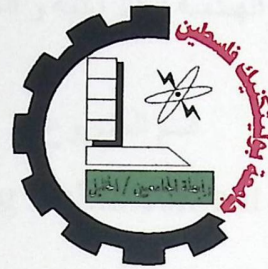


Palestine Polytechnic University



College of Engineering & Technology
Electrical & Computer Engineering Department

Graduation Project
Reading Enhancement Tool

Project Team:

Nour Aldeen J.Jibreen

Mohammed A. Al-Jebrini

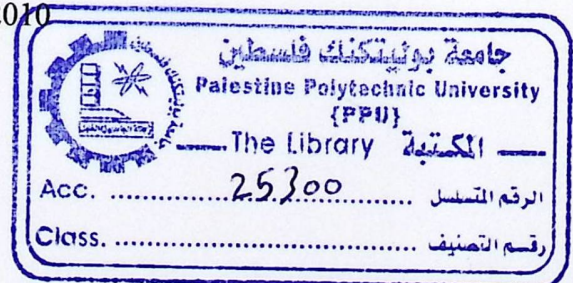
Project Supervisor

Eng. Khalid Daghameen

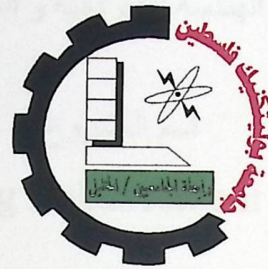
Hebron – Palestine

February, 2010

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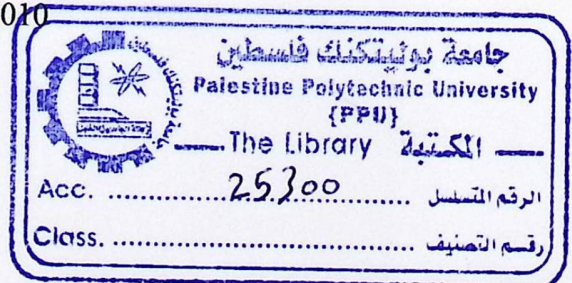
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جامعة بوليتكنك فلسطين
الخليل - فلسطين
كلية الهندسة و التكنولوجيا
دائرة الهندسة الكهربية و الحاسوب

اسم المشروع
Reading Enhancement Tool

أسماء الطلبة

محمد عبد اللطيف الجبريني

نور الدين جمال جبرين

بناء على نظام كلية الهندسة و التكنولوجيا و إشراف و متابعة المشرف المباشر على المشروع و موافقة أعضاء اللجنة الممتحنة تم تقديم هذا المشروع إلى دائرة الهندسة الكهربية و الحاسوب وذلك للوفاء بمتطلبات درجة البكالوريوس في الهندسة تخصص هندسة أنظمة الحاسوب.

توقيع المشرف

.....

توقيع اللجنة الممتحنة

.....

توقيع رئيس الدائرة

.....

DEDICATION

To Our Fathers and Mothers

ACKNOWLEDGMENT

Our appreciation to:

Palestine Polytechnic University

College of Engineering & Technology

Electrical & Computer Engineering Department

Our supervisor: Eng. Khalid Daghameen for his great help and supports

Dr.Safa Naser Aldeen for his great help and supports

Mis.Asma Amro for her great help and supports

All our friends

ABSTRACT

Huge amount of information is issued every moment. Most of those who want to be always up-to-date with what come out of books, articles and reports do not have enough time to read all this amount of information. In addition to that, many of those have slow reading speed. By reading faster, we can increase the amount of information we get. Our application guarantees fast reading but making sure to get the information not just skimming or scanning what we are reading. We implemented a windows application that is built to measure the speed reading , comprehension rate and enhancement of reading for slow readers. We have employed experimented methods for improving reading speed and measuring comprehension rates, based on practical research that was implemented by speed Arabic expert.

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Chapter One

Introduction

- 1.1. Overview
- 1.2. Project Importance
- 1.3. Project Goals
- 1.4. Literature Review
- 1.5. Requirements
- 1.6. Time Schedule
- 1.7. Estimated Cost
- 1.8. Project Risk Management
- 1.9. Road Map

1.1.Overview

Reading process is most essential source of process information in education, it is the path of knowledge to our minds since the beginning of individuals life.

Suppose you want to read many books but you have limit time to do that, a question raises here can I improve my reading speed to read all these documents and books ? how many book can I finish in this time ?

When you look at a tree you instantly recognize many things related to that tree. You recognize the shape, the kind of tree (deciduous or evergreen) perhaps even the species of the tree. The foliage lets you know what the season of the year is. You recognize all of this without focusing on each leaf. You look at a tree with your natural vision. We do not use our natural vision when reading. Most of us look at each word and repeat it silently before moving on to the next word. We are capable of much more.

The human mind it perhaps the most powerful computer ever known. Modern computers are very fast at computation and data processing. Mechanical devices such as keyboards, scanners and printers slow computers down significantly. Our brains are like that. Our eyes are the scanners. Most people are capable of reading far faster than they ever thought possible, fast reading refers to the method that human eyes instantly recognize texts, once eyes can recognize many words on sight we can begging to train our minds to speed read.

In our project we aim to implement a windows application has ability to trains humans eyes and brain to interact rapidly with each other to enhance the speed of reading process, using experimented methods (exercises) used by Arabic speed reading trainers, some of the exercises used to enhance the visual span of eyes (eye window) to become wider than the amount of information (words) recognized by eyes will increased. In addition to this system have ability to measure the speed of reading and comprehension rate with other exercises .

Visual span : The visual span or attention window is the area that the brain has selected to analyze with full detail during a fixation.

1.2. Project Importance

"The more you know the more you grow". The benefits of reading fast to contemporary world is same as the benefits of driving a fast racing car in comparison to any normal one. Speed Reading can help you to read and understand written information much more quickly. This makes it an essential skill in any environment where you have to master large volumes of information quickly.

1.3. Project Goals

- To design and implement reading enhancement system that enhance readers reading speed, measures reading rate and comprehension rate .
- Increase visual span of human eyes to recognize more than one words.
- Duplicates reading speed of users.

1.4. Literature review

In this section we will preview some of tools that related to the project main idea.

1.4.1 " برنامج القراءة السريعة الإصدار الأول (Fast Reading program)"



Figure 1.1 برنامج القراءة السريعة للنقيتان

It is simple Arabic tool that allows a trainer to develop his/her reading speed with single exercise. Trainer determine wanted speed for reading so the text will fade out with that speed, there is no real care about comprehension, it gives ability to calculate reading speed, this was personal effort any one can get this software for free, it is easy to use and have a flexible speed picker. The tool doesn't ensure if the trainee is reading text, and it hasn't variety in exercises, it doesn't support multi users or stores data about user behaviors, information, grades and improvement degrees.

1.4.2 Rocket Reader

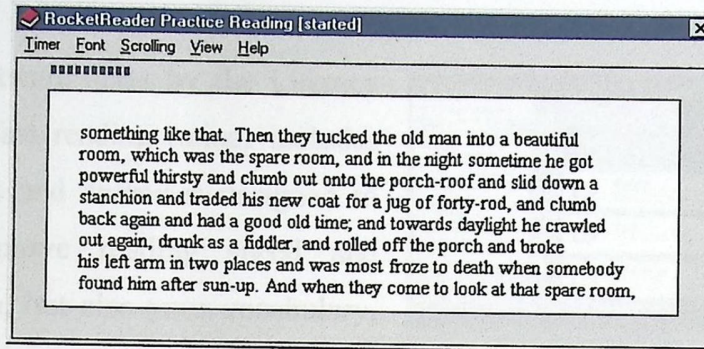


Figure 1.2 Rocket Reader programs

The RocketReader are designed to test and record reading speed improvements over time. User can use the speed timing results to precisely monitor his advancement through it. The text of the speed test is carefully selected to be of uniform consistency, each reading is about 5 pages of text, when user select speed timing the Speed Timing window appears.

User can start and stop the reading when he use the timer menu. The text scrolls on the screen when he holds the down arrow on the keyboard. if user have selected the timer-start option RocketReader will carefully measure and report your reading speed. When he has finished reading the text he can then do a comprehension test to determine your understanding of the material [5].

RocketReader have not visual span increasing exercise or comprehension exercises that measure if the user understand information he reads.

1.4.3 The Reader's Edge

This software done by the Literacy Company as fast reading trainer includes simple lessons and exercises designed to not only improve reading speed and comprehension, but also your vocabulary, memory and recognition skills. There's no limit to the number of users who can take

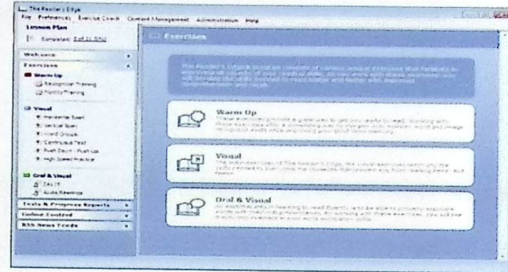


Figure 1.3 The Reader's Edge

advantage of The Reader's Edge and track their progress individually with separate user accounts. Using the built-in word dictionary, he can quickly access word definitions, usage examples and hear the actual word read to him using text-to-speech software. No matter for age, user can read and practice with a wide range of material that interests him and falls within the scope of his current reading abilities. Practice with The Reader's Edge exercises in any language, including English, Spanish, French, Chinese, Arabic and more [6].

The software has Multilanguage support without specification in content material, exercise content updated manually by system users.

1.5. Requirements

1.5.1 User requirements

- The system should have Graphical User Interface (GUI) to control and monitor the system.
- The GUI must show a list of all exercises available to user.
- The GUI must show user registration and login area for users.

1.5.2 System Requirements

1.5.2.1 Functional requirements

- When the user uses the system for the first time, he/she must register using the system. Personal information of the user is entered and used by the system to create a record for the user in the database.
- Using his/her username and password, registered user will be able to login to the system.
- At any point; the user can sign out from the system.
- User starts the exercises and can stop the exercise or cancel it.
- User can save the exercises results after each exercise.
- User must have the ability to move between exercises.

1.5.2.2 Non- Functional requirements

- Performance: the system must obey high performance measures.
- Usability : the system must be easy to use.

1.6. Time Schedule

In this section we will preview the system schedule for the developers, take in care the time period given for delivery the system, and the dependences between tasks.

Table 1.1. Tasks description (first semester)

Task ID	Task description
T1.1	Deciding up the project's idea.
T1.2	Collecting information, literature review and related theory.
T1.3	System analysis
T1.4	System design
T1.5	Writing documentation

Table 1.2. Time plan (first semester)

Task/week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
T1.1																
T1.2																
T1.3																
T1.4																
T1.5																

Table 1.3. Tasks description (second semester)

Task ID	Task description
T2.1	Component implementation.
T2.2	Components testing.
T2.3	Integrity testing.
T2.4	System review and incorporating feedback.
T2.5	Requirements refinement.
T2.6	Writing documentation

Table 1.4. Time plan (second semester)

Task/week	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
T1.4																
T2.1																
T2.2																
T2.3																
T2.4																
T2.5																
T2.6																

1.7. Estimated Cost

In this section we will preview the system cost estimation in term of system Hardware , system software , and human resources.

1.7.1 Software resources

The following tables contain the software that will be used in our system and their costs.

1.7.1.1 Development Software Costs:

Table 1.5. Software resources cost

Software component	Cost
Microsoft Windows XP	\$280
Microsoft Office 2007 enterprise	\$170
Microsoft Office Visio 2007	\$200
Microsoft Visual Studio 2005	\$300
Total	\$950

1.7.1.2 Operational Software Costs:

No additional software is needed to operate the system on user's computer.

1.7.2 Hardware resources

The following tables contain the main requirements for our system and their costs.

1.7.2.1 Development Hardware Costs:

Table 1.6. Hardware resources cost

Hardware component	Cost
1 PC with CPU 2.6 GHz, 40GB HDD, 512k RAM, monitor, keyboard and mouse.	\$800
Printing cost	\$100
Total	\$900

1.7.2.2 Operating Hardware Costs:

Hardware component	Cost
1 PC with CPU 2.6 GHz, 40GB HDD, 512k RAM, monitor, keyboard and mouse.	\$800
Total	\$100

1.7.3 Human resources

The project team consists of two students, work 32 weeks for two semesters, 3 hours a day with \$4 per hour, assuming 5 working days a week.

Each student get: $(32 \text{ weeks} * 5 \text{ days} * 3 \text{ hours} * \$4) = \$1920$.

And the total for 2 students cost is: $\$1920 * 2 = \3840 .

1.7.4 Other resources

The following table contains other resources using in our system and their Costs.

Table 1.7. Other resources cost

Resource	Cost
Transportation	\$200
Internet usage	\$200
Total	\$400

1.7.5 Total Costs

Table 1.8. Total development cost

Resource	Cost
Software resources	\$950
Hardware resources	\$900
Human resources	\$3840
Other resources	\$400
Total	\$6090

1.8. Project Risk Management

The project may face some problems and risks that we have to declare in the early time of the project designing and manipulation, and we must avoid those problems so that the system could work in its high efficiency, so when we find a risk we will try to solve it without affecting the total project as much as we can.

Table 1.9. Risks analysis

Risk ID	Risk description	Probability	Impact ID
R1	One of the group members dies or gets sick.	30%	1
R2	Lack of experience in using programming tools.	20%	3
R3	Hardware failure.	5%	4
R4	Inputs for testing the system are few due to time limitation.	30%	2
R5	Lack of resources and previous available works.	20%	2
R6	Closure of the university.	20%	3

1- catastrophic 2- critical 3- marginal 4- negligible

Table 1.10. Risks effects minimizations strategies

Risk ID	Strategy to minimize effect on the project
R1	The team must divide the work so that if one was absent the other does his work.
R2	Read and study more on using these programming tools.
R3	There should be a backup plan.
R4	Main features will be delivered and other features will be delayed.
R5	The project should be tested at every stage of development.
R6	The team can meet at any other place with all required resources.

1.9. Road Map

The project consists of six chapters, each chapter talks about a specific area of the project.

Chapter One: "Introduction", this chapter gives an introduction about the project, its importance, other related systems, project time plan and project cost.

Chapter Two: "Theoretical Background", this chapter gives a clear picture about the system theoretical background related to the main concepts of fast reading methods.

Chapter Three: "System Design", this chapter shows system block diagram, design options that can be used in the system, and how each system components interface with each other.

Chapter Four: "System Implementation and Testing", this chapter describes the program that operates the project, pseudocode and algorithms that describe project systems and testing under various conditions.

Chapter Five: "Conclusion and Future Work", this chapter is simplifying conclusions and results achieved after implementing the entire project and gives suggestions for the future system developing.

Chapter Two

Theoretical Background

- 2.1. Introduction.**
- 2.2. How people read.**
- 2.3. Who can improve their reading.**
- 2.4. Some facts about eyes.**
- 2.5. Reading Rate.**
- 2.6. Comprehention rate.**

2.1. Introduction

In this chapter we discuss basic concepts in measuring reading speed and comprehension.

2.2. How people read

Mini-eye-movements of left-middle and right, are a strategy and must be learned through practice while you read. It requires Intention- Attention and Volition to acquire. It is not automatic, but liberates your brain to read and remember like a master instead of a slave. Use free imagination.

The eyes only take in information when they are stopped. You can easily verify this by holding a book up in front of someone and watch their eyes as they read. Don't tell them what you are observing. What feels like continuous motion is actually **move -> stop -> read, move -> stop -> read**, etc. Speed readers minimize the number of stops by maximizing the number of words taken in at each stop.

Here's an exercise that will help you do this. Try looking at the following sentence in three ways:

- First, focus your attention / eyes on the first "S" in success.
- Second, adjust your focus / attention so you can see the entire word, "success".
- Third, adjust your focus so you are seeing all three words at the same time.

Because you can't say three words at the same time, you can't sub vocalize if you are reading three words at a time.

It is possible to eliminate vocalization from thought. Although many think that verbalization is essential to linking concepts, common experience shows that this is not so. For example, if you are a mechanic or computer engineer, and someone ask you to think about how a car or computer works, the subject of your thought is too complex and multi-dimensional to be expressed in linear forms. You are able to visualize and manipulate concepts -- and find answers -- to engineering problems without ever putting those thoughts into words.

The same is possible with abstract ideas (which are also often highly complex and multi-dimensional), though it takes practice because there are no familiar "images" to fall back on. Like meditation, one tends to navigate these byways of thought using intuition and feelings of depth, which are no less pragmatic than verbalizing the same idea. In some cases, especially when the thought involved is particularly complex, removing the verbal component not only vastly accelerates the thinking process, but can even lead to intuitive leaps that verbal thinking might have restrained or prevented.

Think about the way in which you are reading this text. Most people think that they read the way young children read - either letter-by-letter, or at best word-by-word.

