INTELLECTUAL GAME DEVELOPMENT USING UNIFIED LEARNING PLATFORM KIT (UTLP)

Mr.Kannan.G[1], Mrs. Priyadharshini. S[2], Dr. R. Preetha[3]

[1]Student, Dept of ECE, Rajalakshmi Institute of Technology, Chennai, India
[2]Assistant Professor, Dept of ECE, Rajalakshmi Institute of Technology, Chennai, India
[3]Associate Professor, Dept of ECE, Rajalakshmi Institute of Technology, Chennai, India

---***---

Abstract - *Embedded system has been drastically developed from the last decade which made its application much more important in medical field, industries, radar etc. The goal of our paper is to implement a brain storming game using ULK (Unified Learning Kit) and it poses a challenge to our intellectual thinking. It is a Single player reflex type puzzle game. The first module is to display the puzzle on the console window and to display the board containing four collaged bmp image in the GLCD screen. The player needs to touch the odd one from the given set of four pictures. In the second module the correctness of the answer is made to be displayed in the CLCD display panel. Finally, the total score obtained by the player is displayed on the seven segment display.*

Key Words: Intellectual thinking, single player game, GLCD CLCD seven segment display, ULK (Unified Learning Kit).

1. INTRODUCTION

UTLP (Unified Technology Learning Platform) is an ardent facilitator which uses a kit named ULK (Unified Learning Kit) for aiding engineers gain hands-on, learn and understand complex and advance technologies simply. Besides, UTLP also concentrates on making students and freshmen industry ready as it gives them the experience of working in real time. Eventually, UTLP embraces modern technologies to bridge the gap between academia and industry. It also promotes and expedites Entrepreneurship and Research within our country.

2. HARDWARE DESCRIPTION:

ULK is based on Texas Instruments OMAP3530 application processor which is a high performance processor based on ARM architecture. The ARM-8 Cortex processor, has the ability to scale in speed from 600MHz to greater than 1GHz. The Cortex-A8 processor can meet the requirements for power-optimized mobile devices needing operation in less than 300mW. It is used to support high-speed devices and number of thread processing application. It supports many interfaces like Audio in & out, TV out, GLCD, Ethernet (10/100Mbps), Keypad, 2 SD cards & external interface connectors such as I2C Header for GPS, Bluetooth & Modem Connector, and Camera Connector & LCD connector. The Spartan-6 FPGA supports internal interfaces likes 10 bit ADC and 12 bit DAC with parallel interface CLCD, Ethernet (10/100Mbps) & external interfaces such as 70-pin IO expansion connector & 20-pin IO header.

The ULK kit runs o n l y on t h e UBUNTU PC of version 12. The Embedded C code is generated using Eclipse software. The CLCD and GLCD is also embedded on the kit which are used for the implementation. It is placed in the arm processor part and hence can be directly accessed while coding using Embedded C. Different APIs were used for enabling and disabling the touch feature on GLCD. The 24 bit RGB and LCD control signals from OMAP 3530 processor has to be taken out to interface with GLCD.

The signals coming out of the GLCD should be of 3.3v. The voltage levels of the signals coming out of OMAP is 1.8v hence level transistors are used in the internal circuitry of GLCD to convert 1.8 level signals to 3.3 level signals. The SPI (serial peripheral interface) of the processor is used to communicate with TSC2046. The external LCD will be interfaced with touch screen controller through 4 pin 2.54mm pitch header. The touch screen analog signals from the 3.5inch LCD will be interfaced with touch screen controller through the 54 pin LCD connector. The character LCD is used display both numbers and characters. The size of CLCD is 2*16 (2 rows, 16 columns). If the string size exceeds the limit of the CLCD an option to scroll the text either from left to right or right to left is provided. It is placed in the FPGA part of the kit and hence cannot be directly accessed while coding using Embedded C. Different API"s is used start, initialize, display characters and stop the display. The software comprises of the FPGA Character LCD interface. The processor communicates with OMAP processor through the Spartan 6 FPGA embedded inside the internal hardware of CLCD of UTLP.

The following paper is organized as follows. The section 1.2 describes the proposed methodology, in which the section 1.2.1 tells about the Intellectual game and its execution procedure. The section 1.2.2 describes the flowchart which gives a detailed instruction to user who play this game. The section 1.2.3 and 1.2.4 gives detailed information on Character LCD and seven segment LED display.

