



**ADDIS ABABA UNIVERSITY**

**SCHOOL OF GRADUATE STUDIES**

FACULTY OF COMPUTER AND MATHEMATICAL SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

Mobile Based Amharic Language Learning Tool

By

Axsumawit Tassew Melese

A Project paper submitted to the School of Graduate Studies of Addis  
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Axsumawit Tassew Melese

Name and Signature of members of the Examining Board:

NAME

SIGNATURE

1. Dr. Fistum Admasu, Advisor \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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## **List of Acronyms**

ADT	Android Development Tools
ALC	Accelerated Learning Center
FDRE	Federal Democratic Republic of Ethiopia
ITS	Intelligent Tutoring System
JLPT	Japanese Language Proficiency of Non- Speakers
MBL	Mobile Based Learning
MLA	Mobile Learning Application
ML	Mobile Learning
PDA's	Personal Digital Assistants
UNESCO	United Nations educational Scientific and Cultural Organization
WBT	Web Based Training

## **Abstract**

Mobile learning refers to the use of mobile and handheld IT devices such as Personal Digital Assistants (PDAs), mobile telephones, laptops and tablet PC technologies, in teaching and learning. It is a new form of learning, using mobile network and tools, expanding digital learning channel, gaining educational information, educational resources and educational services anytime, anywhere. Learning a language requires explicit learning of vocabulary and language rules. This can be supported by mobile learning.

This paper describes a mobile based Amharic language learning tool for beginners. The main emphasis is to teach beginners the basic alphabets, words and common conversation they might come across. To achieve this goal, our main effort is based on three aspects: designing and delivering alphabets, words and conversion lessons, giving exercises for the lessons, and allowing the user to keep track of his/her profile.

*Key words:* Mobile learning, Mobile language learning, mobile learning application

# Chapter One

## Introduction

### 1.1. Background

Mobile learning (ML) refers to the use of mobile and handheld IT devices such as Personal Digital Assistants (PDAs), mobile telephones, laptops and tablet PC technologies, in teaching and learning [1]. It is a new form of learning, using mobile network and tools, expanding digital learning channel, gaining educational information, educational resources and educational services anytime, anywhere.

Some of the advantages of mobile learning are personalization of learning environment, learning experience outside the classroom, learning by recording, organizing over time, taking advantage of the benefits of an informal learning, be more motivated, no more forced to use PC as the only object to have access to materials and knowledge. Although using mobile for education has the above advantages the use of mobile devices may have some difficulties like small screen size, limited memory size, small keyboards, limited battery life, high costs, possibility for mobile devices to be misplaced or stolen, and difficulty to use mobile devices in noisy environments [2].

Learning a language is different from any other subject as it combines explicit learning of vocabulary and language rules with unconscious skills development in the fluent application of both these things. This can only happen when language learners are exposed in authentic language use for many hours every week and this is something that mobile technologies can easily support [3].

Mobile learning provides a free learning environment which learners can study everywhere at every time. It helps accumulate vocabulary in a piecemeal manner. Mobile learning also can offer video and audio to practice the learners' ability of hearing and speaking [1].

### 1.2. Statement of Problem

Many people visit Ethiopia - or hope to do so one day - because of the remarkable manner in which ancient historical traditions have been preserved [4]. Therefore anybody who wishes to visit or stay in Ethiopia can learn the language for communication. Amharic is the official

working language of the Federal Democratic Republic of Ethiopia (FDRE). Outside Ethiopia, Amharic is the language of some 2.7 million emigrants (notably in Canada, United States, and Sweden) [5]. Non- Amharic speaking Ethiopian citizens may also learn Amharic since it is the official working language of the FDRE. Amharic language consists of around 300 alphabets and the language itself is highly inflectional, from one root word we can drive many words with different meaning. Therefore learning this language will take considerable amount of time. Even though the use of mobile phones is growing, there is no work done on Amharic mobile learning.

### **1.3. Objective**

#### **1.3.1.General Objective**

The general objective of this project is to develop a mobile based Amharic language tool which can help to develop a user's listening, vocabulary and reading skills.

#### **1.3.2.Specific Objective**

Specific objectives for this project are the following:

- Assess similar works on language learning tools.
- Identify the main areas of language learning that can be included in the system to be implemented.
- Design the language learning application for mobile phones.
- Develop mobile based language prototype
- Test the developed prototype.