If you notice the way in which your eye muscles actually move when reading a *printed* text, you will probably find that you are fixing your eyes on one block of words, then moving your eyes to the next block of words, and so on: effectively you are reading not words, but blocks of words at a time. The period of time during which the eye rests on one word is called a fixation time.

You may also notice that you don't always proceed from one block of words to the next: sometimes you may move back to a preceding block of words if you are unsure about something. These disruptions to the forward flow of reading are called skip-backs.

Only speed read reader have been trained to create mini-eye-movements, while the rest of us make-do reading with micro- eye-movements, which are automatic, and keep adjusting our eyes to place the words we read on our foveae centralize, the sharpest focusing area of our retina.

The micro-movements of our eyes are like our heartbeat, circulation, blood-pressure and respiration, on auto-pilot. We are unaware of them 99% of the time. These micro-quakes, micro-tremors, and micro- saccades of our eyes permit us to see clearly and read with acuity.

Mini-movements (sweeps), across our retina produce speed reading because they engage our peripheral-vision to chunk words simultaneously, not just one-word at a time. School taught you sailing, we teach speed reading.

- **Pay attention**

when you read and read as if it really matters. Most people read in the same way that they watch television, i.e. in an inattentive, passive way. Reading takes effort and you must make the effort.

- **Reducing Fixation Time for speed reading**

It is thought that the minimum length of time needed for a fixation is only quarter of a second. By pushing yourself to minimize the time you take, you will get better at picking up information from a very brief fixation. This is a matter of practice and confidence[10].

2.3. Who can improve their reading?

Some people read fast and remember everything. Others read slowly and take a couple of times to get all the information. It doesn't matter, really, so long as when you read, you get the information you're seeking.

Not everyone is ready to benefit from learning methods of increasing reading speed. A man who has difficulty understanding what he or she reads will not be helped by learning to misunderstand faster. Rather, techniques for deriving meaning from one's reading are more helpful. A student who is hampered by a limited vocabulary will be helped more by building word knowledge, so that puzzling over unknown words will not slow one down.

There are two main approaches to improving reading skills: speed reading, which increases the number of words that can read in a minute, and use of reading strategies to extract information from a text in the most effective possible way. Speed reading is covered elsewhere within Mind Tools. This article will concentrate on effective use of reading strategies.

You will find that you can fix your eyes on one block of several words, then moving your eyes to the next block of words. You can read blocks of words at one time (not individual words one-by-one). You can notice you do not always go from one block to the next (sometimes you may move back).

Even when you know how to ignore irrelevant detail, there are other technical improvements you can make to your reading style that will increase your reading speed.

A poor reader will become bogged down, spending a lot of time reading:

- Small blocks of words.
- Losing the flow and structure of the text and overall understanding of the subject.
 - Skip back, this irregular eye movement will make reading tiring. Poor readers tend to dislike reading, and may find it harder to concentrate and understand written information.

2.3.1 Bad reading habits:

- Improved comprehension almost always results from eliminating bad reading habits. PR can quickly help individuals end the following eighteen bad reading habits:
 - Poor decoding.

- Poor fluency. This includes rushing past commas instead of pausing (which can produce situational dyslexia, easily corrected). dissonance. Cognitive projection. Cognitive projection as one reads regularly.
 - Blaming real physical issues for what is often just a simple lack of proper modeling: lisp, speech defect.
 - No or poor use of auditory memory. No or poor use of visual memory. No thinking about what the sentence means.
 - No sensing music of sentence.
 - No hearing an inner voice.
 - Poor automatically.
 - Sub vocalization and lip reading; not reading fast enough.
 - Guessing when stumped instead of backing up and sounding out text (trying different possible pronunciations if necessary): An individual word.
- Cognitive
- Reading too fast.
 - No outlining (for preview and use during reading or review).
 - No review as one reads by having each sentence repeated
 - Poor and limited use of dictionary due to six problems which are easily corrected.
 - Improper lighting of text; contrast and brightness problems.
 - Physical discomfort while reading/typing (easily corrected): Books are not automatically held open at the right height and distance while you sit upright and relaxed, with proper neck, back and shoulder support (instead, reader crouches over book). Head must be turned back and forth from paper to monitor when typing. Keyboard, monitor and printed text should all be in-line.

Table 2.1. Comparison of efficient and slow readers

The efficient reader	The slow reader
Reads ideas.	Reads words.
Reads multi-word phrases.	Reads one word at a time.
Visualizes ideas.	Vocalizes words.
Sets a purpose.	Reads to "the end of the book."
Adjusts reading speed to need.	Reads everything slowly and deliberately.
Keeps reading.	Re-reads sentences to be sure of understanding.
Has a large vocabulary in that subject area.	Has a limited vocabulary in that area.
Uses a pacer.	Lets eyes wander.
Practices speeded reading daily.	Rarely attempts speeded reading.
Marks text for memory.	Leaves pages pristine and clean.
Sorts materials as critical, interesting, or trash.	Reads everything indiscriminately.

2.3.2 Causes of slow reading speeds:

Individual variables : intelligence, motivation, physiological and psychological traits. Deficiencies in vocabulary and comprehension levels required by the particular reading material. A student who has difficulty understanding what he/she reads will not be helped by learning to misunderstand faster. A student who is hampered by an inadequate vocabulary will not be helped by learning to skip any faster through unknown or vaguely defined words.

Most frequent causes of unnecessarily slow speeds when the causes above are at adequate levels:

1. **Inflexibility:** the tendency to read everything the same way regardless of what it is, why it is being read, etc.

2. Passivity: the failure to become involved with the material being read, the failure to interact with the author and to anticipate his next thought, his conclusions, etc.
3. Unnecessary and habitual regression or re-reading because of lack of concentration.
4. Habitually slow "reaction time" to reading material a general "rut" which makes attempts at faster reading extremely uncomfortable at first.

We have attempted to point out the relationship between rate of reading and extent of comprehension, as well as the necessity for adjustment of reading rate, along with whole reading attack, to the type of material and the purposes of the reader. The factors which reduce rate were surveyed as a basis for pointing out that increase in rate should come in conjunction with the elimination of these retarding aspects of the reading process and as a part of an overall reading training program where increase in rate is carefully prepared for in the training sequence.

2.3.3 The reasons why you read slowly:

There are three major reasons for our slow reading:

- Sub vocalization. We can only read as fast as we can speak.
- Poor eye fixation technique and Low eye focus. Reading Word For Word - 60% of words we read are structure words, not content words. This slows us down dramatically.
- Incorrect reading habits. The average reader moves back over words or phrases 20 times per page. This means we are rereading the same things over again and we do it about 1/6 of the time.

Readers who read slowly often express fears that they will not be able to understand unless they read everything very slowly and carefully. The evidence suggests that this is not the case.

Many slow readers try to remember every single piece of information. This is unrealistic and unnecessary. Some points will be very important to the essay, report or exam that you are preparing for, and you will need to note the details precisely. Usually, you are only required to gain an overall understanding from the text that you are reading.

2.3.4 Poor Eye Fixation Technique:

This means that as you read your eyes tend to fix on many different points on the same line, as well as going back over areas already read.

Your eyes jump all over the place, from line to line, word to word. You often read the same word several times, and often the whole line several times. This slows you down greatly, and actually reduces your understanding of what you have read. The next section will show you how to use a visual guide to minimize this effect.

Improving your eye fixation techniques will mean that each eye movement will now be useful, rather than causing confusion in your mind by re-reading material out of logical order. Over reading the same phrase, line or section does not help your

comprehension, it actually reduces it. It causes loss of the order of your material, and also tends to make your mind wander more while you are reading.

If you follow the order of the text your understanding and comprehension will improve, and it is less likely that at the end of the page you realize you were not paying attention and have no idea what you just read.

2.3.5 Who are less efficient readers

- They see and read one word at a time.
- They have lower levels of comprehension because they are unable to derive the meaning of new words from the context.
- They limiting reading speeds to 160-220 words per minute
- They vocalize or sub vocalize each word as it is read.
- They eyes fixate on each word.
- They Re-read words.

2.3.6 Who are fluent readers:

- They see and read groups of words.
- Have higher levels of comprehension because they are reading groups of words.
- Dispel the popular myth that one must read slowly to have good comprehension.
- They brain is capable of handling thousands of words per minute.
- They do not vocalize the words.

- They do not reread words[11].

2.4. Some facts about eyes

Corner (peripheral) vision can be trained. From our earliest moments in life we develop our ability to use sight to match up information with our movement system and other senses to organize, confirm, and develop experience. Vision also becomes a primary influence in higher functions such as attention and concentration.

The visual span or attention window is the area that the brain has selected to analyze with full detail during a fixation. For the average reader the visual span corresponds to one word; while for a good reader it is about five words at a time. The eyes have the capacity to perceive with sufficient detail text in an area of roughly 30 characters wide by 10 lines high. However as reading is not only seeing, this large span cannot be exploited.

When man studies a subject, his eyes jumps with a frequency of 2-5 jumps per second. When reading the eyes make 3-4 jumps per second. A slower reader's eyes make the same amount of motions as a faster reader's. The difference between them is concluded in the volume information accumulated at one eyes fixation. The perception of text occurs during an eye's fixation only. Long stops are caused by an unfamiliar word or a misprint. You need to widen your corner of view (peripheral vision) in order to increase your speed-reading skills. Another tip for speed-reading is in high recognition of the text. Try to understand the main idea of the text in only one or two words from the paragraph. The more you read then the larger the database of words, terms and word stamps you have. The more databases you have the faster

you will speed-read. To use an analogy the same applies when you have become fluent in a foreign language.

2.5. Reading rate

Reading process differs from one person to another according to the way that person read texts besides content of the text itself wither it's include complex phrases or rarely used words in language, of course the consisting of these structures for sentence in texts make some difficulties in reading process that mean decreasing the speed and comprehension and increase times needed to read the same number of words for two different texts [3].

Reading rate give us an indication about how many words read on determined time without regard about any factors affecting reading rate that reader face it, we can summaries this idea in the following formula:

$$\text{reading rate} = \frac{\text{Number of words}}{\text{Number of minutes}}$$

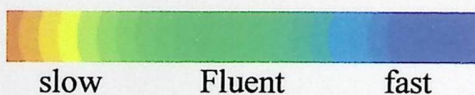


Figure2.1. Reading Speed [3]

Slow reader:

0 - 150 words per minute. Slow or beginning reader. Many people who read slowly do not enjoy reading. Typically they find reading difficult, tiring and they have poor comprehension. This tool helps slow readers to build reading speed, fluency, stamina and confidence.

Poor reader:

150 - 230 words per minute. Below average to average often have poor comprehension and will often avoid reading. By training with our tools you can double your reading speed and improve your comprehension.

Average reader:

230 - 250 words per minute. Average readers can achieve excellent reading gains with fast read training.

Good reader:

250-350 words per minute. Above average reading speeds. Good readers can achieve faster speeds (up to around 500 words per minute) training with this tool.

Excellent reader:

350 - 800 words per minute. Fast to very fast reader. Such readers typically have high educational levels and are professional, avid social readers or have participated in an effective speed reading / reading program.

Skim reader:

Faster than 800 words per minute. Skimming is useful tool for locating relevant sections within a document. Studies show that comprehension drops off sharply at speeds greater than 800 wpm for almost all readers. Be skeptical if a vendor claims that accurate reading is possible over 800 wpm.

2.6. Comprehension rate

The relationship between reading comprehension and rate are mostly positive correlations but the amount depends on the test groups, reading materials, measuring instruments, and reading purposes. [4]

Generally, to get comprehension rate, we collect answers group of questions on general ideas of the text, division of correct answers per sum of questions will indicate comprehension rate, as shown in the following formula:

$$\text{comprehension rate} = \frac{\text{correct answer}}{\sum \text{comprehension questions}} \times 100\%$$

The complex processes involved in reading comprehension are divided into three categories. The categories include vocabulary instruction, text comprehension instruction, and teacher preparation and comprehension strategies instruction.

When text includes unused words for individuals that will increase hardness, decrease reading rate and decrease the comprehension rate, and it will affect the text comprehension at all, so there is instruction before reading to guide trainee to keep care for reading way.

Chapter Three

System Design

- 3.1 Introduction
- 3.2 Project objective in details
- 3.3 Architectural design
- 3.4 System model
- 3.4 Graphical User Interface design (GUI)

3.1. Introduction

This chapter involves the issues related with the conceptual design of the project, brows the architectural design, the system modeling in addition to go deep in project objectives.

3.2. Project objective in details

- To design and implement reading enhancement system that enhance readers reading speed, measures reading rate and comprehension rate .

Our goal in this system to implement speed reading exercises using .Net technology (VB.NET + MSSQL), in other words the user will interacts with windows forms for measuring reading rate , measuring comprehension rate and enhance reading speed by the exercises forms.

- Increase visual span of human eyes to recognize more than one words.
This could be achieved by employing visual span enhancement exercises (Flash exercises [letters, words, numbers]).

- Duplicates reading speed of users.

This could be achieved by employing speed reading exercises that give text passage to user and timer start count the seconds that user spend while reading, after reading the number of words in text will divided by time .



Figure 3.2 : System Block Diagram

- To overcome some of the drawbacks of current systems related with visual span and exercises types.

During our search we found speed reading program has drawbacks reading to training exercises and ignoring the visual span improvement process.

3.3. Architectural design

3.3.1 Exploration of the system (definition)

This software is designed to measure and enhance reading speed through various exercises in addition to measuring the comprehension rate regarding to the formulas in chapter two (reading speed , comprehension rate).

3.3.2 System block Diagram

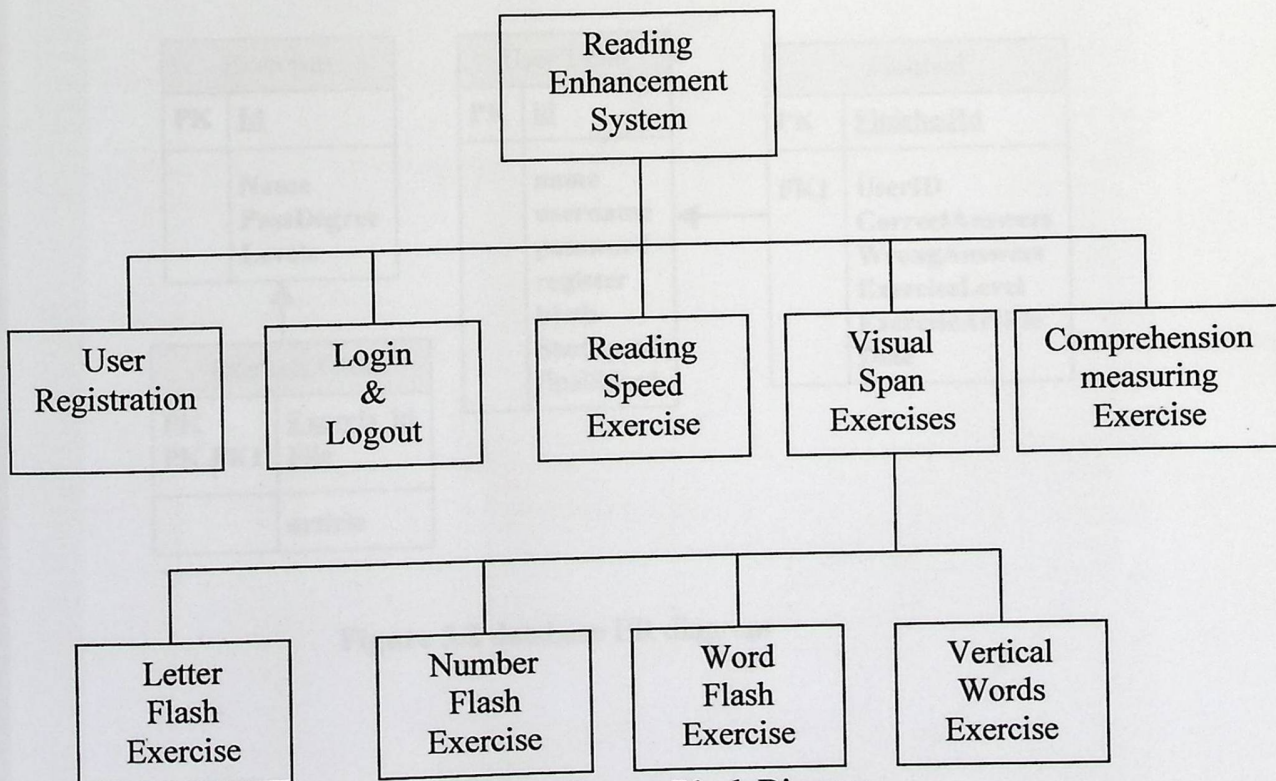


Figure 3.1 : System Block Diagram

3.3.3 Database definition

System using Microsoft SQL Server 2005 database for storing users and exercises information and results, it contains from four tables one for users the second for exercises, the third for exercises file paths and last one save user transaction when user start program registration a new account created in user table, the result for user will stored simultaneously in user row inside user tables, when trainee do any exercises to the end the action will appends inside user transactions table immediately.

