

Mobile Cellular Phone Based Tsoro Yematatu

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Abstract.

Mobile phones have become the dominant form of wireless communication in the world, and therefore are suitable medium for distributing african games such as Tsoro. Tsoro is an african indigenous word which is translated to mean war between two parties. The game of tsoro thus comprises competition between two or more parties. Numerous forms of this game exist ranging from the Ndebele, Zezuru zig zag, manyika and kalanga. In this paper we report on the design and implementation of a version of the tsoro board game called Tsoro Yematatu on a cellular mobile phone platform. Our design and implementation thus achieves the following:

(i) Enables two players to play against each other via Bluetooth (ii) Human player to play against a computer (iii) several players to be hosted on a tournament by a tournament manager (iv) Provide a help facility and enables user to keep a record of their wins.

The game can be used to teach some specific mathematical concepts such as logic. Moreover the game also helps promote spontaneous interaction amongst learners as they communicate their activities to fellow participants. This, to a greater extent, creates familiarity between mathematics and indigenous games and in the process helps learners to overcome their fear of mathematics

Keywords: Game, Tsoro, Phone, Bluetooth

INTRODUCTION

The protection and preservation of the diverse cultures of the world is one of the foundations upon which the United Nations was built. The United Nations education scientific and cultural organization (UNESCO) is the primary body of the UN to protect and preserve culture. At the core of UNESCO's work is the recognition of the link between culture and the broader aims of the people throughout the world (Elizabeth, A and Thomas, H, 2000).

Information and Communication Technologies (ICTS) are increasingly being put to many different uses for cultural preservation ranging from the creation of databases and archives to organizing and keeping safe important understandings as well as artifacts to the development of iphone apps for language learning (Mathew ,C,2001). Moreover, within the African context, the New Partnership for Africa's Development (NEPAD), has created an e-Africa Commission a special task team responsible for the ICT sector. The implementation framework for e-Africa comprises the elements shown in figure 1:



Figure 1: e-Africa Elements(Mathew ,C,2001)

An important initiative within the context of content and applications element is the development of African games software as a natural point of entry for Africa into industry that must be utilized to gain some intellectual property over these creations.

On the basis of this initiative, we present a design and implementation of a Mashona traditional game called Tsoro Yematatu on a cellular mobile phone. Tsoro Yematatu game is a board game usually played by two players. Players first drop their three pieces onto the board, and then move them to create a 3 in-a-row which wins the game (Wiki). The rules are as follows:

1. The board is empty in the beginning. Players decide what color pieces to play, and who starts first.
2. Each player drops one piece per turn on any vacant point on the board. Players alternate their turns. Pieces cannot be moved until all six pieces have been dropped. Observe that after all pieces have been dropped, there is only one vacant point on the board.
3. A piece can be moved one of two ways: a) A piece can move one space per turn onto a vacant point following the pattern on the board, or b) a piece can jump over another piece (friend or foe) adjacent to it, and land on a vacant point on the other side; the jump must be in a straight line and follow the pattern on the board. There are no captures in this game.

4. The game can last a very long time, and if no one is still able to create the 3 in-a-row, the players can agree to a draw.

The game is implemented on the cellular mobile phone because mobile phone devices are increasingly becoming widely available. This paper's contribution is as follows:

- (i) Enables two players to play against each other via Bluetooth
- (ii) Human player to play against a computer
- (iii) several players to be hosted on a tournament by a tournament manager
- (iv) provide a help facility and enables user to keep a record of their wins.

The rest of the paper is as follows. Section 2 presents the background of the Tsoro game, section 3 presents the design of the game while section 4 presents the implementation and the final section concludes the work.

BACKGROUND

According to (Kumar, S, Ncube, O and Munapo E, 2003) tsoro is an African indigenous (possibly Nyanja/shona) word which implies brain war between entities. It also infers a strategy by one party to win over the other party. The tsoro game belongs to the mancala family (Henney A J and Agbinya J I, 2005).