### **1.4. Scope and Limitation of the Project**

The scope of these project is only limited to teaching the alphabet, the common words of the language and some common conversation. It will include the three language skills i.e. listening, reading and writing. Words will be taught through pictures and the corresponding English word because using only pictures will create confusion to the learners when describing abstract words. In order to teach the words we will use concatenative text to speech synthesis. The tool will not be used for teaching speaking and in order to use this tool learner must know English language.

### **1.5. Methodology**

The methodology that we followed for this project was first to gather information on how to teach the Amharic language for beginners. In doing so, we have observed classes that were given at the institute of language studies, department of Ethiopian language and literature. We observed the methods that they use in order to teach foreigners the Amharic language. We have also tried to look at different language learning tools. After a thorough study of these methods we have designed lessons and exercises accordingly. The lesson was mainly adopted from one of the reference books that AAU uses for the foreign beginners. After finishing designing the lessons and exercises we have implemented the system using Eclipse integrated development environment and the Android development tool.

### **1.6. Application of the Project**

A user with mobile phone will be using this Amharic language tool to practice the language. He/she can learn the phonetics of the language which helps for reading, can also learn vocabularies and different recorded audios will be used to help the user develop his/her listening skills. The tool can be used by a foreigner or anybody whose first language is not Amharic.

### **1.7. Organization of the Paper**

This project paper is organized into six Chapters including the current one. The second Chapter details the literature review and related works on mobile learning. The third Chapter discusses the system analysis. Functional requirements, non- functional requirements and system models are presented in detail in this chapter. Chapter four discusses the different designing models used in the project. In the fifth chapter we will discuss the system development tools in detail and the implementation of the system. The last Chapter, chapter six, details the conclusion of the paper and the future works.

## Chapter Two

### Literature Review and Related Works

#### 2.1. Literature Review

##### 2.1.1. Requirements of Mobile Language Learning

Anastasios A. Economides in his paper “Requirements of Mobile Learning Applications” [6] presented the mobile learning requirements along four dimensions: Pedagogical, Socio-Cultural, Economical and Technical. From these requirements we will consider the pedagogical requirements and technical requirements.

##### *2.1.1.1. Pedagogical requirements*

The pedagogical requirements are categorized into the following areas: Learning theories, Instructional Design models, Content Quality, Content Comprehensiveness & Completeness, Content Presentation, Content Organization, Student Support & Feedback, and Control.

The Learning theories emphasize the inclusion of various learning and didactic theories (e.g. constructivism, behaviorism, cognitive, social learning) should be incorporated into the MLA (mobile learning application).

The Instructional Design models stress the use of various instructional design models (e.g. analyze, design, develop, implement, evaluate) should be included into the MLA. For example, there should be exercises on evaluation and comparison of various theories so that the learners’ evaluation abilities are enhanced.

Regarding the Content Quality, it should be valid, trustworthy, and accurate. It should be useful and appropriate for the intended educational objectives, ages and level of learners. It should also motivate the learner.

The Content Comprehensive & Completeness of MLA should cover all main topics, ideas and key points at all levels, at the right quantity for mobile learning (restrictions due to screen size, memory etc.).

Content Presentation in MLA should be based on a variety of media (e.g. text, picture, image, graphs, diagrams, audio, video, immersion) of high quality (e.g. resolution, number of colors,

refresh rate, sound fidelity, mono or stereo sound). There should be the right mix of media objects at the appropriate positions in the content.

The Content Organization should be simple, modular and flexible. It should be easy to navigate providing many navigation tools (e.g. Table, Map, Directories).

The Student Support & Feedback retirement points out that the MLA should support the learner and react to his actions at the right quantity at the right moment. The feedback would aim at informing (e.g. advising on content, helping on assessment, guiding or navigation, supporting on collaboration, notifying on events and activities), alerting (e.g. reminding on deadlines, warning on danger), or motivating (e.g. attracting learner's attention, stimulating, challenging, provoking, building confidence, assuring, encouraging, praising, relaxing) the learner.

Control levels among the learner, the teacher and the system should be possible. For example, the learner may have the option to overtake control over the educational activity ignoring any suggestions of the system. Also, various educational tools should be provided to the learner and the teacher (e.g. content designing, creating, and organizing; learner monitoring, instructing, tutoring, evaluating, and recording) to use without requiring to know programming.

#### **2.1.1.2. Technical requirements**

##### **A) User Interface**

The requirements for the User Interface are categorized into the following areas: Usability, Layout & Organization, Media, Navigation & Orientation, Effectiveness, Accessibility, Help, and Personalization.