3.4. System model

3.4.1 Database Design

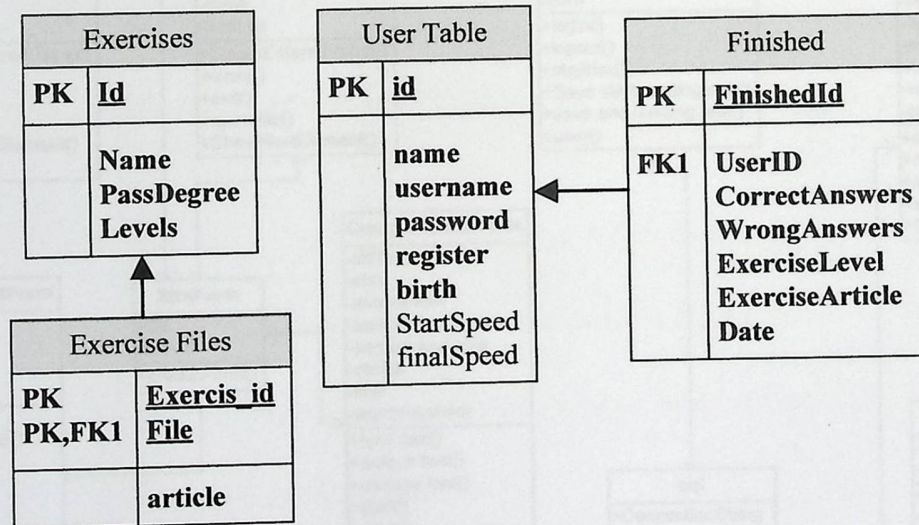


Figure 3.2 database ER diagram

Database have four tables :-

- users have all user information.
- exercises have exercises information;
- Exercises Files table has name of files and file location. one exercise may have many files and each file should be for one exercise .
- Finished table stored additional information about number of correct answer about the exercise that user finished and wrong answers , date and the exercise level .

3.4.2 Static Class Diagram

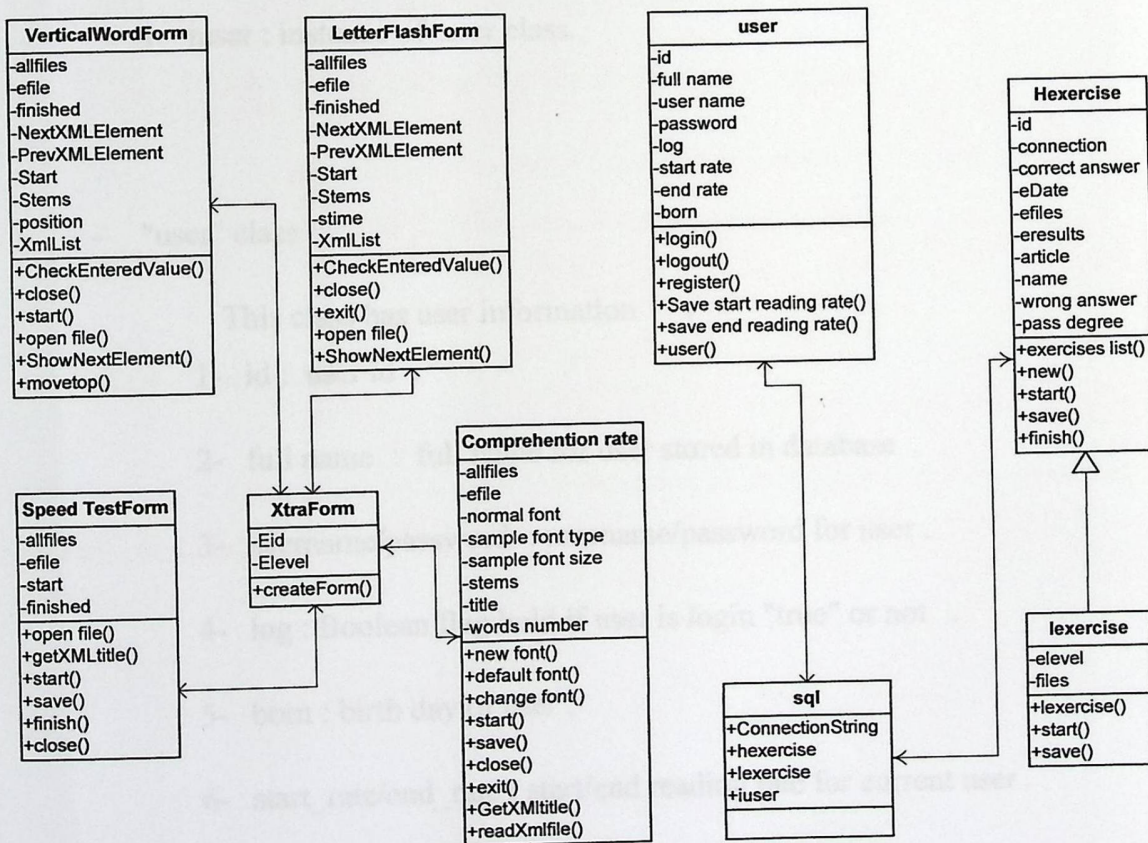


Figure 3.3: Static Class Diagram

Static diagram in figure (3.3) represent all system classes with relations between classes, data variables and methods in this classes .

- "sql" shared class :

This class is shared class that can be accessed by any other class with the same namespace :

- 1- Connection String : shared string variable has the database connection string .
- 2- hexercise : instance of Hexercise class .
- 3- lexercise : instance of Lexercise class.
- 4- iuser : instance of user class.

- "user" class :

This class has user information :

- 1- id : user id .
- 2- full name : full name for user stored in database .
- 3- username/password : username/password for user .
- 4- log : Boolean flag hold if user is login "true" or not .
- 5- born : birth day of user .
- 6- start_rate/end_rate : start/end reading rate for current user .

- "Hexercise" and "lexercise" class :

This is parent exercise class used for exercises that has one level only, the child exercise inherits Hexercise and used for multi level exercises :

- 1- id : exercise id .
- 2- name : name of the exercise .
- 3- Connection : sql client connection .
- 4- eDate/eFiles/eresults : in which date exercise start/ exercise material files location / exercise result .
- 5- correct_answer/wrong_answer/pass degree : birth day of user.
- 6- article :title of the article in exercise material .
- 7- elevel/files (lexercise class only) : exercise current level (1,2 and 3) / list files location of exercise material .

3.4.3 Use CASE

Is a description of a system's behavior as it responds to a request that originates from outside of that system.

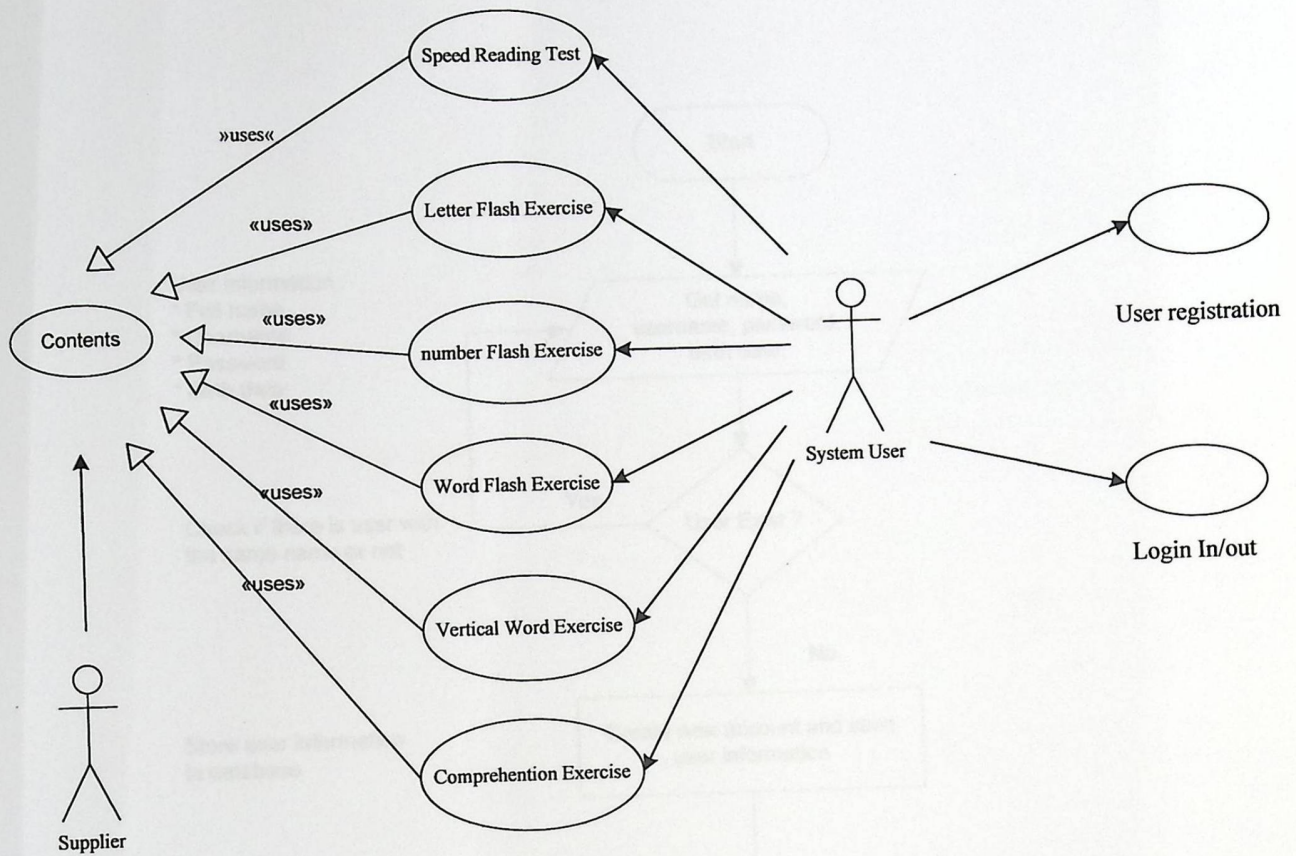


Figure 3.4 : Use CASE diagram

System actors interact with system through many functional properties, system user which is the primary actor can register new account for subsequent use, log in operation and log out operation and taking exercises and submit results can be done by system user too, there is another actor who supplies exercise with new content so system can have a newly exercise content.

- User registration

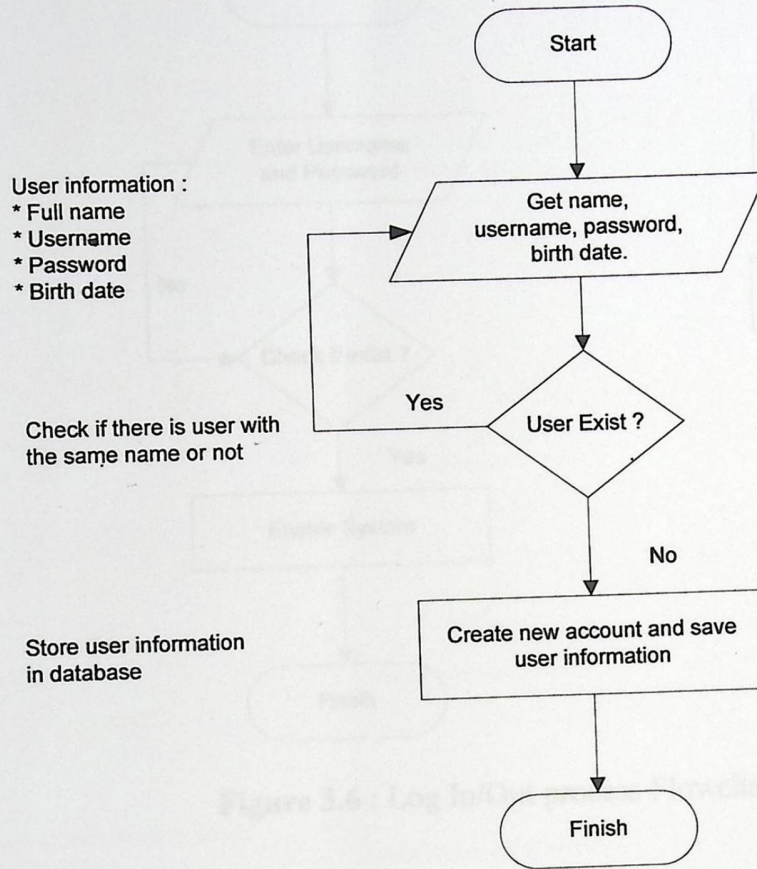


Figure 3.5 : Registration Flowchart

- Log in/out

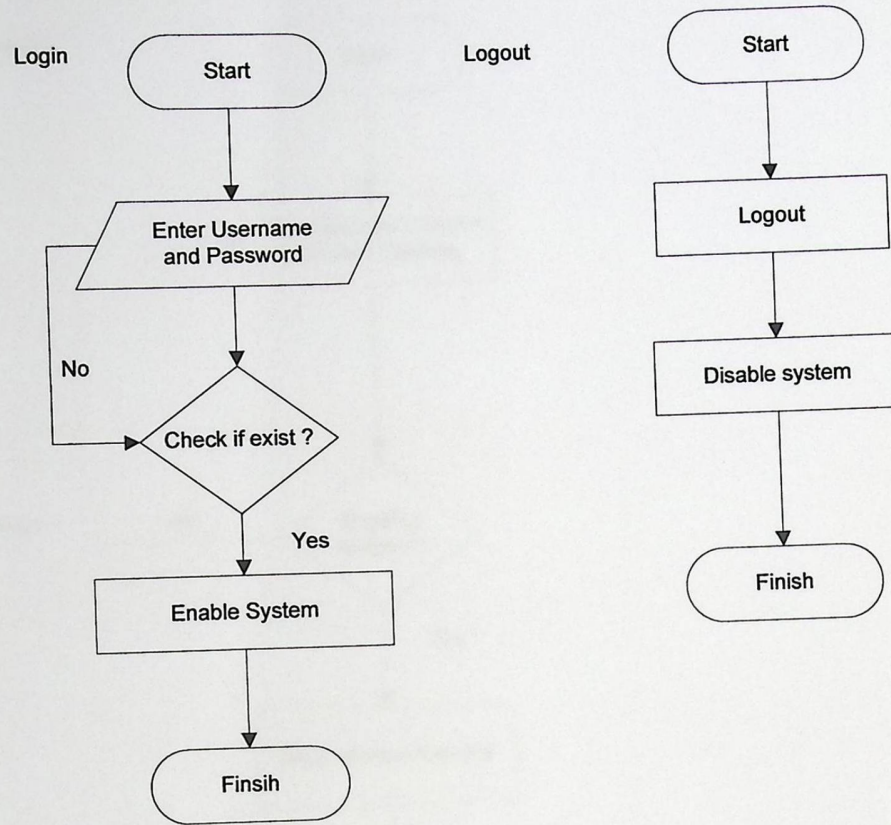


Figure 3.6 : Log In/Out process Flowchart

- Speed reading exercise (speed measurement)

Speed reading exercise

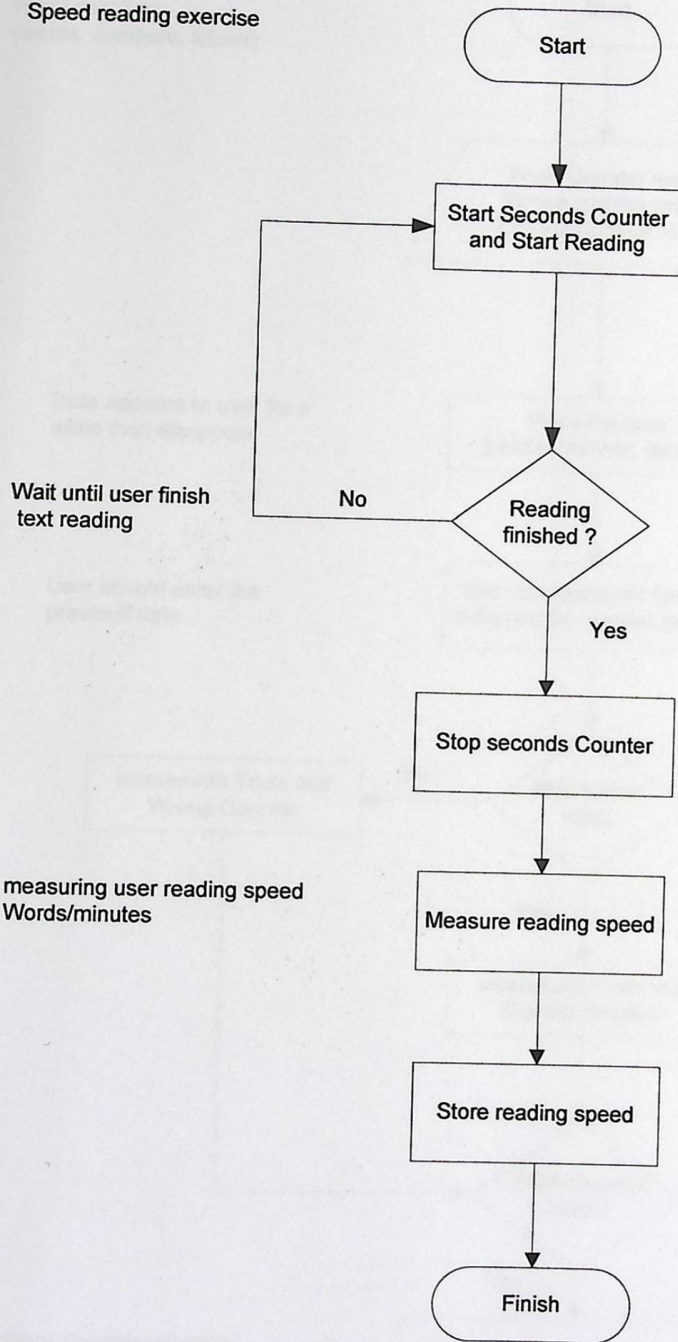


Figure 3.7 : Speed reading exercises flowchart

- Flash exercises (Letter, Word, Numbers)

