Game Programming: Arabic Words Puzzle.

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Abstract
This research shows the design and implementation of a small and simple Arabic word-puzzle game to test the effect of electronic games in enhancing and supporting the traditional learning system. The system based on from the real needs of classrooms in the Iraqi primary schools so the game is designed for primary school students (first and second grade) and this required the exploration of how schools use and teach information. The system is built by using Visual Basic version 6 programming language in conjunction with the Microsoft Office Access 2007, Results show our game based educational program is effective. 14 children (6-7 years old) played the game. The children played through multiple sessions. For each child; this game is useful in learning new words and enhance his/her memory by repetition.

Keywords: Game Programming, Arabic words Puzzles, Enhance Learning.

برمجة الألعاب: لغز الكلمات العربية

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الخلاصة:
في هذا البحث تم تصميم وتطبيق لعبة لغز الكلمات العربية وذلك لاختبار تأثير الألعاب الالكترونية في تحسين ومساندة أنظمة التعليم التقليدية. تم بناء النظام من الاحتياجات الحقيقية للفصول الدراسية (الصف الاول والثاني)في المدارس الابتدائية العراقية وهذا تطلب استكشاف كيفية استخدام المدارس للمعلومات وتعليمها. تم بناء المنظومة باستخدام لغة برمجة Visual Basic version 6 و Microsoft Office Access 2007. اظهرت النتائج بان اللعبة هي برنامج تعليمي فعال. 14طفل تتراوح اعمارهم (6-7) سنوات لعبوا هذه اللعبة من خلال عدة محاورات. اللعبة ساعدت كل طفل على حدة في تعلم كلمات جديدة او تذكر كلمات عن طريق التكرار.

1. Introduction

Recently, new technology based systems are growing rapidly, it is required to establish literacy education of the new systems. Word games are fun ways to increase learner vocabulary, diagnose player's knowledge level, thus they can be used in literacy education systems.
To develop games several things must be taken into consideration such a: working environment, thinking through the game project stages, deciding, what kind of game to make, targeting devices,

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designing the interface and controls, using sound and music and finally number of players**.** For more details see [1].

T. Hata, N. Ushijima, H. Hiraga and K. Watanabe have developed a game based on learning program for e-money literacy education. They applied "The Game of Life" as an educational material [2]. M. Ronimus, J. Kujala, A. Tolvanen and H. Lyytinen investigated in their study the effects of two game features (the level of challenge and the reward system) on first and second graders' engagement during digital game-based learning of reading [3]. H. Mohammed, developed a Cross words for kids application. The kid can choose from only 15 game. The application helps to teach reading by the presence of sound property useful for children who cannot read [4]. Qatar University developed Letters & Words is an educational yet exciting application for kids. The application consists of three different components—Letters, Words, and Sounds—each component incorporating both learning and fun [5].

2. Arabic Game Puzzle Design and Development:

The design process passes in several steps, these steps are

1- Step One: Gathering the Information and Specifications.
2- Step Two: Game Structure Design and Implementation.

2.1 Step One: Gathering the Information:

In this step the requirements for Arabic game development are gathered and defined such as:

1- Specify that the personal computer (PC) will be the working environment.
2- Specify that the system will be programmed using visual basic and Microsoft access.
3- Specify that Arabic Game Puzzle will be the kind of game to make.
4- Specify that the targeted users are any user from 7 years and above can play the game.
5- Specify that the inputs and outputs for the game.
6- Specify that the player will navigate through the game by using mouse and menus and thus
7- Specify the interface, graphics, sounds or music and controls.
8- Specify that the game is a single player game.
9- Specify that the game is free for all the users.

2.2 Step Two: Game Structure Design and Implementation:

In this step the main system architecture is designed and code is developed, implemented and tested as shown in figure -1 below. The human expertise and knowledge engineer are responsible on information gathering and specification, coding the system based on the (sketched architecture, gathered information and specification), testing the code incrementally and finally; revising based on testing.