*Usability* focuses on how MLA should be easy to understand, learn, remember and use its functions. It should be simple and convenient to operate. It should neither distract nor cognitively overload the learner. Rather, it should attract the learner's attention and focus.

Regarding its *Layout & Organization*, it should be simple and intuitive to use. Its design should be aesthetically attractive, pleasant and fun to use. They should appear in a consistent and uniform way. The number of menu levels and choices per level should be appropriate.

Various media types (e.g. text, audio, video, immersion) of high quality and fidelity should be supported. They should appear at the right mix and position.

*Navigation & Orientation* should be easy, simple and intuitive to navigate. They should be accurate and consistent

*Effectiveness* should provide useful, appropriate and meaningful means to increase the user productivity.

*Accessibility* should be as usable as possible by as many people as possible regardless of age, ability or situation. It should support various languages and modes of communication. It should support persons with special needs (e.g. screen magnification/ zooming, speech-to-text and text-to-speech translation).

*Help* MLA should offer various forms and tools to support the user.

*Personalization* MLA should be aware of the user and the environment, predicting any changes and actions, and be tailored to the individual user. For the same conditions similar personalization should be achieved. The responses to any change should be transparent to the user, immediate and effective.

## **B) Functionality**

The requirements for the Functionality are categorized into the following areas: Variety, Quality, Interactivity, and Communication & Collaboration.

MLA should offer *Variety* of functions. It should also offer many features to deal with various situations. These features should cover as many as possible cases.

*Quality* of MLA suggested that it should have functions that are useful and suitable for the educational objectives, the learner and the situation. They should be simple and self-explanatory. They should provide to the learner flexibility and convenience at the right moment.

*Interactivity, Communication & Collaboration* of MLA should be with various communication modes (e.g. synchronous or asynchronous; user-to-device or user-to-user; one-to-one, one-to-many, many-to-one). Synchronization and coordination among media, features, applications, devices and networks are also very important.

## **C) Reliability & Maintainability**

The requirements for the Reliability & Maintainability are categorized into the following areas: Error Free, Error Recognition & Prevention, Fault Tolerance & Recoverability, Availability, Installation easiness, Maintenance easiness, Reconfiguration easiness, Upgrade easiness.



*Error Free:* MLA operation should be correct and accurate with no errors (faults). Its operation should be consistent and similar states should be treated similarly.

*Error Recognition & Prevention:* MLA should continuously monitor its state. It should be easy and fast to analyze and test its state. If an error or fault happens, it should recognize its existence and its source. Then, it should make correct diagnosis of the error. It should also prevent errors that may occur.

*Fault Tolerance & Recoverability:* any errors that cannot be prevented should be easily repaired with minimum effort and resources at the minimum time. The MLA should be able to continue valid operation in case of fault or failure of some of its parts. The repair should be transparent to the learners. No data or other useful resources should be lost in case of error. No data discrepancies should occur due to hardware faults (e.g. power off, communication disconnection).

*Availability:* MLA should always be available in any environment. It should survive at most extreme situations keeping on its integrity.

*Easiness of Installation:* MLA should be easy and fast to install at any appropriate device or system.

*Easiness of Maintenance:* minimal effort and time is needed to maintain MLA's efficient operation.

*Easiness of Reconfiguration:* it should be easy, unproblematic and fast to reconfigure or replace parts in case of changes in its scope and operation. Self-tuning would be appreciated.

*Easiness of Upgrade:* it should be easy and fast to revise and upgrade it.

### **2.1.2.Features of Mobile Learning**

There are four fundamental elements in mobile learning: learners, instructors, teaching contents and the teaching methods. All of them have the same feature Mobility. Compared with the traditional learning methods, mobile learning has the following features: [7]

*Mobility:* As long as within the areas covering the mobile telecommunication network services, the learners can study anytime and anyplace. By the same token, the instructors can give their teaching information anytime and anyplace, and also can revise, renew the teaching resource database anytime and anyplace.

*Real time:* If learners have the needs to get some knowledge, by using some technical methods, the learners can get that knowledge at once. So M-Learning is a real time learning method.

*Interactive:* By using mobile terminal instruments and the services of mobile communication, both learners and instructors can communicate each other. So M-Learning is very interactive.