Flash exercises
(words, numbers, letters)

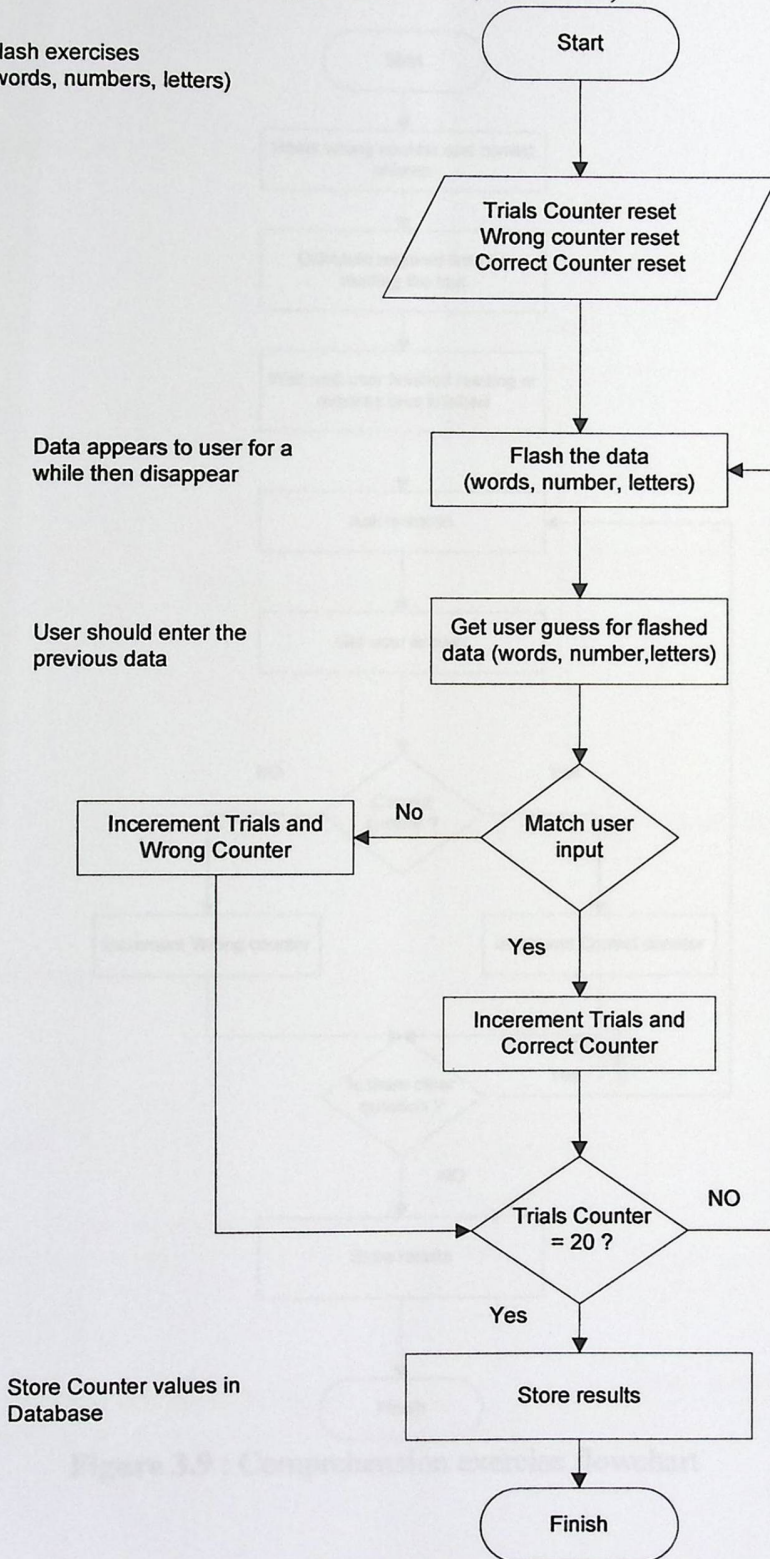


Figure 3.8 : Flash exercises flowchart

- Comprehension rate exercise

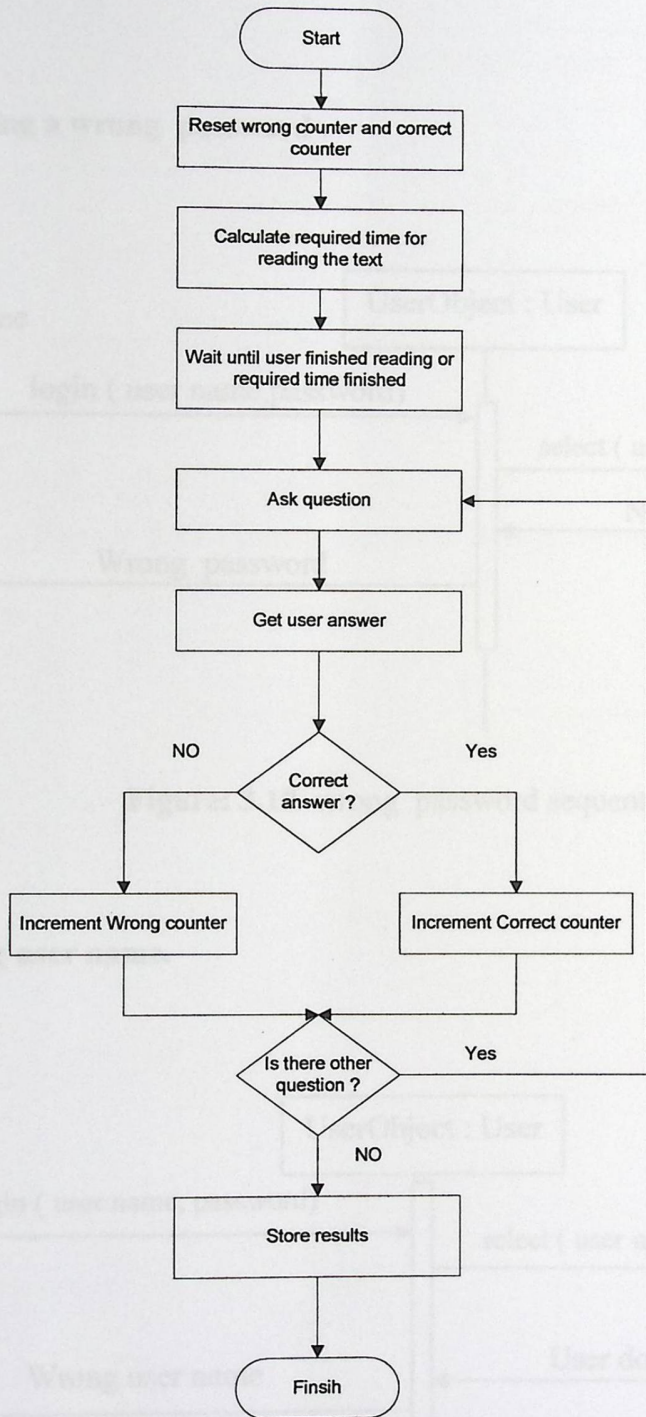


Figure 3.9 : Comprehension exercise flowchart

3.4.4 Sequence diagrams

1- Entering a wrong password .

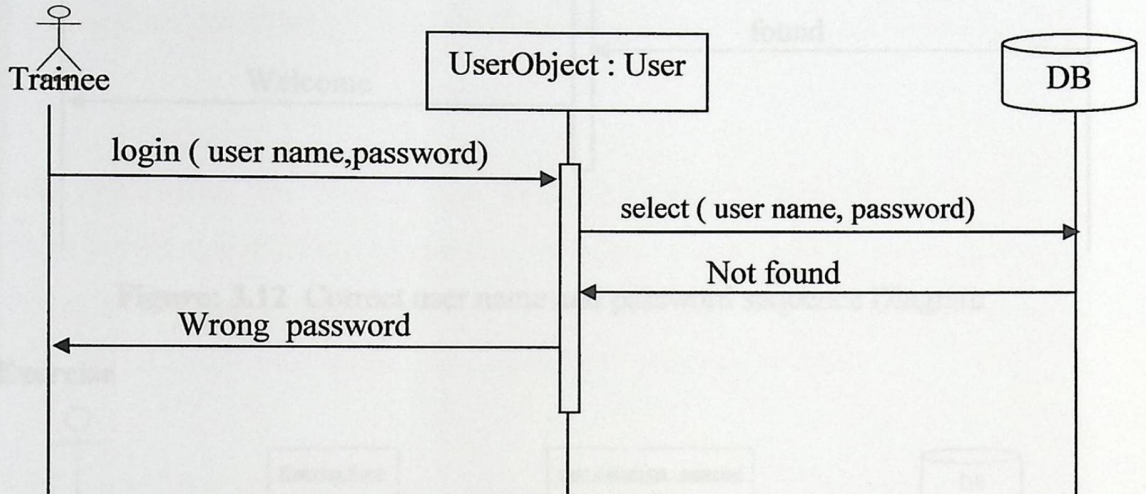


Figure: 3.10 wrong password sequential Diagram

2- Wrong user name.

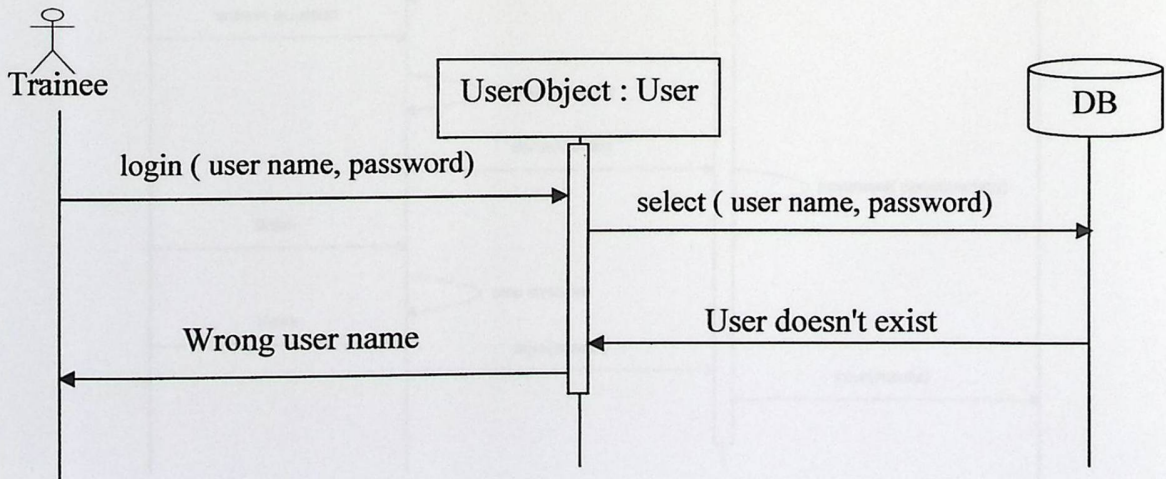


Figure: 3.11 wrong username sequential Diagram

3- Correct user name and password combination.

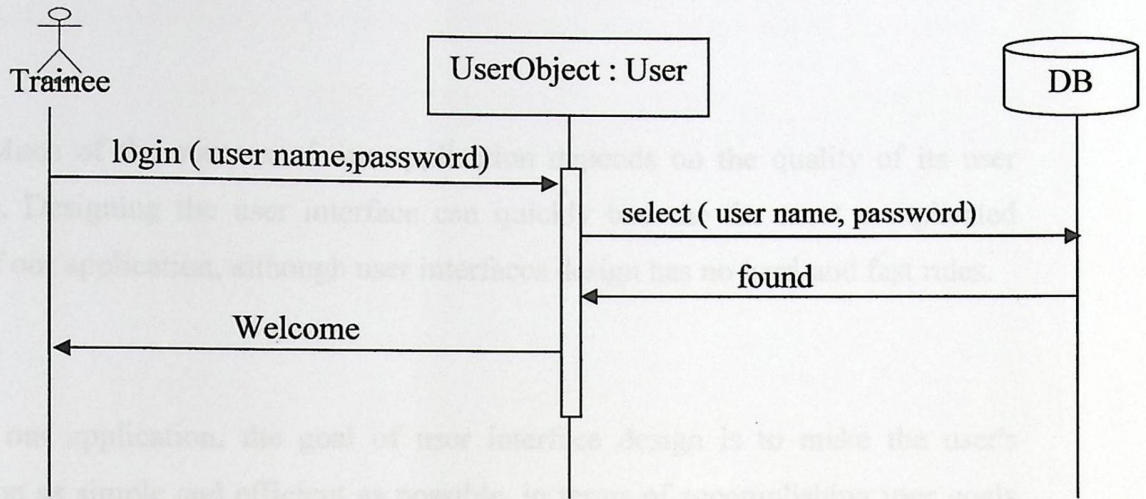


Figure: 3.12 Correct user name and password sequence Diagram

4- Exercise

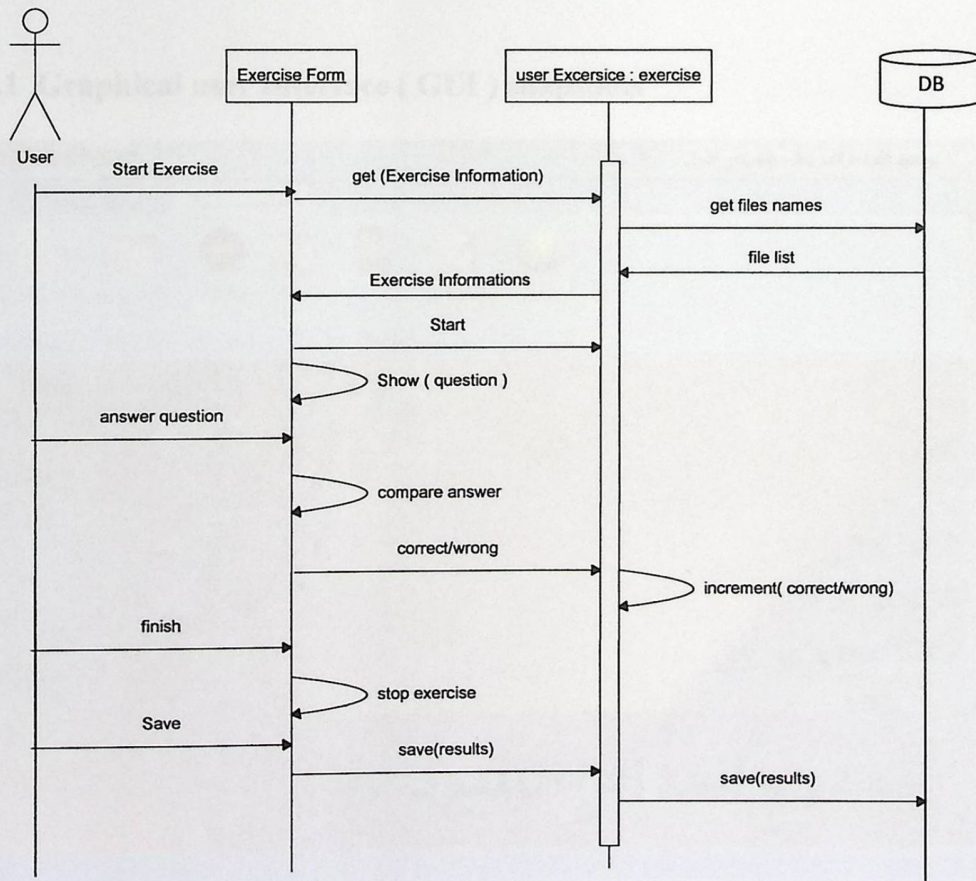


Figure 3.13 : exercise sequential diagram

3.5. Graphical User Interface design (GUI)

Much of the success of our application depends on the quality of its user interface. Designing the user interface can quickly become the most complicated aspect of our application, although user interfaces design has no hard-and fast rules.