3. PROPOSED METHODOLOGY:

3.1 Odd One Out Game:

An intellectual game which pick a correct image from odd one is a single player game in which input is given to the ULK Control panel using a keyboard via a program coded and compiled using eclipse software is as shown in figure 1 and it gets interfaced with the ARM 8 Processor and Spartan6

FPGA. After compilation, the ULK control panel is interfaced to the ULK kit. The code is loaded in control panel for running the system. When the user selects the "PLAY NOW" option the question number is displayed on seven segment display. After displaying the question number the user is asked to play the game by touching the correct picture. Similarly at last Total score will be displayed using seven segment LED display. The detailed flow chart of information retrieval system is as shown in Fig. 1.
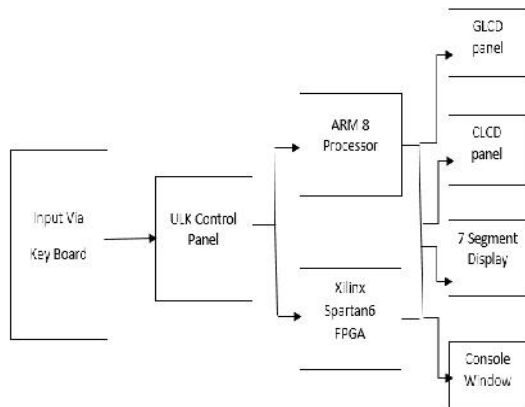
Fig-1: block diagram of Odd One Out game

3.2 Flowchart:
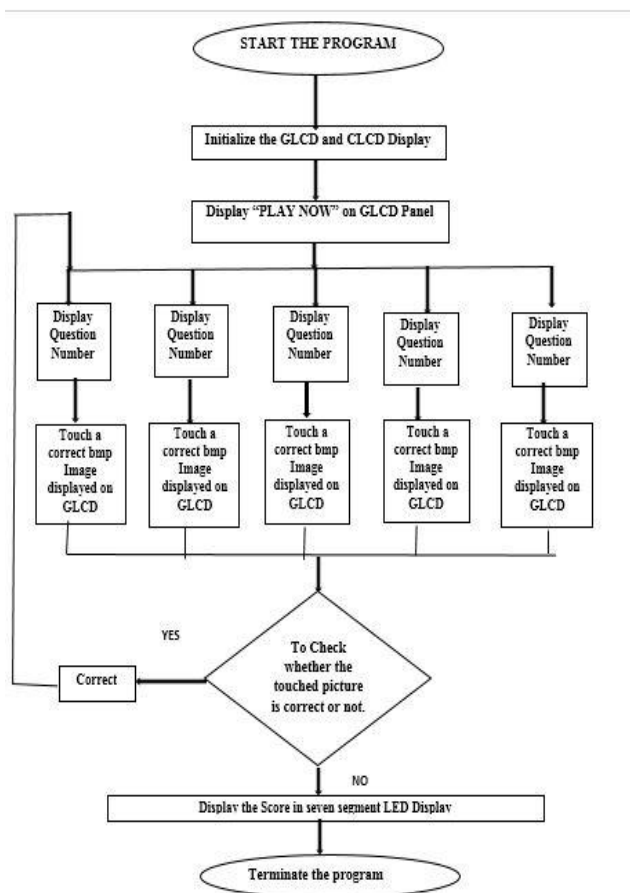
Fig -2: Flow chart of Odd One Out game

The above figure 2 shows the flowchart which describes our game titled "ODD ONE OUT" in a detailed manner for users who playing this game.

3.3 Character LCD:

A 16x2 LCD shows to display 16 characters per line and has 2 lines. Each character is displayed in 5x7 pixel matrix. Character LCD interface is shown as Fig.3. The 16x2 character LCD is connected through the I2C interface. Each pixel is programmed with Display and Touch. R, G and B are the primary colours. The size of CLCD readily interfaced on the kit is 3.5 inch (320*240 pixels). To display other colors trial and error method has to be used.
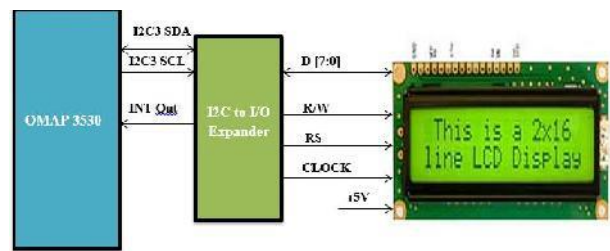