The game of *tsoro* has many varieties. In all varieties, the game is played by two people. Each player has two rows of holes. The number of holes in each of the four rows is constant. However, varied games have varying numbers of holes in each row. There are games with holes ranging from 4, 6, 9 etc. The holes comprise the same number of pebbles. Usually, each hole contains three pebbles. The holes are arranged in a rectangle with four rows, the first two being allocated to the first player and the last two to the second player. The number of columns is equivalent to the number of holes (4, 6, or 9, etc.) in each row. In one of the Tsoro versions in Zimbabwe row has four holes, with three pebbles in each initially (Masiwa T(1999)). The authors in (Masiwa T 1999) fall short of recognizing yet another important version of tsoro-called Tsoro Yematatu (Zijlma A.). Tsoro Yematatu is a two-player abstract strategy game from Zimbabwe (Agbinyah, J. I. 2004). To date, (Agbinyah, J. I. (2004) has attempted an online version of the game in which the user can play against a computer. The game is not so accessible, as it requires one to have not only a computer to be able to play but internet connectivity as well. The games industry has become a new area for revenue generation for cellular network operators and is set to rival what is being achieved using ring tones (Zaslavsky C1998). Moreover the majority of games that are currently available on cellular handsets do not address the needs of the African market as very few of the African cellular users identify with them. The African context is home to widespread diversity of games that appeal to both the young and old. Clearly a whole lot of unexplored games exist on the African content and there is an urgent need to preserve them through the use of information and communication technologies (Majuta C, Nleya S.M and Nyathi T.V, 2010).

METHODOLOGY

Adopting an agile unified approach to the design of Tsoro Yematatu as well as making use of the Java 2 Micro edition and Bluetooth technology. The design is presented initially through an architectural design for two players as shown in figure 2. The players, player 1 and player 2 are using phones to interact via bluetooth technology. The initiator of the game player 1 is the one considered to be the server while the invited player 2 becomes the client. The game engine is the game application software that is loaded on the phone. Figure 2 shows the user interface design of the game, the board is an isosceles triangle. Each of the players has at most three pieces to use when making their moves.