In our application, the goal of user interface design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals what is often called user centered design. Good user interface design facilitates finishing the task at hand without drawing unnecessary attention to itself.

3.5.1 Graphical user Interface (GUI) snapshots

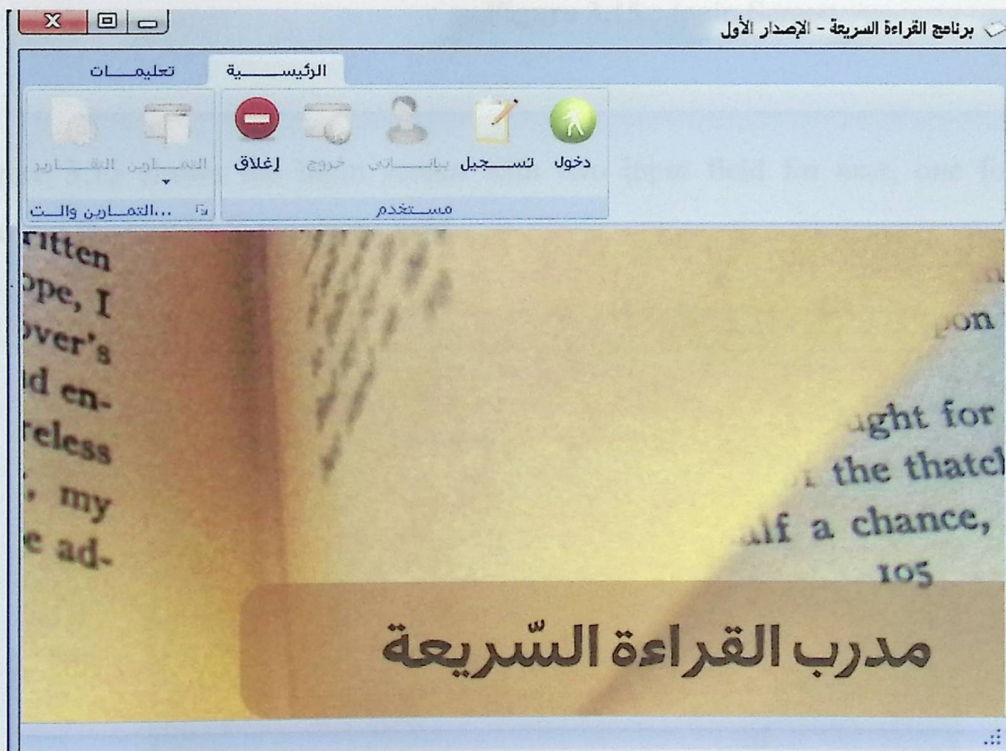


Figure 3.14 : locked system screen

3.5. Graphical User Interface design (GUI)

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3.5.1 Graphical user Interface (GUI) snapshots

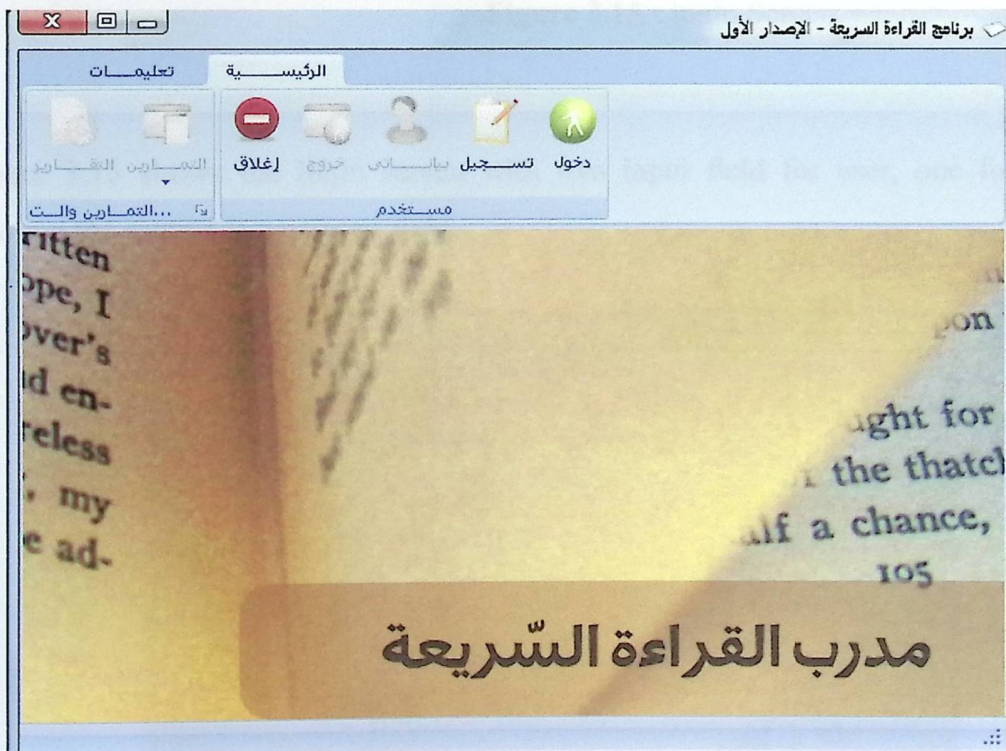


Figure 3.14 : locked system screen

previous figure 3.14 shows the main program screen in locked status which is the default screen while user login with valid username and password to the system .

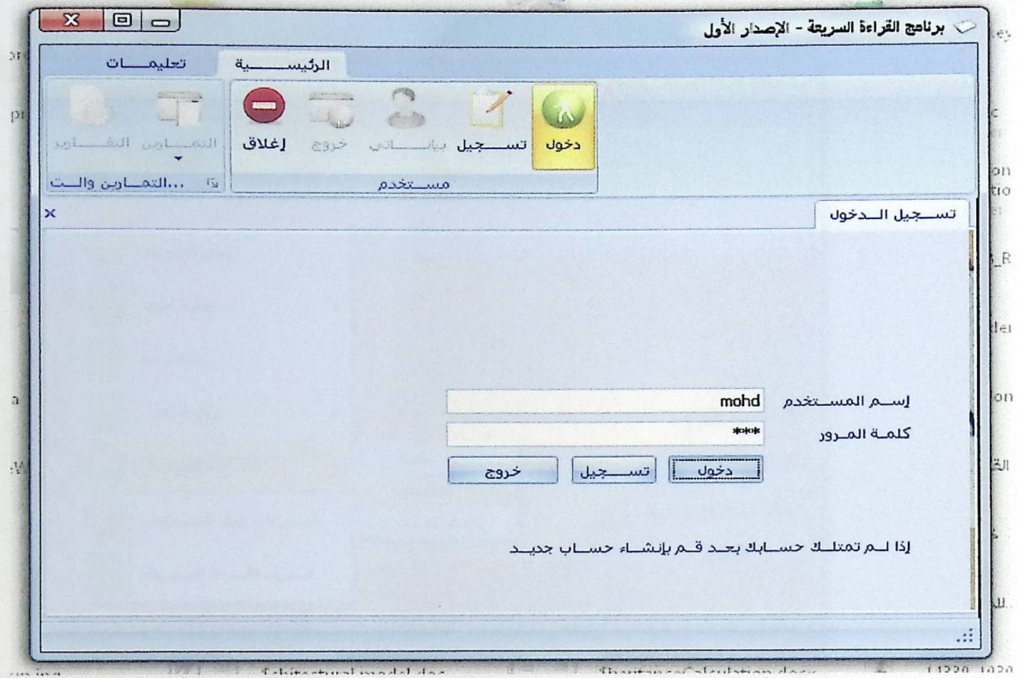


Figure 3.15 : login Screen

Figure 3.15 shows the login screen with two input field for user, one for username and the second is password field.

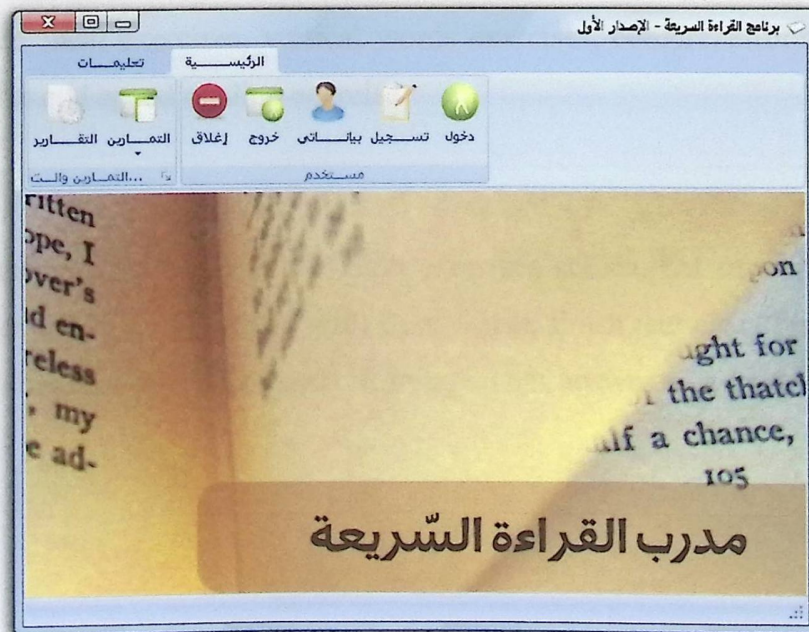


Figure 3.16 : unlocked system screen

Figure 3.16 show the main system screen in unlocked status when valid user is login, all system features available to be used.

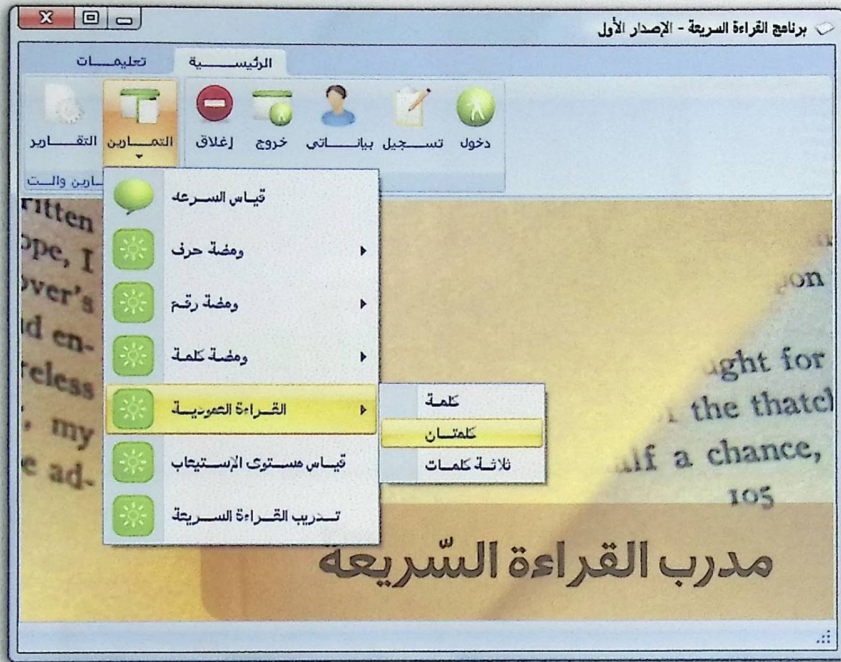


Figure 3.17 : Exercises menu screen

Figure 3.17 shows the exercises menu, menu consist of all exercises available in the system; reading speed measurement exercise, letter flash exercises, number flash exercises, word flash exercises, vertical words exercises, comprehension rate measurement exercise and speed reading exercise.

Figure 3.18 shows detailed view for flash exercises screen, list of available material appears on the left of the screen with start, finish, finish and close buttons, presentation board where the letters or words flashing on has answer area field.

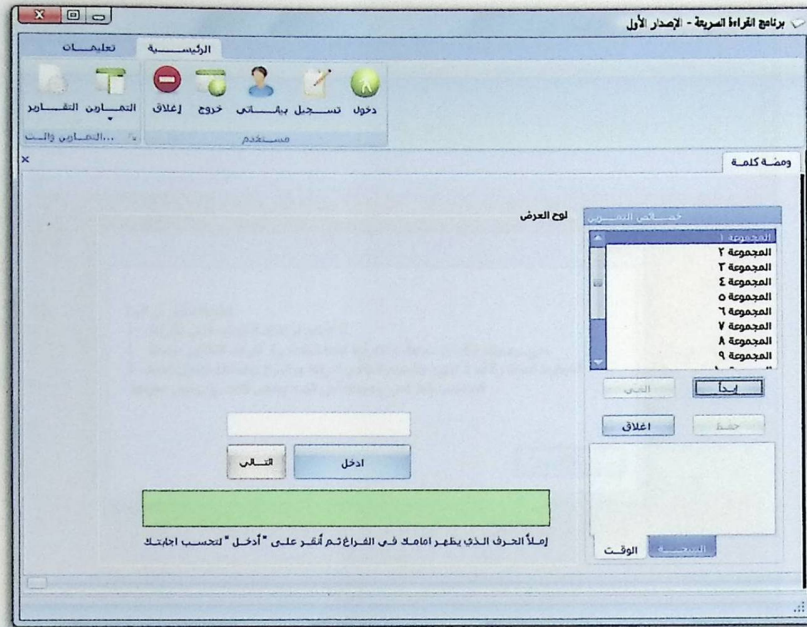


Figure 3.18 : Letter flash screen

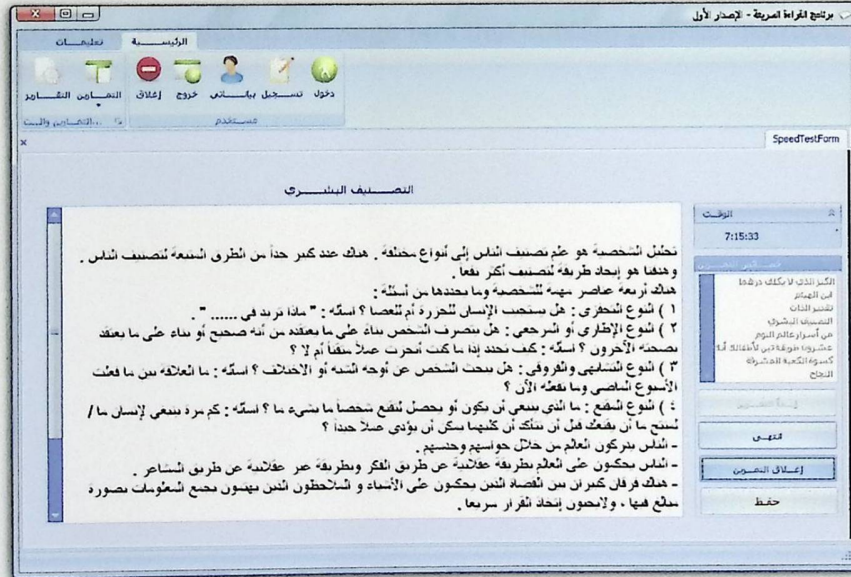


Figure 3.19 : Speed reading exercise screen

Figure 3.19 shows the speed reading measurement exercise with detailed view for the text and time clock and other controls appears in figure for controlling exercise process.

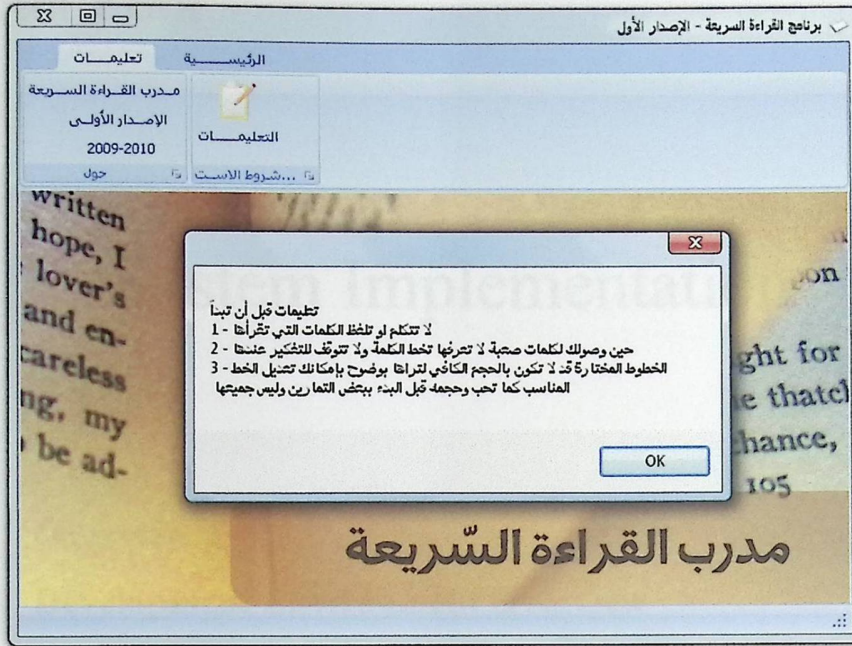


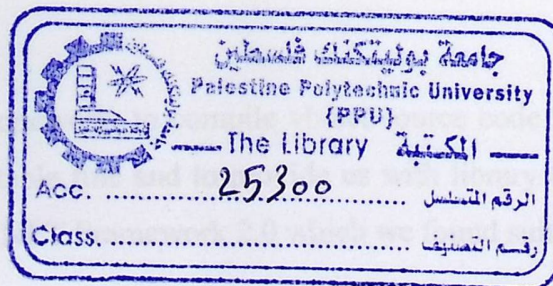
Figure 3.20 : instruction message screen

Figure 3.20 show instruction message box that contain general instruction for reading process.