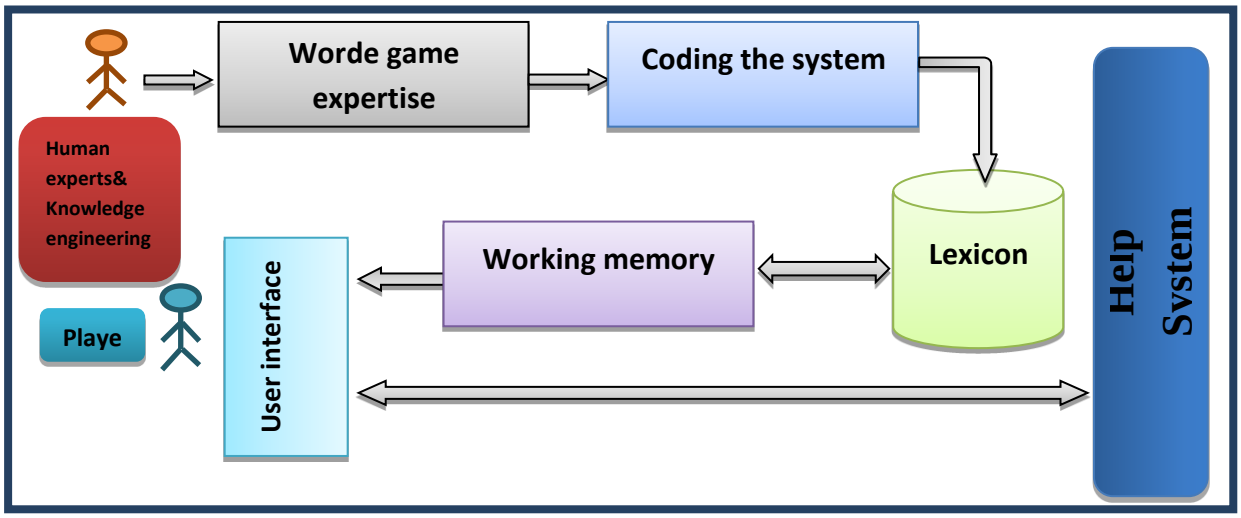

Figure 1- Relations among the Parts of the Program**.**

Lexicon: is the part of the program that includes identified words. It includes about 100 words taken from textbooks of the first and second grades in Iraqi primary schools [6, 7].
Working Memory: is the part of the program that stores intermediate results.
Help System: is the part of the program that explains how the game can be played.
User Interface: is the part of the program that enables the player from playing the game and connects the player with other parts of the program.
Flowchart of the game program that shows flow control is shown in figure -3 below.
Simplicity in game menus is required so the player does not feel bored and leaves the game; thus, only a single menu is used (which is the main menu). This menu includes the necessary controls (buttons) shown in figure -2 below. A single sub-menu is driven, which is Help System Menu; this menu includes description about how to play. There is no public domain readymade Arabic word lists available for download, therefore a list consists of 100 words was created. When running the program, the menu shown in figure -2 will appear.

Figure 2- Main Menu.

The program includes required buttons, such as:
Start (بدء) button, Stop timer (ايقاف المؤقت), Stop game (انهاء اللعبة), Check the word (تحقق من الكلمة), Resort (اعادة ترتيب) and Help system (النظام المساعد) button.