*Virtualization:* The instructors can create the virtual classroom, virtual instructors, and the learners can create the virtual class. The relationship between the instructors and the learners are dynamic and virtual.

*Digitization:* The teaching resource of digital multimedia, the system of network and the mobile terminal instruments, all of them determine the digitization of M-Learning.

*Individuation:* M-Learning can provide the individual services according to the learners' needs and the features of the subjects.

## **2.2. Related Works**

As a technical gap between personal computers and cellular phones has narrowed down, the technological obstacles of designing learning system in these technologies are almost indifferent. Today, what we did in the past with the computer-based training and web-based training is easily being transferred to mobile learning environment [8].

A MBL (Mobile Based Learning) can provide more flexible learning opportunities to learners because a mobile phone is the most wearable technology that is diffused in today's society [8].

The widespread ownership of mobile devices such as cell phones, personal media players, personal digital assistants (PDAs), smart phones and wireless laptops mean that „mobile learning“ is no longer in the preserve of technical experts and researchers with specialist knowledge. Teachers and learners have begun to integrate mobile technologies into everyday practices and there is evidence of efforts to invent exciting new scenarios of use. Language learning is one of the disciplines that looks set to benefit from these developments.

While reviewing related works on mobile based language learning there are some interesting works on web based and PC based Amharic language learning [9] [10]. There is no work related to mobile based Amharic language learning tool. But there are other experiences on mobile language leaning in other countries. They are presented in the following sections.

### **2.2.1. Tense Intelligent Tutoring Systems (TenseITS)**

Intelligent tutoring systems (ITS) build a model of the individual learner's knowledge, difficulties and misconceptions, as they interact with the system. This learner model can be compared with a model of the target domain to enable suitable tutorial strategies to be inferred by the system, as appropriate for the learner according to the contents of their learner model – i.e., the educational interaction is tailored to the specific learning needs of the individual student.

TenseITS [11] is a mobile intelligent tutoring system for the use of tense in English, designed primarily for Chinese learners of English. It allows the learner to learn while on a bus, while waiting for friends at a restaurant, while waiting for an appointment, for a brief period of time between lectures, etc

The key learner model attributes for TenseITS are: *knowledge, difficulties, and misconceptions*; augmented by contextual information about *location, interruption/distraction, concentration, available time*.

It infers a user's understanding of the domain based on their responses to multiple choice questions, representing this understanding in the learner model. The system models the learner's knowledge (i.e., what they know – e.g., *the present perfect is used with expressions relating to completed time*). Their lack of knowledge is inferred from an absence of data about a concept or topic in the learner model. Difficulties are inferred from the number of incorrect responses for a question type. Misconceptions (e.g., *the present tense always refers to present time*) are modeled, inferred by matching a set of incorrect responses to data in a misconceptions library. User states their location by menu selection, at the start of an interaction. By doing so appropriate content or exercises are then selected according to both the learner's knowledge state and their context.

Thus, TenseITS not only aims to adapt the interaction according to an individual's current knowledge state, as in standard ITSs, but also aims to take account of the user's current context (location, frequency of interruption, level of concentration, available time) in order to provide an interaction which is also appropriate for the mobile learner.

### **2.2.2. Pocket Eijiro**

ALC Press, Inc., one of Japanese largest publishers specialize in English language education, had provided paid English learning system called „Pocket Eijiro“ for mobile phone users [8].

When pocket Eijiro project (PEP) first designed, ALC used WBT system as a prototype for designing the PEP because ALC already had several successful WBT systems. However, after one of successful WBT systems was precisely copied and transferred in MBL environment, the end product was not satisfying for test learners in terms of usability and continuous learning. Since the mobile phone does not initially equipped with keyboard, the learning system needed to be more click-centered than type-centered. Moreover, due to a small screen size of mobile phones, each learning content was too long for MBL. As a result, the system designers have learned that even though computers and mobile phones possess very similar technological qualities, WBT and MBL carries different prerequisites for users' learning environment. Based on this observed difference the developers designed a successful English learning application.