Chapter Four

System Implementation

- 4.1 Overview
- 4.2 Development Environment Overview
- 4.3 Implementation phases
- 4.4 Testing and Validation



4.1. Overview

In this chapter we demonstrate the implementation phase of developing the system and the testing conditions upon which the validation was done.

4.2. Development Environment overview

The lower case tools which we used in developing the system can be explained as the following:

- Visual Studio 2005

which we found flexible and free, we used it for both developing the GUI of the application and naturally for writing the source code.

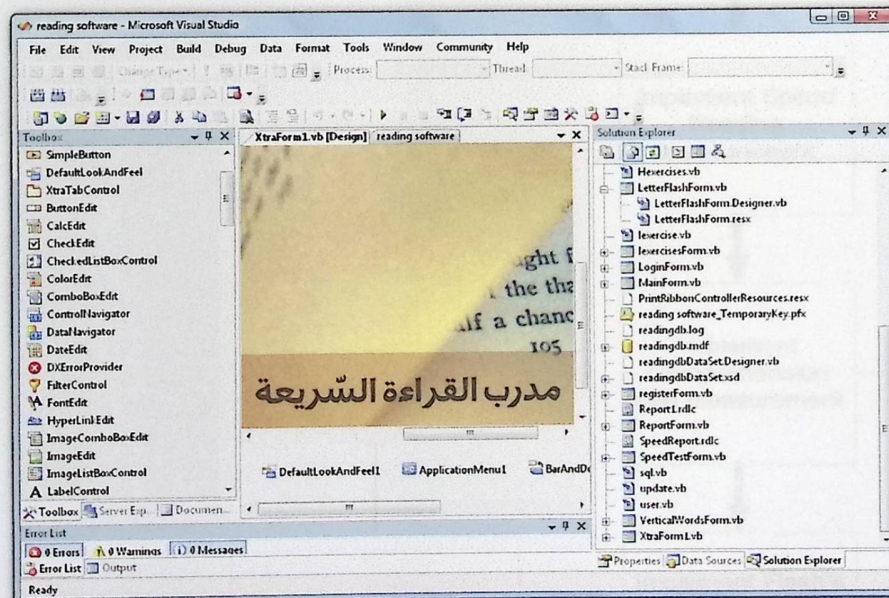


Figure 5.1 : Visual studio 2005 IDE

- .NET Framework: to compile vb.net source code into machine code to be executable fine and to provide us with library that we need. In ours we used .NET Framework 2.0 which we found suitable.

- DevExpress Toolkit: to provide us with GUI library, like ribbon controls and forms.
- Microsoft SQL Server 2005 express edition: to implement the database.

4.3. Implementation phases

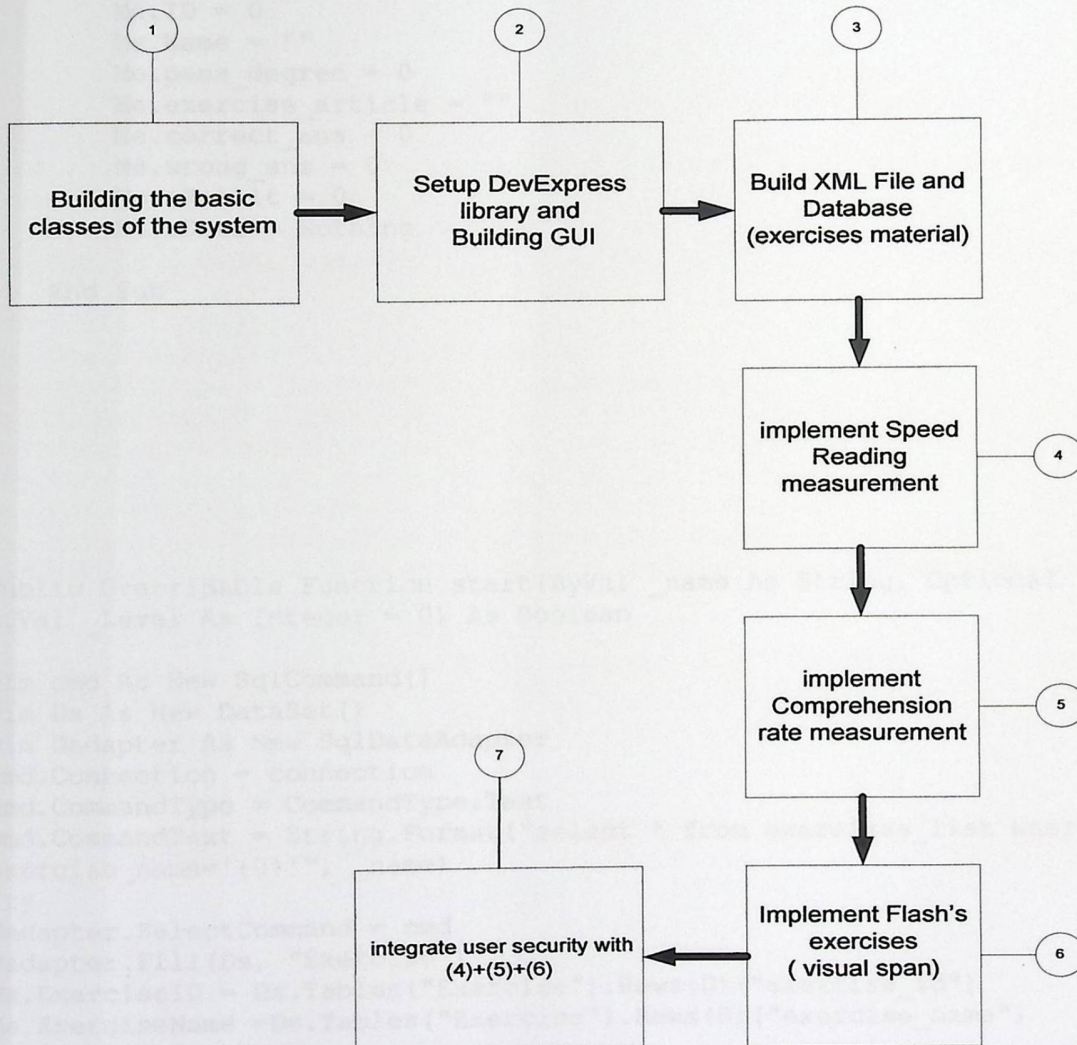


Figure 5.2 : Implementation phases

The figure (5.2) summarizes the implementation phases by which we brought the system to reality.

Step 1:

Implementing basic classes (Hexercise, Lexercise, sql, user).

- Hexercise Class

```
Public Class Hexercises
```

```
.
```

```
.
```

```
Public Sub New()
```

```
Me.ID = 0  
Me.Name = ""  
Me.pass_degree = 0  
Me.exercise_article = ""  
Me.correct_ans = 0  
Me.wrong_ans = 0  
Me.eResult = 0  
Me.eDate = Nothing
```

```
End Sub
```

```
.
```

```
.
```

```
.
```

```
.
```

```
.
```

```
.
```

```
Public Overridable Function start(ByVal _name As String, Optional  
ByVal _Level As Integer = 0) As Boolean
```

```
Dim cmd As New SqlCommand()  
Dim Ds As New DataSet()  
Dim Dadapter As New SqlDataAdapter  
cmd.Connection = connection  
cmd.CommandType = CommandType.Text  
cmd.CommandText = String.Format("select * from exercises_list where  
exercise_name='{0}'", _name)  
Try  
Dadapter.SelectCommand = cmd  
Dadapter.Fill(Ds, "Exercise")  
Me.ExerciseID = Ds.Tables("Exercise").Rows(0)("exercise_id")  
Me.ExerciseName = Ds.Tables("Exercise").Rows(0)("exercise_name")  
Me.ExercisePassDegree =  
Ds.Tables("Exercise").Rows(0)("Exercise_pass_degree")  
Me.ExerciseDate = System.DateTime.Now.Date.ToShortDateString  
Me.correct_ans = 0  
Me.wrong_ans = 0  
Me.eResult = 0  
Me.eDate = System.DateTime.Now.Date.ToShortDateString
```



```

cmd.CommandText = String.Format("Select * from exercises where
exercise_id ={0}", Me.ExerciseID)
Dadapter.SelectCommand = cmd
Dadapter.Fill(Ds, "Exercises")
ReDim Me.efiles(Ds.Tables("Exercises").Rows.Count)
Dim i As Integer = 0
For Each Element As DataRow In Ds.Tables("Exercises").Rows
    efiles(i) = Element("exercise_file")
    i += 1
Next
Catch ex As Exception
End Try
End Function

.
.
..
Public Overridable Function save(ByVal _correct As Integer, ByVal
_wrong As Integer) As Boolean
If Me.ID > 0 And sql.iuser.GetID > 0 Then
Dim cmd As New SqlCommand()
Try
connection.Open()
cmd.CommandText = "dbo.lexerciseSave"
cmd.CommandType = CommandType.StoredProcedure
cmd.Connection = connection
cmd.Parameters.AddWithValue("@user_id", sql.iuser.GetID)
cmd.Parameters.AddWithValue("@exercise_id", Me.ExerciseID)
cmd.Parameters.AddWithValue("@correct_ans", _correct)
cmd.Parameters.AddWithValue("@wrong_ans", _wrong)
cmd.Parameters.AddWithValue("@result", sql.iuser.StartReadingRate)
cmd.Parameters.AddWithValue("@date",
System.DateTime.Now.Date.ToShortDateString)
cmd.Parameters.AddWithValue("@exercise_article", Me.Name)
cmd.ExecuteNonQuery()
MsgBox(" بنجاح الحفظ عملية تمت ")
Catch ex As Exception
    MsgBox(ex.Message)
Finally
    connection.Close()
End Try
End If
End Function

.
.
.
Public Function ExercisesList() As String()
Dim Elist() As String
Dim i As Integer = 0

```



```

Dim command As New SqlCommand("select * from exercise_list",
connection)
Dim Datas As New DataSet()
Dim Dadapter As New SqlDataAdapter(command)
Try
Dadapter.Fill(Datas, "Elist")
ReDim Elist(Datas.Tables("Elist").Rows.Count)
For Each Entry As DataRow In Datas.Tables("Elist").Rows
    Elist(i) = Entry("exercise_name")
    i += 1
Next
Return Elist

Catch ex As Exception
    MsgBox(ex.StackTrace)
Return Nothing
End Try
End Function

```

- Lexercise Class

```

Public Class lexercises
    Inherits Hexercises

    Dim elevel As Integer

    Sub lexercise()
        Me.elevel = 0
    End Sub

    Property ExerciseLevel()
        Get
            Return Me.elevel
        End Get
        Set(ByVal value)
            Me.elevel = value
        End Set
    End Property

    Public Overrides Function start(ByVal _name As String, Optional
ByVal _Level As Integer = 0) As Boolean
    Dim cmd As New SqlCommand()

```



```

Dim Ds As New DataSet()
Dim Dadapter As New SqlDataAdapter
cmd.Connection = connection
cmd.CommandType = CommandType.Text
cmd.CommandText = String.Format("select * from exercises_list where
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Try
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Me.ExerciseID = Ds.Tables("Exercise").Rows(0)("exercise_id")
Me.ExerciseName = Ds.Tables("Exercise").Rows(0)("exercise_name")
Me.ExercisePassDegree =
Ds.Tables("Exercise").Rows(0)("Exercise_pass_degree")
Me.elevel = _Level
Me.ExerciseDate = System.DateTime.Now.Date.ToShortDateString
cmd.CommandText = String.Format("Select * from exercises where
exercise_id={0}", Me.ExerciseID)
Dadapter.SelectCommand = cmd
Dadapter.Fill(Ds, "Exercises")
ReDim Me.files(Ds.Tables("Exercises").Rows.Count)
Dim i As Integer = 0

For Each Element As DataRow In Ds.Tables("Exercises").Rows
files(i) = Element("exercise_file")
i += 1

Next
Me.SetFiles = files

Catch ex As Exception
MsgBox("التالية للأسباب العملية تعذرت" & vbCrLf & ex.Message)
End Try
End Function
End Class

```

- SQL Class

```

Public Class sql
Public Shared connectionString As String = "Data
Source=.\SQLEXPRESS;AttachDbFilename=|DataDirectory|\readingdb.m
df;Integrated Security=True;User Instance=True"
Public Shared iuser As New user()
Public Shared lexercise As New lexercises()
Public Shared hexercise As New Hexercises()
End Class

```


- User Class

```

Public Class user
Public Function register(ByVal _Name As String _
                        , ByVal _born As Date _
                        , ByVal _username As String _
                        , ByVal _password As String) As Boolean
Dim connection As New SqlConnection(sql.connectionString)
Dim Command As New SqlCommand()
Try
    connection.Open()
    Command.Connection = connection
    Command.CommandText = "dbo.UserReg"
    Command.CommandType = CommandType.StoredProcedure
    Command.Parameters.AddWithValue("@name", _Name)
    Command.Parameters.AddWithValue("@username", _username)
    Command.Parameters.AddWithValue("@password", _password)
    Command.Parameters.AddWithValue("@register",
        System.DateTime.Now.ToShortDateString.ToString)
    Command.Parameters.AddWithValue("@born",
        _born.ToShortDateString.ToString)
    Command.ExecuteNonQuery()
Catch ex As Exception
    MsgBox(ex.Message)
    Return False
Finally
    connection.Close()
End Try
.
.
Public Function SaveStartReadingSpeed(ByVal _speed As Integer)
If Me.log And Me.ID > 0 Then
Dim connection As New SqlConnection(sql.connectionString)
Dim Command As New SqlCommand()
Try
    connection.Open()
    Command.CommandText = "dbo.StartSpeed"
    Command.CommandType = CommandType.StoredProcedure
    Command.Parameters.AddWithValue("@speed", _speed)
    Command.Parameters.AddWithValue("@id", Me.ID)
    Command.Connection = connection
    Command.ExecuteNonQuery()
    Me.start_rate = _speed
Catch ex As Exception
    MsgBox(ex.Message)
    Return False
Finally
    connection.Close()
End Try
End If
Return True
End Function
End class

```


Step 2:

Installing DevExpress Toolbar and integrate it with visual studio tool box as shown

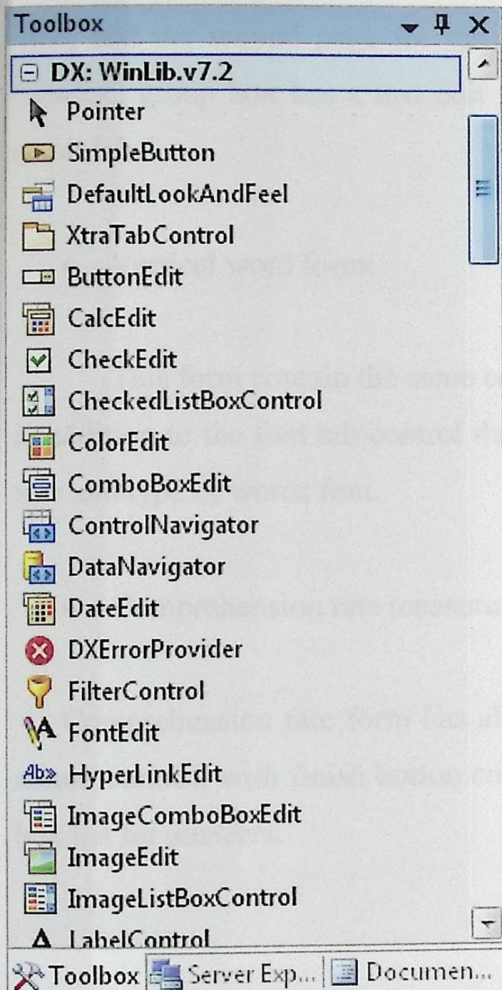


Figure 5.3: DevExpress Toolbar in Visual Studio 2005

in figure 5.3, the library component can be dragged and dropped inside windows form designer in visual studio.

- Main screen form:

This form consist of shortcut ribbon that contain login button, logout button, My information button, exercise menu and instruction menu.

- Login screen form

This form consist of two text edit control (username, password), and three button control (register, cancel, login).

- Speed reading exercise form:

This form consist of list box control and start button, save button, cancel and close button, navbar control and label control, memo edit control.