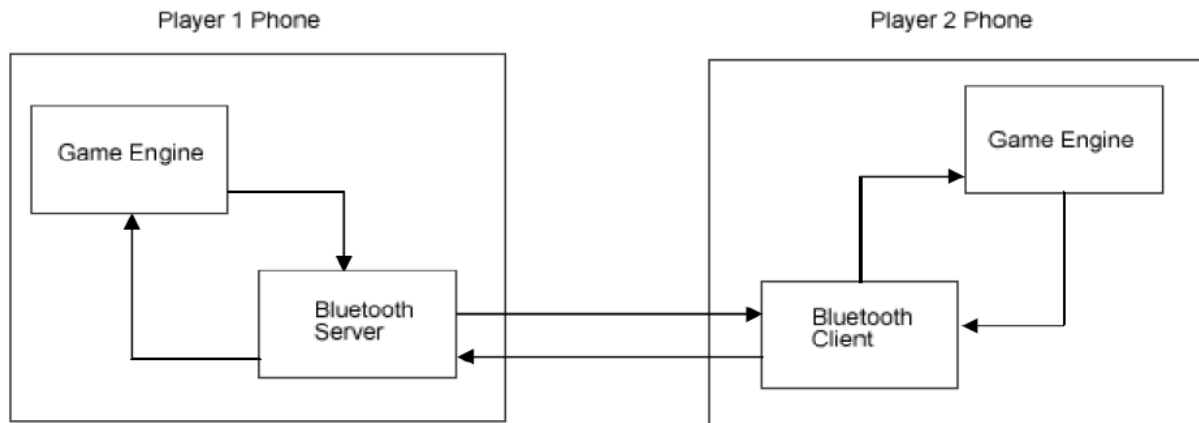


Figure 2: Architectural Design

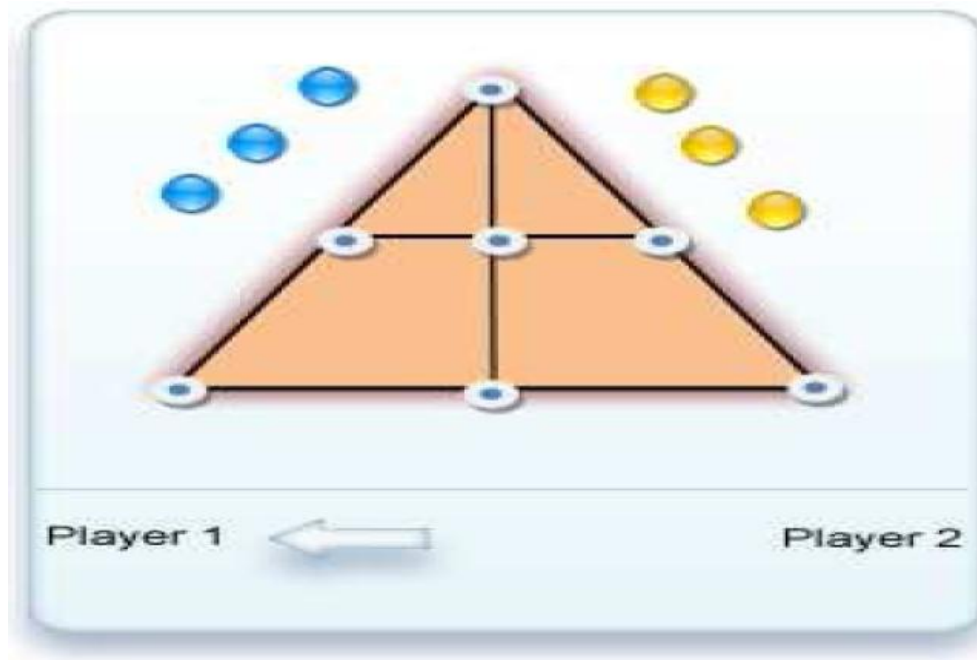


Figure 3: Interface Design

The arrow is used to indicate which of the players is to make the next move. In the diagram the arrow indicates player one has to make a move.

The class diagram(fig4) of the Tsoro Yematatu game shows the main software objects, their attributes as well as the associated interactions and operations. The diagram also depicts the relationships between these objects such as generations and association.