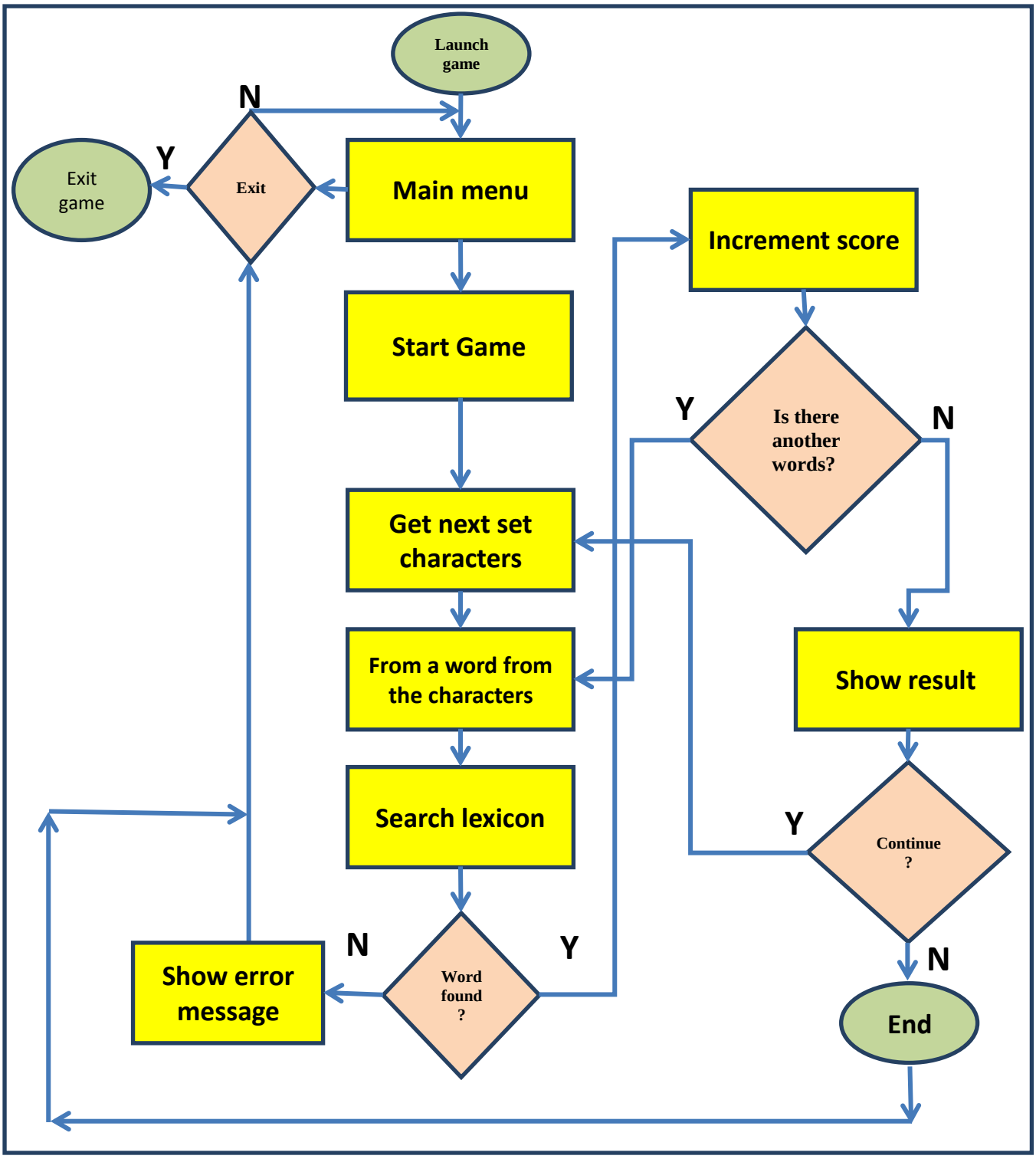

Figure 3- Arabic Word Game Puzzle Flowchart.

The player can start playing by pressing the start button (بدء). Each player will be given three minutes (180 seconds) for playing and random letters will appear, so the player can choose from them to form meaningful words as shown in figure -4 below:

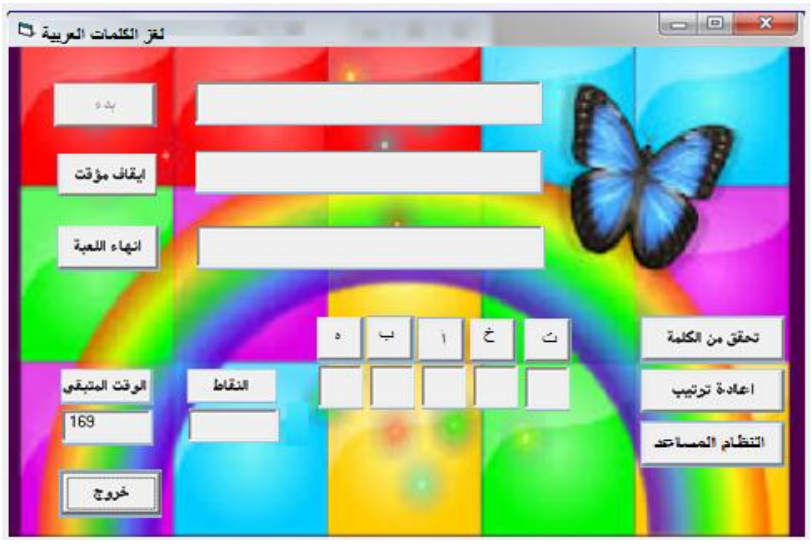

Figure 4-Player Choose from Randomly Selected Letters.