- Registration form:

This form has four text edit controls (name, username, password, birth date) and two button controls (register, cancel).

- Flash exercises form:

This form contain list box for exercises files, four button controls(start, close, save, cancel), Tab control with two pages the first has label control for showing the time, and the second page for results which has a label control shown results of exercise, group box has a text edit field and two button controls (Enter, Next) and result label.

- Vertical word form:

This form contain the same controls with same design as Flash exercises form in addition to the font tab control that have a font type and size fields to control the size and type of words font.

- Comprehension rate measurement Form:

Comprehension rate form has all vertical word form controls in addition to text memo control, with finish button control and question label control with four check box list for answers.

Step 3:

Implementing XML Files which contain data used in exercises, implementing database schema in Microsoft SQL 2005 server and create stored procedure for subsequence use in program queries.

- **XML File Format :**
 - **Reading speed test XML file format**


```

1 <ReadingSpeedTest>
2 <title>
3 {1}
4 </title>
5 <topic words="{2} ">
6 .....
7 {3}
8 .....
9 </topic>
10 </ReadingSpeedTest>

```

This exercise require three element to be formed in each file:-

- 1- Title of article .
- 2- Number of words in the article body .
- 3- Article body (text paragraphs).

We can see that each one of these element has its special place should exist in :
 {1} -> title , {2} -> number of words , {3} -> article body .

- **Flash Exercises XML file format**

```

1 <Flash>
2 <one e1={1} e2={2} e3={3} ... e19 = {19} >
3 </one>
4
5 <two e1={20} e2={2} e3={3} ... e19 = {39} >
6 </two>
7
8 <three e1={40} e2={2} e3={3} ... e19 = {59} >
9 </three>
10 </Flash>

```


In general all flash exercises has three levels for each level there is data form, three node named as one, two and three, each node has twenty properties each property has end value needed in our system.

- **Comprehension rate exercise XML file format**

```

1 <ComprehensionRate>
2 <title>
3 {1}
4 </title>
5 <topic words="{2} ">
6 .....
7 {3}
8 .....
9 </topic>
10 <Q1 question="Q" answer1="..." answer2="..."
11 answer4="..." correct=# ></Q1>
12 <Q2 question="Q" answer1="..." answer2="..."
13 answer4="..." correct=# ></Q1>
14 ...
15 ...
16 <Q20 question="Q" answer1="..." answer2="..."
17 answer4="..." correct=# ></Q1>
18 </ComprehensionRate>

```

Comprehension rate exercise consist of :-

- 1- Article title .
- 2- Article body .
- 3- Number of article works .
- 4- 20 different multiple choice question .

In XML file element title and body and number of words placed on {1},{2} and {3} , and the twenty different question formed as node for each question with question property and four different choice property and final property of node contain the correct answer number of the previous four choice .

- **Stored procedure**

- **User registration stored procedure**

```
Create PROCEDURE UserReg
```

```
@name varchar(100),  
@username varchar(100),  
@password varchar(100),  
@register varchar(50),  
@born varchar(50)
```

```
AS
```

```
INSERT INTO  
USERS ([name], [username], [password], register, birth, [srate], [erate])
```

```
VALUES
```

```
(  
@name,  
@username,  
@password,  
@register,  
@born, 0, 0  
)
```

```
RETURN
```

- **User Login stored procedure**

```
CREATE PROCEDURE dbo.UserLogin
```

```
@username varchar(100),  
@password varchar(100)
```

```
AS
```

```
select * from users  
where username =@username  
and password =@password
```

```
RETURN @@ROWCOUNT
```


- Exercise save stored procedure

```
CREATE PROCEDURE dbo.lexerciseSave
    @user_id int ,
    @exercise_id int ,
    @exercise_level int = -1,
    @correct_ans int,
    @wrong_ans int,
    @date varchar(50),
    @exercise_article varchar(300) ,
    @result int = NULL
AS
insert into finished_exercises

([user_id],exercise_id,exercise_level,correct_ans,wrong_ans,[date],e
xercise_article,result)

Values

(@user_id,@exercise_id,@exercise_level,@correct_ans,@wrong_ans,@date
,@exercise_article,@result)

RETURN
```

Step 4:

Implement speed reading measurement, this form calculate the user reading speed declining on the reading time interval spending by user and the code for calculate the reading speed shown below :

```
Dim readingSpeed As Single
Dim finished As TimeSpan
Dim start As DateTime
Dim time As Integer
Dim words As Integer
.
start = DateTime.Now
.
.
finished = DateTime.Now.Subtract(start)
time = finished.Seconds + finished.Minutes * 60
readingSpeed = Me.words / time
readingSpeed *= 60
```


Step 5:

Implement comprehension rate measurement, to measure comprehension the result of 10 question answer stored for the user, the next code shown the calculation operation:-

```
Dim Comprehentionrate As Integer
sql.hexercise.WrongAnswer = 0
sql.hexercise.CorrectAnswers = 0
.
.
Me.Comprehentionrate = sql.hexercise.CorrectAnswers /10
Me.Comprehentionrate *= 100 ' ex. 70%
```

Step 6:

Impalement Flash's exercises indicates to calculation of flash time interval that based on the user reading speed, the next code shown the calculation:

```
Dim TimeInterval As Integer
Dim FlashTimer as New Timer()
.
.
TimeInterval = 60 / sql.iuser.StartReadingRate ' interval in second
TimeInterval = TimeInterval * 1000 ' interval in ms
FlashTimer.interval = TimeInterval
FlashTimer.Start()
WordLabel.show()
.
.
wordLabel.hide() ' On FlashTimer Tick event
```


Step 7:

Integrate user security with all exercises. By preventing unregistered users from accessing exercises while they don't have user accounts.

This code checks if the user is logged in and if he has measured his reading speed to access the letter flash form:

```
If sql.iuser.IsLogin = True And sql.iuser.StartReadingRate > 0 Then
    sql.lexercise.start("حرف ومضة", 1)
    Dim letter As New LetterFlashForm
    letter.MdiParent = Me
    letter.WindowState = FormWindowState.Maximized
    letter.Show()
    .
    .
    .
Else
    MessageBox.Show(
        "بك الخاصة البدائية السرعة قياس تمرين باءاء تقوم أن أولا عليك " _
        , "عذراً", MessageBoxButtons.OK, MessageBoxIcon.Warning)
End If
```

Figure 5-4: Success registration

This code checks if the user is logged in and if he hasn't measured his reading speed to access the reading speed measurements form:

```
If sql.iuser.IsLogin And sql.iuser.StartReadingRate = 0 Then
    sql.hexercise.start("السرعة قياس")
    Dim speed As New SpeedTestForm
    speed.MdiParent = Me
    speed.WindowState = FormWindowState.Maximized
    speed.Show()
    .
    .
Else
    MessageBox.Show("سابقا بنجاح التمرين هذا اتمت لقد " _
        , "تنبيه" _
        , MessageBoxButtons.OK _
        , MessageBoxIcon.Stop)
End If
```


4.4. Testing and validation

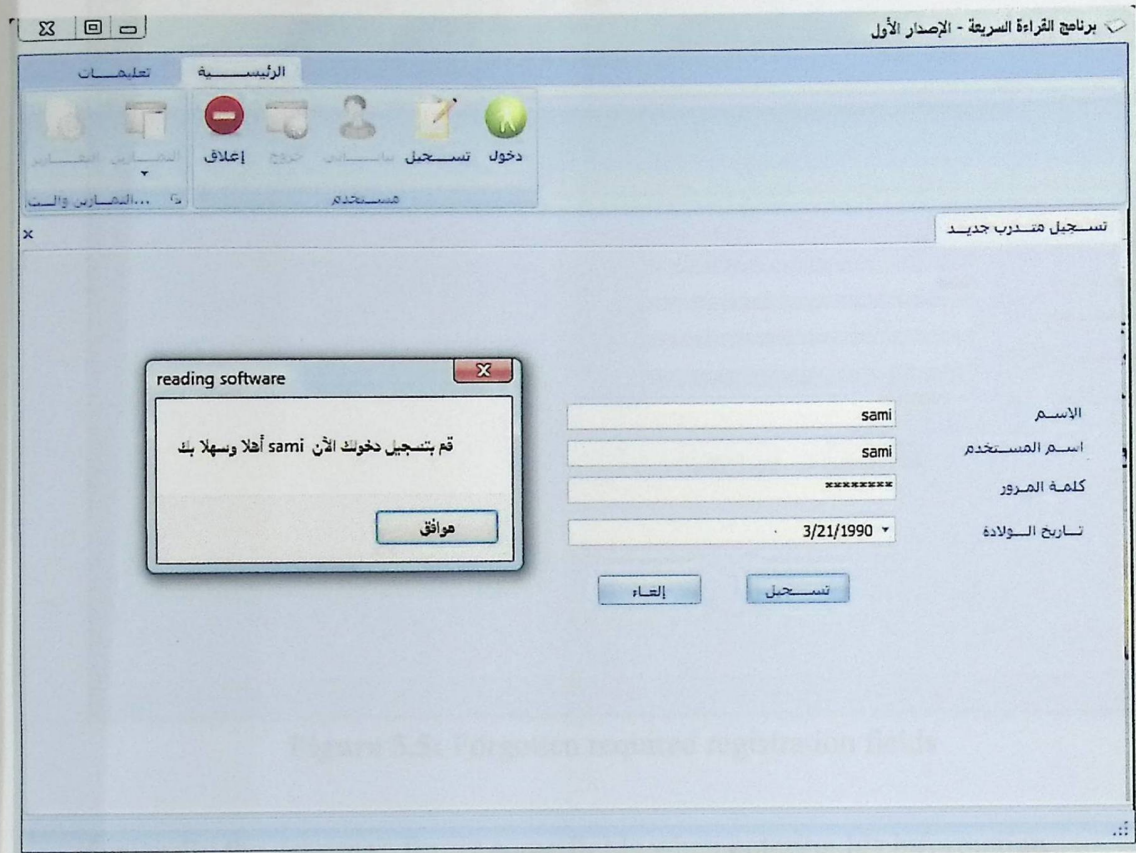


Figure 5.4: Success registration

Generally when user finish a success registration operation with valid data we announce him to login with the new account.

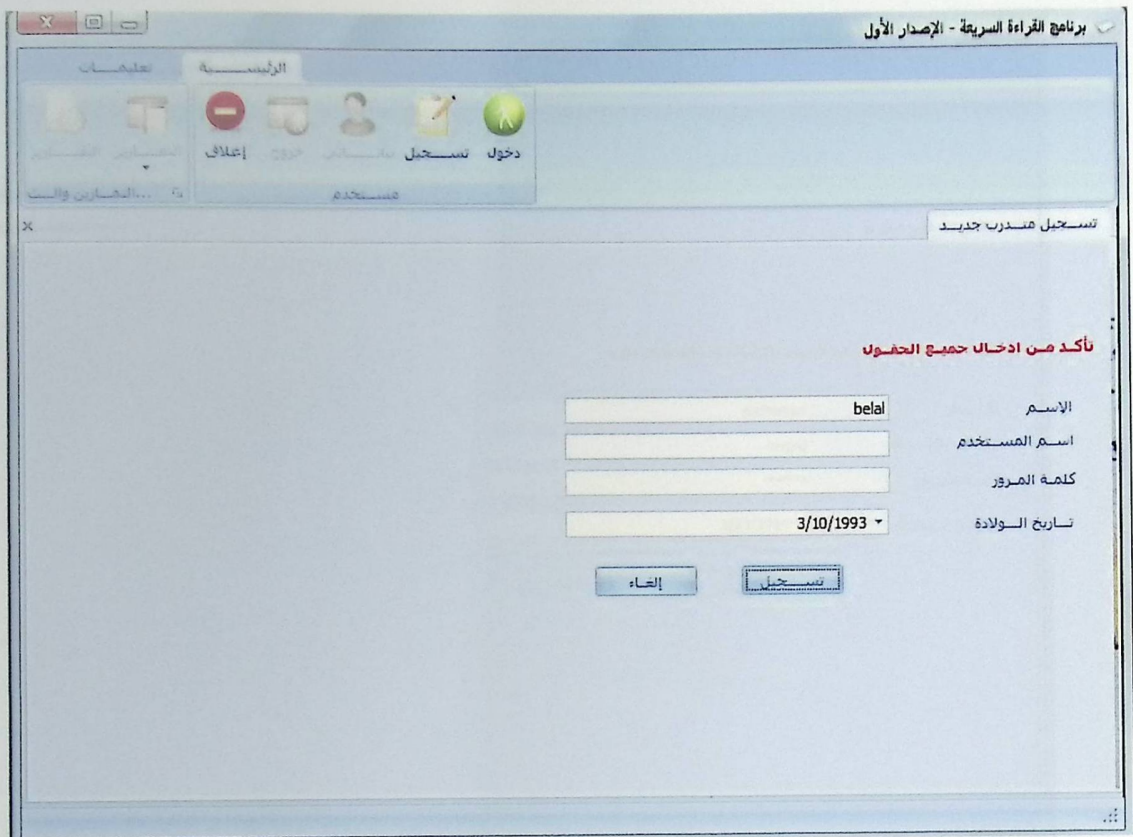


Figure 5.5: Forgotten required registration fields

Generally the user may forget some fields when entering his information avoiding that we suggested to warn him by this message.

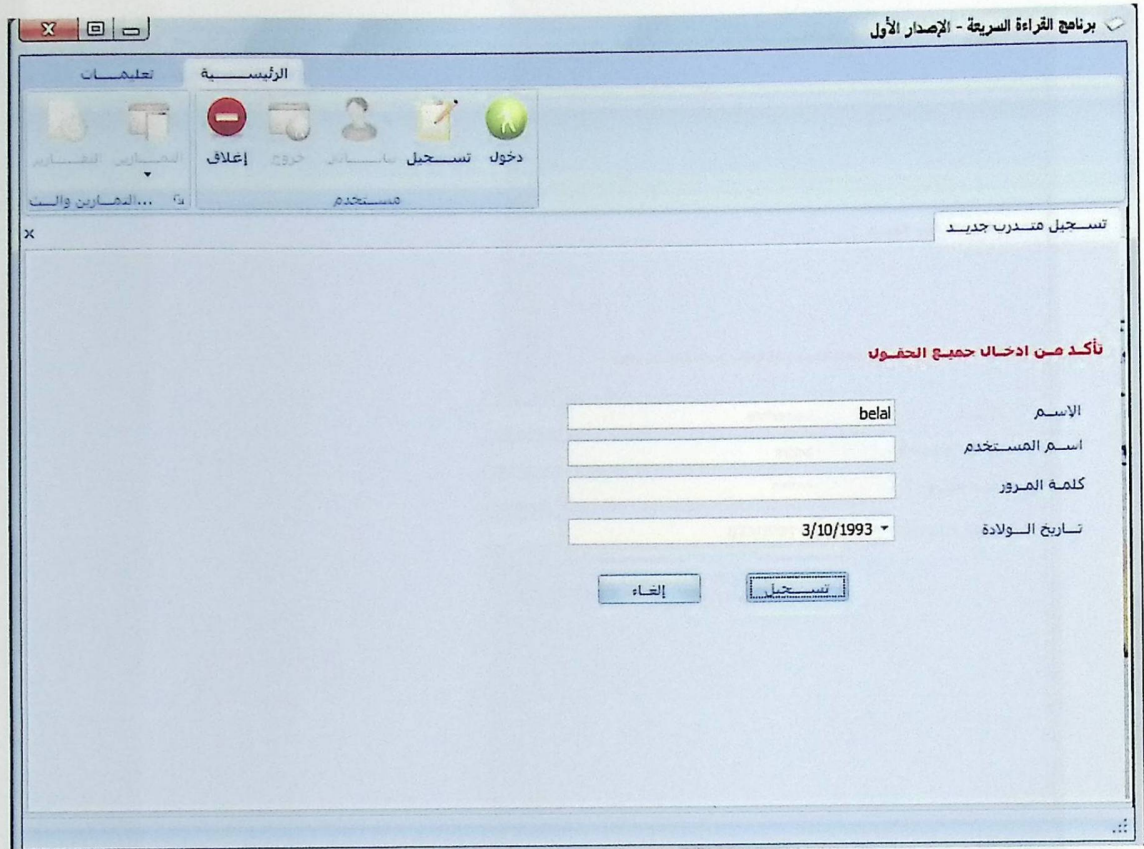


Figure 5.5: Forgotten required registration fields

Generally the user may forget some fields when entering his information avoiding that we suggested to warn him by this message.