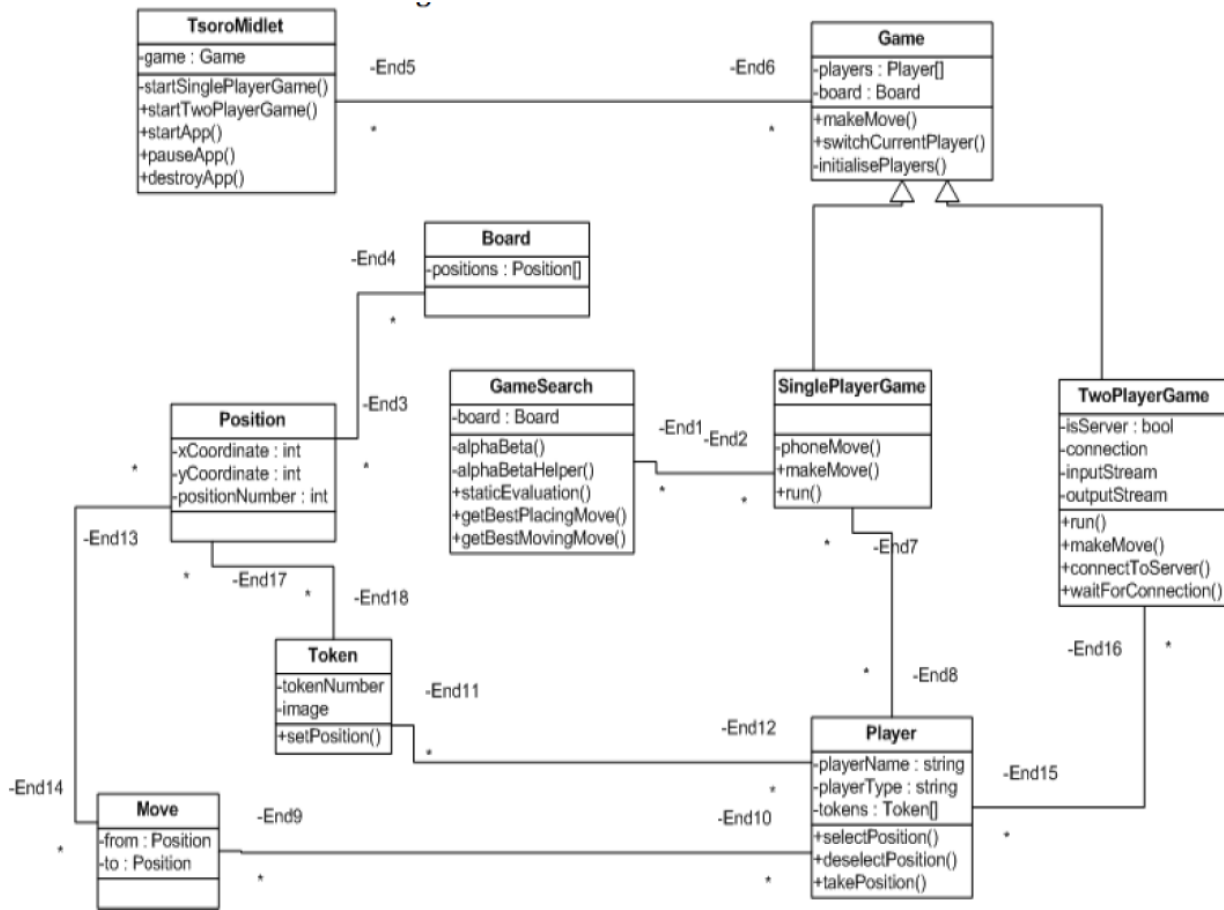


Figure 4: Class Diagram

IMPLEMENTATION

The initial approach to the implementation is that of dealing with the user interface where the option to log-in is availed. The user has an option to select their login name as shown on figure 5a. However; new players are also catered for as shown in Figure 5b where the new player option has to be chosen.

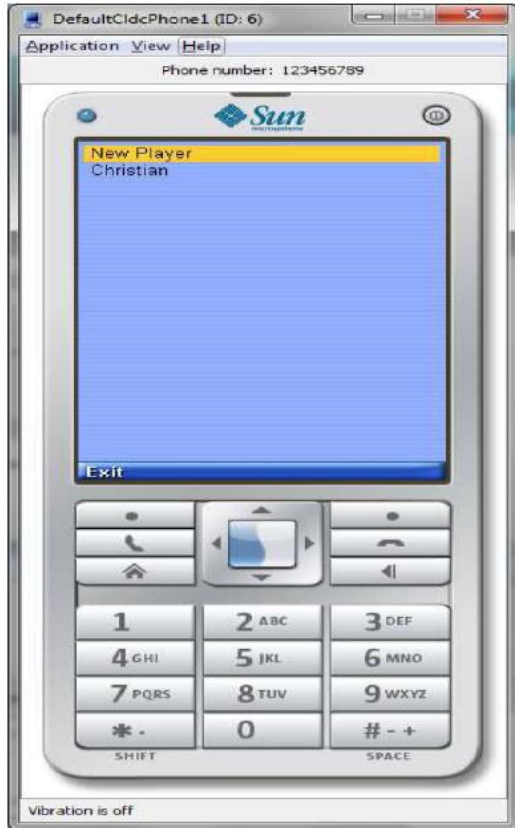


Figure 5a: Existing player



Figure 5b: New Player Option

LANGUAGE MENU

The game has four language options namely English, Shona, Ndebele and Kalanga. The user is thus free to select a language of their choice. The options are shown in figure 6. It is important to note that more the application can be configured for more language options.