Fig -3: Character LCD Display

3.4 Seven Segment display:

The kit also has seven segment LED is used to display the characters. The 7 Segment LED can be used in many applications. Some of them are digital clocks, electronic meters, basic calculators and other electronic devices that display numerical information etc.
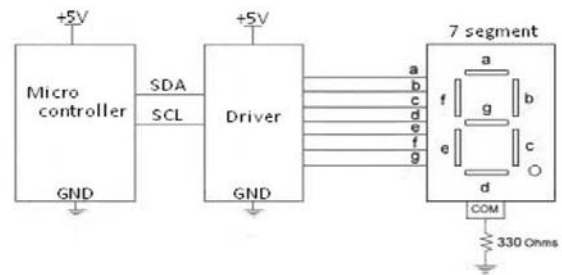

Fig – 4: Seven Segment Display

3.5 Eclipse Software :

Eclipse is multi-language software which is developed by development environment tool for developing the applications in Java program and, by means of various plug-in systems, other programming languages including Ada, C, C++, COBOL, FORTRAN, Haskell, Perl, PHP, Python etc. Eclipse IDE tool is a tool which is used for developing applications based on C language for UTLP.
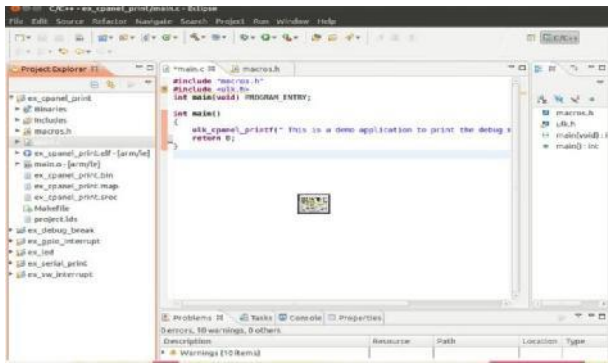
Fig – 5: Eclipse Software program window

3.6 ULK Control Panel:

The ULK (Unified Learning Kit) control panel is an application program which is developed using ubuntu development PC (Personal Computer) which facilitates the communication between the Ubuntu Host personal computer and the UTLP. It also enables downloading and executing the UTLP program in a both Lab mode and Normal mode. Fig 6(a), shows the host and client interface in which the ULK kit is connected to a personal computer.
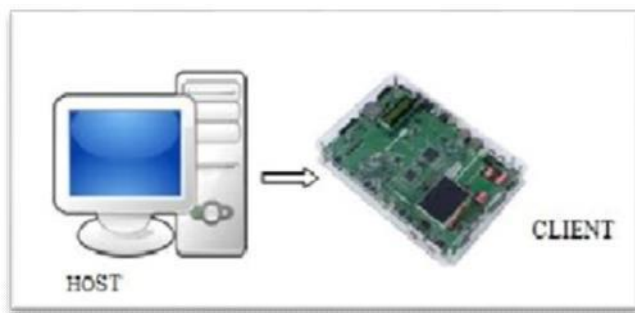

Fig- 6 Host and Client Interface

Fig- 7 ULK Control Panel

4. IMPLEMENTATION:

The program has been implemented in Unified Technology Learning Platform kit display. When a player starts playing by touching " PLA Y NO W" in Touch LCD panel, A Question number will be displayed in 7 segment LED display first and An output score will also be displayed on Seven segment display and Console window with the help of API

which is coded using Eclipse software. Unified Technology Learning Platform kit display. When a player starts playing by touching "PLA Y N OW" in T ouch L CD pan el, An Image can be displayed on GLCD and Question number will be displayed in 7 segment LED display An output score   will also be displayed on Seven segment display and Console window with the help of API which is coded using Eclipse software.

Fig 8- ULK Load operation

5. DISCUSSIONS:

The program written in Embedded C was executed using the Eclipse software. C application program window is shown in the figure. After successful execution, it is interfaced with the UTLP kit through ULK control panel.