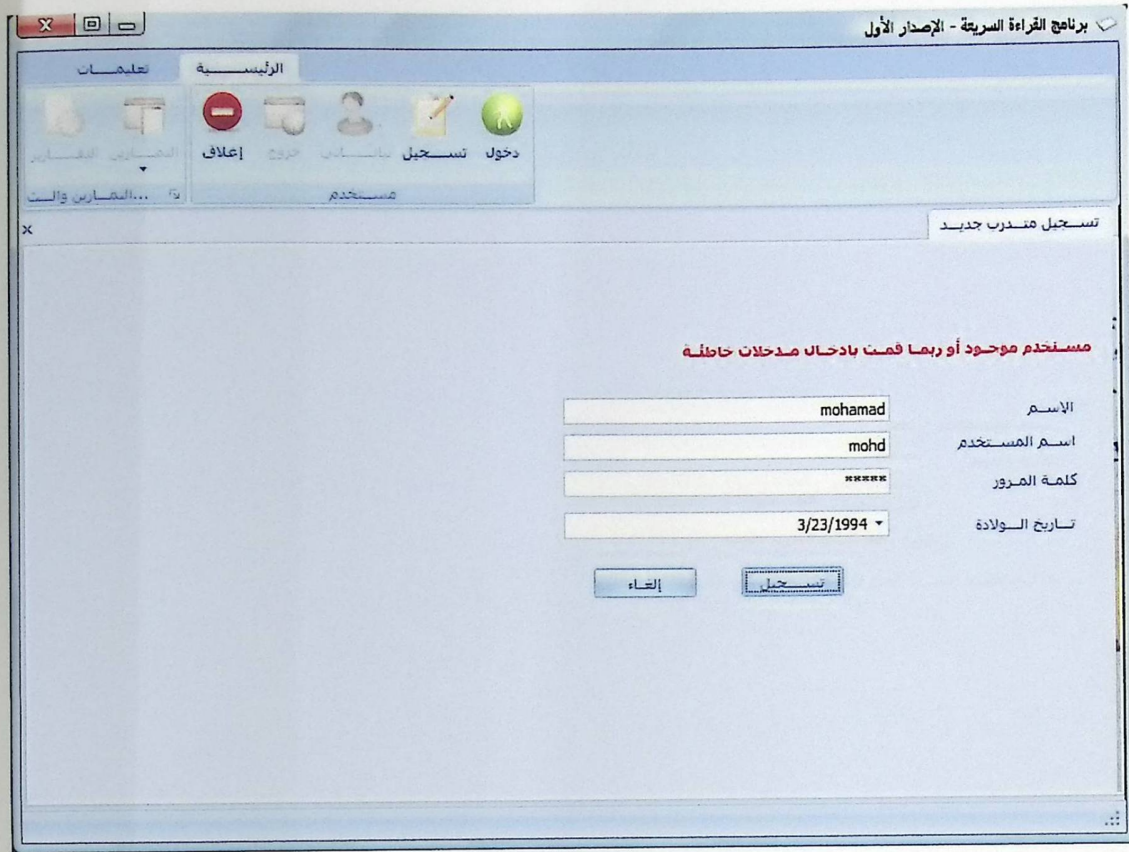


Figure 5.6: Existed user

The user may attempt to register with existed username or he may attempt to enter wrong information, we suggested to warn him for that.

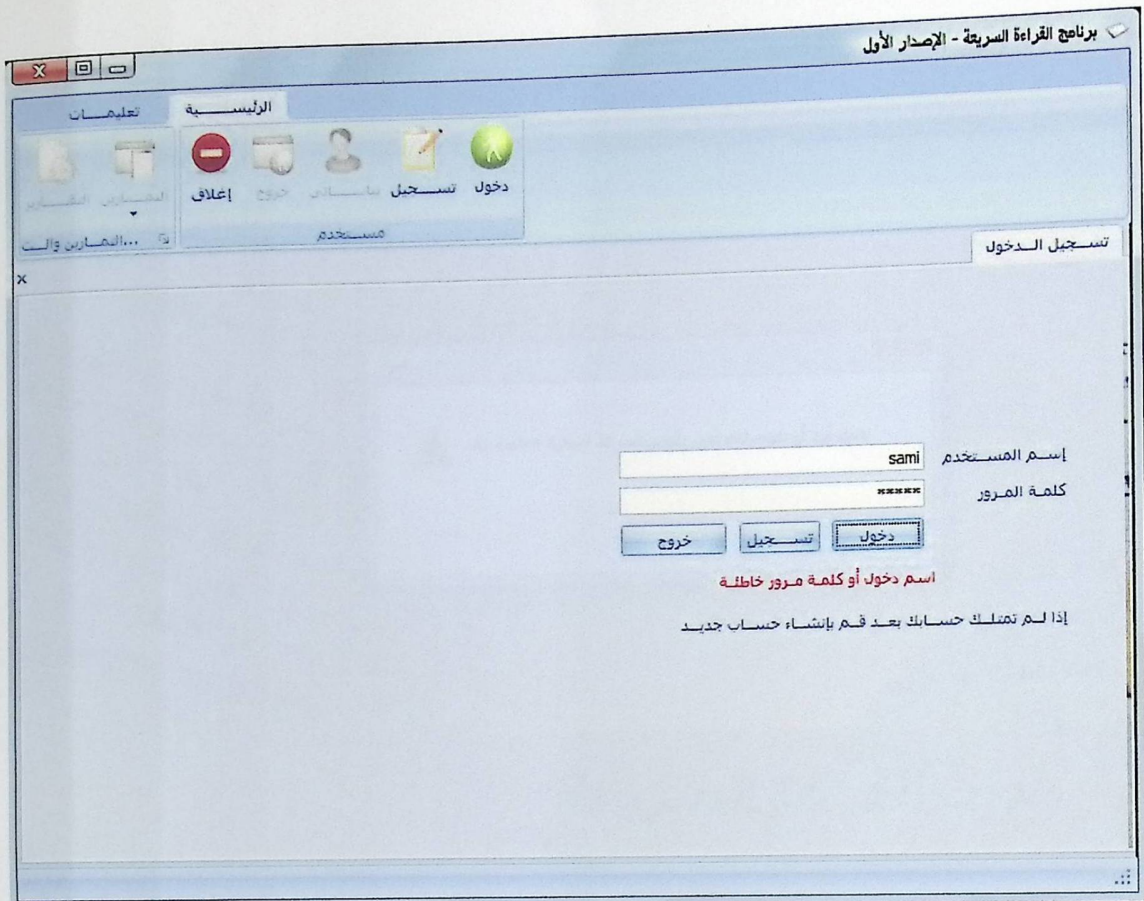


Figure 5.7: Wrong login data

Always user should enter the correct username and password to login.

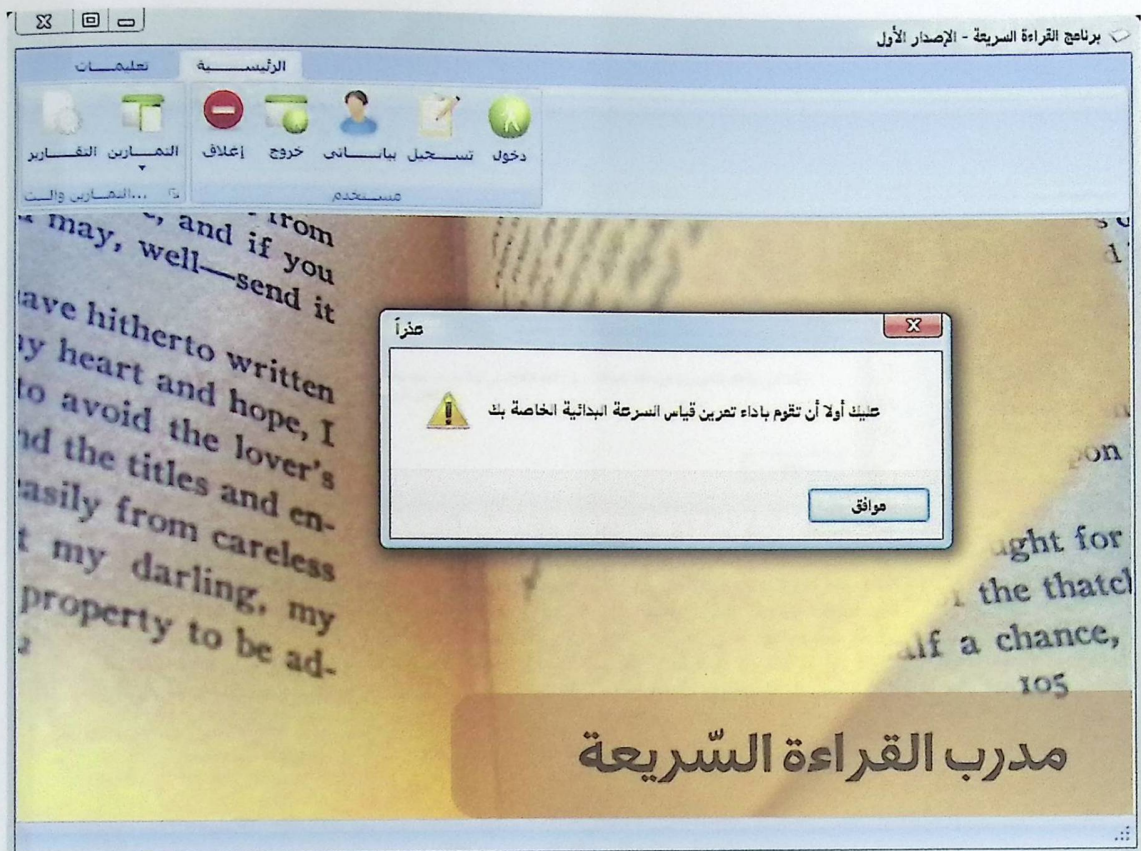


Figure 5.8: Unaccessible exrcises

In this case user didn't measure his reading speed and he is trying to access any other exercise.

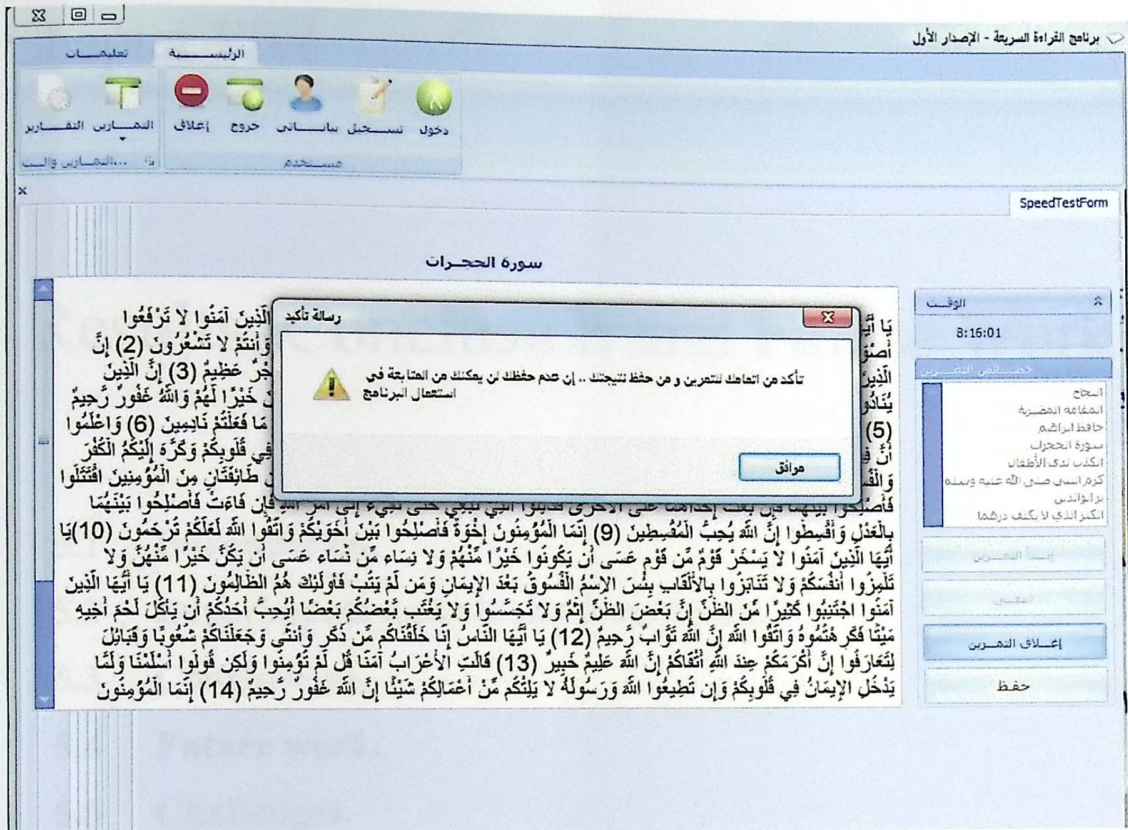


Figure 5.9: Save message

Chapter Five

Results, Conclusion and Future Work

5.1 Introduction.

5.2 Experiments and results description.

5.3 Conclusions.

5.4 Future work.

5.5 Challenges.

5.1 Introduction

In this chapter we demonstrate the experiments done to test the efficiency and reliability of the system showing how much we reached the goals previously assigned, coming to the conclusions after these experiments, and finally speak freely about the possible enhancements that could be done as a future work.

5.2 Experiments and results description.

We have chosen a group of students at Palestine Polytechnic University to examine this system and study the results of the experiment to measure the effectiveness of the system and its ability to achieve the goals, this sample relied on volunteers from university students.

We have confined the trial period and limited it to only one week to see improvement in reading speed of volunteers during the week of the use of this system; these experiments takes one hour daily includes the flashing exercises (Letter, numbers and words) then the vertical words exercise then comprehension rate and finally the speed reading exercise, the results shown below display the different reading rates for each user:

Table 5.1. Result1

Name	Eman Mahmoud
Start Speed	125 words/minute
Final Speed	285 words/minute
First Comprehension Rate	30%
Final Comprehension Rate	70%
Start Date	6/2/2010
End Date	13/2/2010
Conclusion	The user has duplicated his reading speed and she has an improvement on the comprehension rate too.

Table 5.2. Result2

Name	Ibrahem Nassar
Start Speed	219 words/minute
Final Speed	430 words/minute
First Comprehension Rate	40%
Final Comprehension Rate	60%
Start Date	7/2/2010
End Date	15/2/2010
Conclusion	The user has duplicated his reading speed and she has an improvement on the comprehension rate too.

Table 5.3. Result3

Name	Ilias Ewiwi
Start Speed	248 words/minute
Final Speed	575 words/minute
First Comprehension Rate	40%
Final Comprehension Rate	70%
Start Date	2/2/2010
End Date	9/2/2010
Conclusion	The user has duplicated his reading speed and he has an improvement on the comprehension rate.

Table 5.4. Result4

Name	Samer Barakat
Start Speed	122 words/minute
Final Speed	279 words/minute
First Comprehension Rate	60%
Final Comprehension Rate	70%
Start Date	1/2/2010
End Date	8/2/2010
Conclusion	The user has duplicated his reading speed and he has an improvement on the comprehension rate.

Table 5.5. Result5

Name	Anees Barakat
Start Speed	248 words/minute
Final Speed	575 words/minute
First Comprehension Rate	70%
Final Comprehension Rate	80%
Start Date	29/1/2010
End Date	4/2/2010
Conclusion	The user has duplicated his reading speed and he has an improvement on the comprehension rate.

Table 5.6. Result6

Name	Hamza Abu Ajameah
Start Speed	260 words/minute
Final Speed	405 words/minute
First Comprehension Rate	60%
Final Comprehension Rate	80%
Start Date	2/2/2010
End Date	9/2/2010
Conclusion	The user has duplicated his reading speed and he has an improvement on the comprehension rate.

Table 5.7. Result7

Name	Sami Badr
Start Speed	355 words/minute
Final Speed	682 words/minute
First Comprehension Rate	60%
Final Comprehension Rate	70%
Start Date	3/2/2010
End Date	10/2/2010
Conclusion	The user has duplicated his reading speed and he has an improvement on the comprehension rate.

From the gotten result's, we can see that all users has duplicates there speeds and they have an improvement in there comprehension rate, that's mean user speed can be improved without decreasing the comprehension of the individuals. The first comprehension rates computed by the system indicate low level of comprehension compared with the final comprehension rates for all users as same as reading speed.

5.2 Conclusions

- We concluded that the use of reading speed system is efficient in terms of speed improvements.
- We concluded that there is no restricted fact that the improvement in the speed will decrease the comprehension rate.
- We conclude that comprehension rate in all cases will improved by 10% or more for who have less than 50% comprehension rate.
- Within one week you can duplicate your reading speed using the system and with more usage you will be able to improve your reading speed to become fluent reader.

5.3 Future works

We are impassioned to analyze and process the reading, studying more exercise techniques that will improve the efficient of reading and improve comprehension of users.

We are interested also to design and implement web based system that serves users around the worlds with multi language system.

5.4 Challenges

In this period of project which was prepared for gaining results to show how much we achieved our goals, it was very difficult and challenging.

- The commitment of volunteers in a manner of time and practices the exercises daily.
- Uses new toolkits library to design GUI of the system.
- We have to use local SQL Server on volunteer's machines in manner of testing.

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