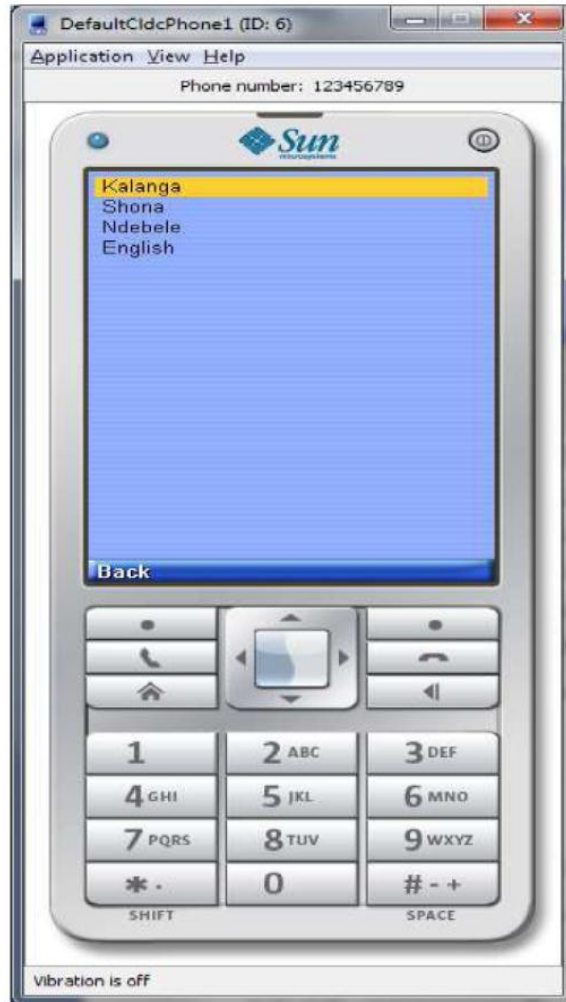


Figure 6: Language Options

Game menu

In the game option, a player can choose to play against a computer (single player) or against another player (two players). The game system will keep track of the scores of the game. A help facility in the form of instructions is available to assist the new players as shown in figure 7. The other part of Fig 7 shows the Tsoro Yematatu board on the cellular Phone.

