to perform complex combinational functions, or merely simple logic like AND & NAND. In most FPGAs, the logic

blocks also include memory elements, which may be simple flip-flops or more complete blocks of memory.

3. Software Packages

The software packages used are:

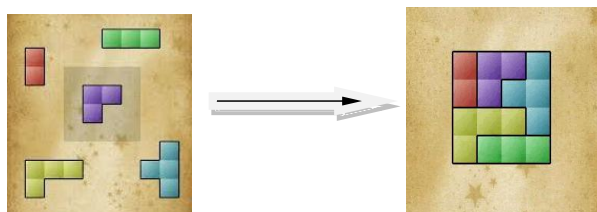
- Eclipse
- ULK Control Panel

Eclipse:-Eclipse is an open source community whose projects are focused on building an extensible development platform, innovative start-ups, runtimes and application frameworks for building, deploying and managing software across the entire software lifecycle. It uses plug-ins to provide all the functionality within and on top of the runtime system. It is an integrated development environment (IDE) for Java and other programming languages like C, C++, PHP, and Ruby etc. Development environment provided by Eclipse includes the Eclipse Java development tools (JDT) for Java, Eclipse CDT for C/C++ and Eclipse PDT for PHP, among others.

ULK Control Panel:-The Ethernet Stub (for the OMAP 3530) Functionality implemented on the ULK is designed as the Stub Client. The Client responds to the various commands sent from the Linux Server Application (Stub Host). Launching the Stub on the ULK reads the System IP Address and Initializes the Ethernet Controller. If any of these steps fail, the Stub is exited and suitable Error Messages are displayed on the Console. A Kit in the Factory Reset State will not be having any pre-configured IP Address. In this case the Stub Client will attempt to acquire an IP Address through DHCP. The Stub on the ULK continuously receives Ethernet Packets. Both Broadcast Packets as well as Non Broadcast Packets are received and processed. Processing the Packets involves identifying the authentic Ethernet Packets (Packets sent from the Linux Host Application - Stub Host), Identifying the Command in the Authentic Packets and Responding to the Command if needed. Using this Application it is possible to scan for the available ULK's connected to the Network, Establish a Connection with a Particular ULK, and to communicate with the ULK once the connection has been established.

4. Methodology

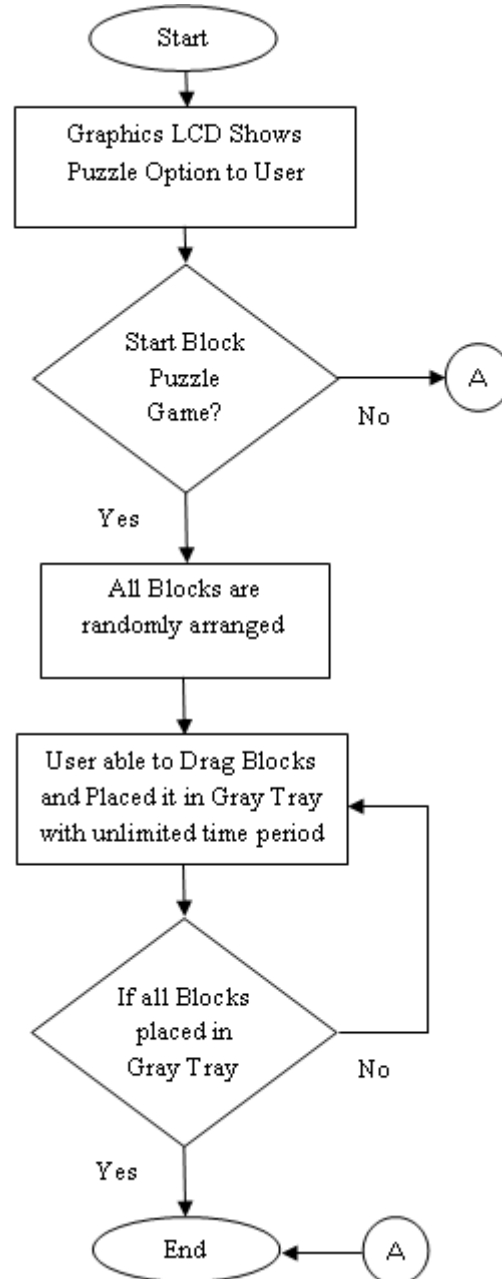
Just select start options and the game begins. Then user has to follow rules and regulations to play a game.



The premise of Block Puzzle is simple: Drag blocks around the screen to fit them into the gray tray which is in the

middle of the screen. This is simple at first with just a few blocks and a few different possible arrangements. But as the number of blocks increase it definitely becomes a challenge.

5. Flowchart



6. Result

A Block Puzzle logic program is created after studying all the tools and features of UTLP and as a result a game of block puzzle is generated which helps a player to select a block and fix it in the gray tray. In addition to this the user can also select levels of difficulty in the game and can view his score and compare it with other players score which are automatically stored in memory.

7. Conclusion

Graphics LCD, touch panel, counter, LEDs all interfaced and logically programmed to generate a game of block puzzle on UTLP kit. Improvements can be done in the fields of generating chess checker, and other logical games.

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