Fig. shows the execution window of the ULK panel where the program was interfaced with the kit. ULK load and execution operation was done in the ULK panel. The output was displayed in the console window shown in the fig., as well as in the CLCD a n d G L C D as shown in fig.6e. As fig.6e, depicts the 7 segment display for Score and Question number.
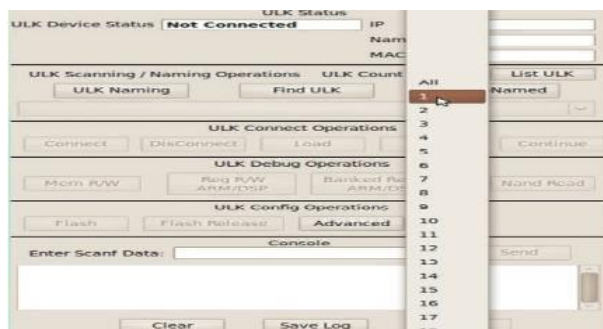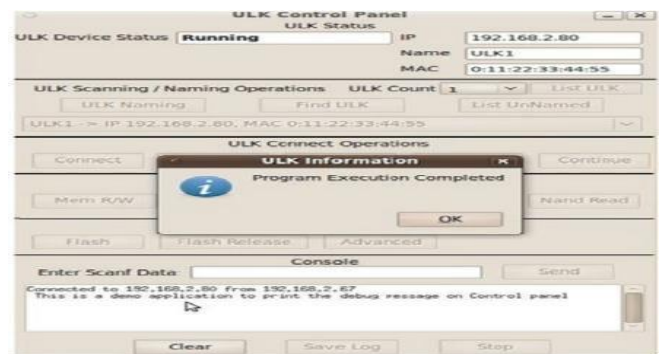

Fig-9 Program Execution in ULK Control panel

Fig -10 CLCD display shows that the choosing picture is correct one.

Fig- 11 CLCD display while showing that the choosing picture is wrong one.

Fig- 12 GLCD display shows that the player touched one of the four images while playing a game.

Fig- 13 Seven segment display while showing a question number.

Fig- 14 Seven segment display while showing a Score at the end of game.

6. CONCLUSIONS:

Thus The paper titled "ODD ONE OUT" aimed at using UTLP because of the advantages it offered when compared to other alternative design options. The Embedded C language is used effectively for the some reasons. The main problems encountered during the project implementation such as uploading the images on GLCD and the conversion of .jpeg file to .h file. Introduction of various options for the user gave the opportunity to learn the proficiency of UTLP kit and Embedded C.

The other details of the game like general information, high score, Various levels are also displayed according to the user's choice within a touch, according to the objective of the project and thus provides an efficient and better platform for the development of project. This model can be further improved by providing an audio output in both English and local languages.

7. FUTURE WORK:

My future work is to implement the same in the medical field not as a game but to check the availability of a products at a right time by touching the product name which already programmed in the GLCD panel. The result of searched product will be displayed in the CLCD and its availability count in seven segment LED display.

8. ACKNOWLEDGEMENT

9.REFERENCES

[1]. "Hardware Reference Manual", Documents, Mission 10x, Wipro Technologies.

[2]. Lab Example Programs", Documents, Mission 10x , Wipro Technologies . K. Elissa, "Title of paper if known," unpublished.

[3]. Vasanthan S Dasan, Sun Microsystems,Inc.,"Personalized information retrieval using user-defined profile", June 2. 1998.

[4]. Saira Sultana, "TOUCH AND RETRIEVE" Information Retrieval System using Unified Technology Learning Platform (UTLP).

BIOGRAPHIES:

Mr. Kannan. G is a third year student of Department of Electronics and communication engineering, Rajalakshmi Institute of Technology, Chennai-124. His area of interesting is Embedded programming, VLSI Design.

Mrs. S. Priyadharshini received her B.E in Electronics and Communication Engineering from Pallavan College of engineering in 2011 and M.E degree in Applied Electronics from Saveetha Engineering College in 2014. She is currently working as Assistant Professor in Rajalakshmi Institute of Technology, Chennai and has 3.5 years of

experience. Her area of interest includes Medical Image Processing and Embedded Systems description .

Dr. R. Preetha received her B.E in Electronics and Communication Engineering from Madurai Kamaraj University in 2003, M.E in Communication systems from Anna University- Chennai in 2011. She pursued her Ph. D in information and communication Engineering-Anna University in 2017. Her area of interest includes Image Processing, Medical Image Processing and Digital Image Processing. She is a member of IEEE, ISTE and IETE.