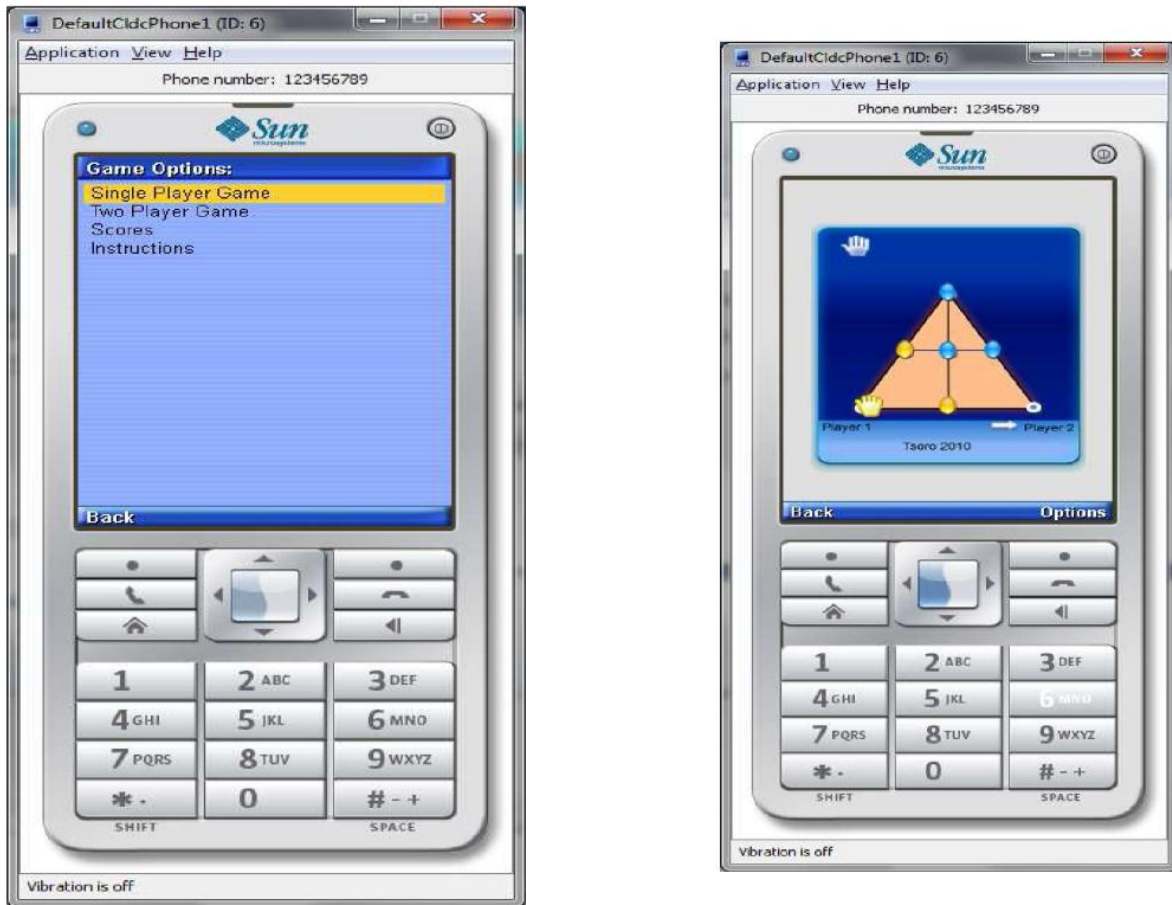


Figure 7: Game Menu

When the game ends, the player is shown over the game canvas what the outcome of the game is as shown in figure 8. The performance measure of the player can also be made available through a provision of the previous game scores as shown in figure 8b.



Figure 8a: End of Game

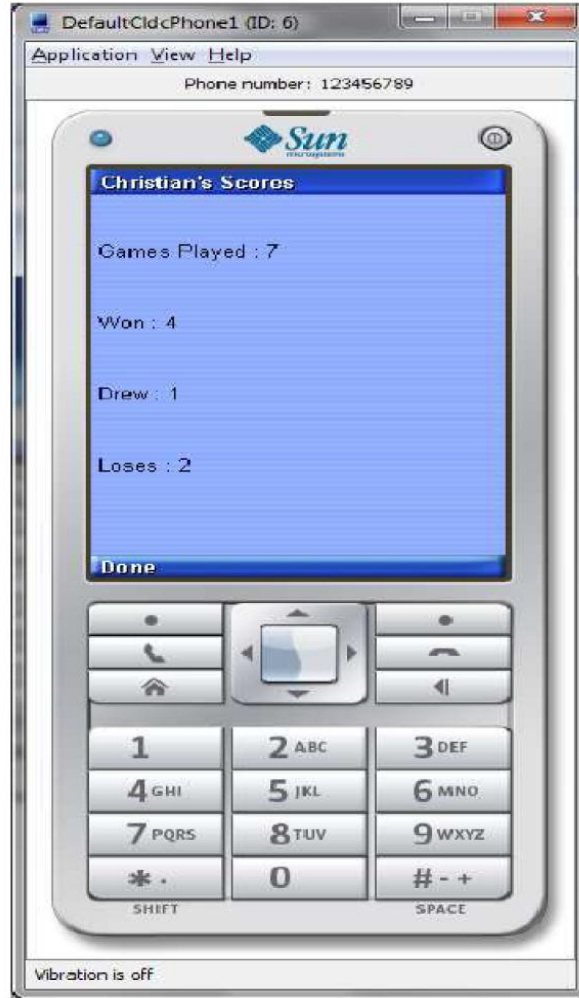


Figure 8b: Scores

Finally a tournament can be played as shown by the log table in figure 9. The log table shows the number of matches played and the associated points.