The program chose (ه،ب،ا،خ،ت), the player selected letters (ا and خ) then pressed (تحقق من الكلمة) button. The program will search for the word (اخ) in the lexicon. If it is found then the scores will be incremented by 3 as shown in the figure -5 and figure -6 below:

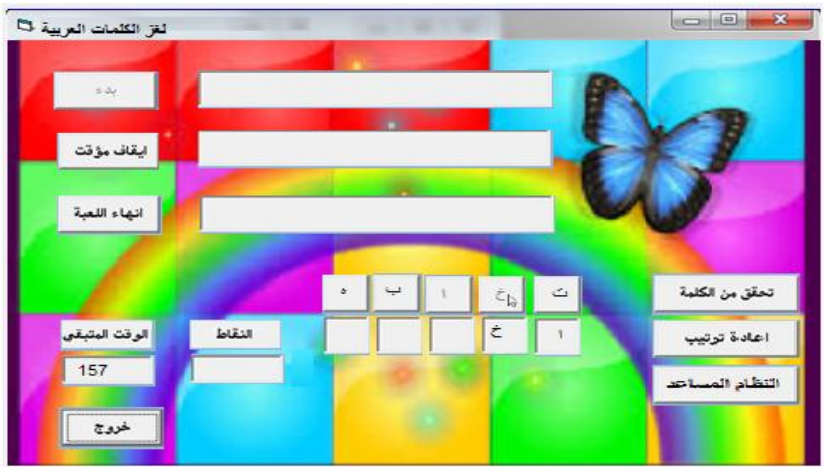

Figure 5- Choosing ا،خ Letters.

Figure 6- Increment Score.

Since the player has more time; so can choose another word as shown in figure -7 below:

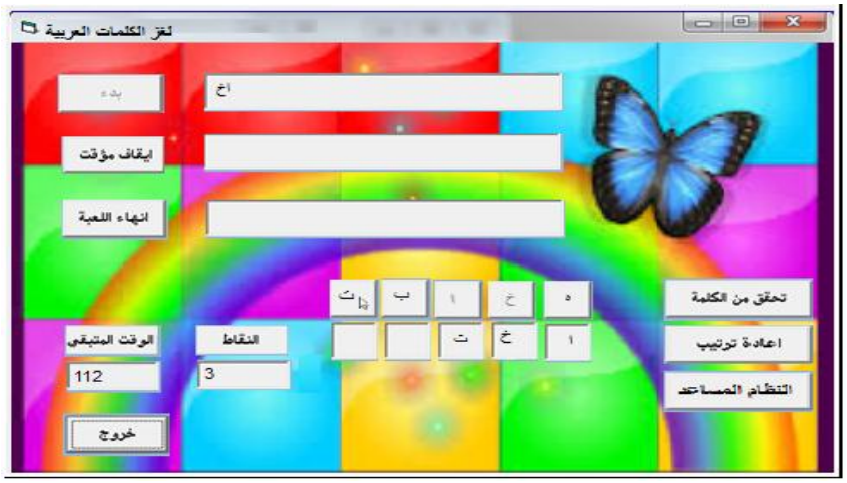

Figure 7- Choose Another Word.

The player chose the word (اخت); the program found it in the lexicon and incremented the score by 3 as shown in figure -8 below:

Figure 8- Continue Playing.

The player can end the game at any time by pressing (انهاء اللعبة) button, so the program will show the final result as shown in figure -9 below:

Figure 9-Stop the Game.

The game was played by 14 children at different ages, ranging from 6 years to7 years. The children played through multiple sessions. For each child; this game is useful in learning his /her new words and enhance his /her memory by repetition but it has been noticed that the children felt boring quickly and stopped playing, thus it is required to find more entertainments and provide more powerful programming interfaces that encourage children to play more and more until achieving the required final goal from the game.

6. Conclusions and future works:

In this research, we describe details of a small and simple Arabic word-puzzle game for primary school students (first and second grade). The students experienced and used the game. And the students got motivations for the future study. The results showed that the program worked effectively for the students to learn and remember Arabic words. This was the first step. Good results were got, but more development is required. For examples; expert system shell need to be built to make the modification of lexicon and other game contents easy, to make the game either single or multiplayer, and so on. To increase such sub-programs, it is important to provide more fruitful educational programs for Arabic literacy in the future**.**

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