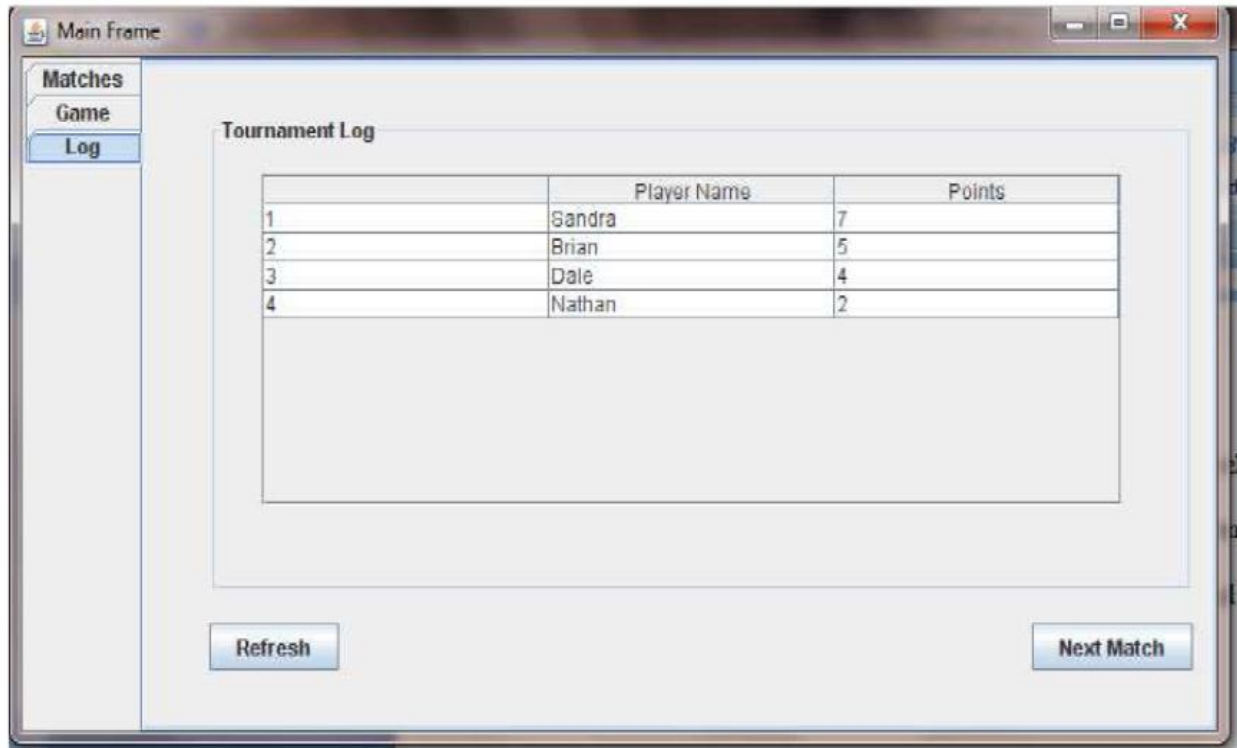


Figure 9: Log Tournament

CONCLUSION

A cellular phone based Tsoro Yematatu game has been designed and developed. The game is cellular based because mobile phones have become the dominant form of wireless communication in the world. It would however be interesting to investigate a number of issues; firstly how this game can be played using four pieces as well as how rules can evolve to make the game more dynamic. Secondly it is important to investigate optimal winning strategies. More importantly it would be reasonable to promote through the same technologies other forms of indigenous African games. This game and most other games can also be used to teach useful mathematical concepts such as logic and are also a cultural preservation.

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