### **2.2.3. Exploring the Effectiveness of Mobile Phones to Support English Language Learning for Migrant Group**

This project is a ten-week project that sought to explore the potential of mobile phone-based English language learning within a predominantly Bangladeshi community in the City of London [12]. The project was funded and supported by the Government's Delivery Innovation Team and the City of London Corporation, delivered by Anspair Ltd., and independently evaluated by Bone Wells Urbecon Ltd. An interactive English language learning application was provided on Nokia mobile phones to two groups of learners: a group of women who were already enrolled in a formal language class and who used the phone application as a supplementary tool; and a group of women who were not undertaking any formal classes. The project sought to explore the extent to which the use of the mobile phone resources increased participants' confidence in their English language skills, and whether this contributed to both digital and social inclusion of the participants. The project findings were positive, with increased confidence levels for both groups, and extensive use of the mobile phone resources within families. The findings suggest that the use of mobile phones for learning could contribute to learner confidence in the use of ICT, and in access to employment, education, and public services.

### **2.2.4. Adaptive Kanji Learning Using Mobile-based Email**

In this project mobile phone email is considered as a good tool for teaching the four language skills. The main emphasis is put on using the adaptive learning to resolve one common problem of the mobile-based email or SMS language learning systems. This problem is that text messaging service is in push mode that the texts are sent by the server not requested by the

clients, so many of the studies ignored the „anytime, anywhere“ affordances supposedly offered by mobile devices. The main efforts are made on three aspects: sending the contents following learners“ interests, adjusting the difficulty level of the tests to suit each learner“s cognitive level and adapting the system to their learning styles. The main process of the system is first, the learner should send an empty mobile phone email with a constant subject to the system for requesting a test. Then the system will process with the request email and compose a test of Kanji pronunciation. In the third step, the learner can reply the questions by typing the answers into the brackets and send them back to the system. Finally, the system will check the answers, record the information of the test and return the feedback to the learner including the right answers, English meanings, and some example sentences. If he or she wants, the learner can request for more. The system allows the users to specify their special interests of fields and when the system sends both the words and the sentences to the learners, it will follow each learner“s favorite fields. In order to make the difficulty of the tests suit the learners, the difficulty levels of the tests are according with the learners“ JLPT (JLPT is a standardized test to evaluate and certify the Japanese language proficiency of non-native speakers.) level. To determine an optimal sending timing the system can analyze the best period of one day for each learner and determine the optimal timing by calculate the average time of this period [13].

As mentioned in the preceding sections there are systems on mobile language learning showing a possibility of applying mobiles for language learning in various countries. It has been shown that using mobile for learning, especially for language, has advantages. But there are no similar works in Ethiopia on language learning applications for mobile phones. Therefore, in this project we are going to develop a mobile based Amharic language learning tool.

## Chapter Three

### System Analysis

This chapter presents the proposed system. We will detail about the functional and non-functional requirements of the system. Finally we will look at the system models (use case mode and sequence diagram).

#### 3.1 Functional Requirements

The system will provide the following functionalities:

##### 3.1.1. Content comprehensive and completeness

- The system must enable the user to study the Amharic alphabet tutorial.
- The system must enable the user to learn common Amharic words.
- The system must enable the user to learn common conversation that he/she will encounter in everyday life.

##### 3.1.2. Instructional Design Models

- The system must enable the user to create his/her own profile for tracking his/her progress during the tutorial.
- The system must enable the user to take different tests which are going to be recorded as part of his/her profile.

#### 3.2. Non- functional Requirements

##### 3.2.1. User interface and human factors

###### 3.2.1.1. Usability

The system was designed in such way that it is easy to understand, learn, remember and use its functions. It has navigations that will make the use of the tool convenient to operate.

###### 3.2.1.2. Layout and Organization

The system uses simple and pleasant to use layout and organization. It is designed in such a way that it is consistent and uniform during menu selection.

### **3.2.2. Hardware and software consideration**

The system requires android enabled mobile device or a mobile phone with the capability of accepting android operating system. The device will have the Amharic language learning installed on it. The learner will start the tool by selecting the Amharic language learning tool icon from the home screen. From there the application will direct the user.

### **3.2.3. Security issue**

Mobile phone usually is owned by only one person. Therefore, the security issues related to the mobile phone directly related to the security of the Amharic language learning tool. Security mechanisms like password protection for the phone and pin code protection during start up will help to protect the application tool from getting used by other people other than the owner of the phone.

### **3.2.4. Quality issue**

The system must be reliable in such a way that it shall deliver its intended purpose. Since the system makes use of Text to speech for teaching Amharic words it should feel natural to the user.

### **3.2.5. Resource Issues**

The system makes use of different recorded audios and pictures for illustration during the tutorials and exercises.

### **3.2.6. Content organization**

The system must organize the contents in a simple modular manner which is easy to navigate.

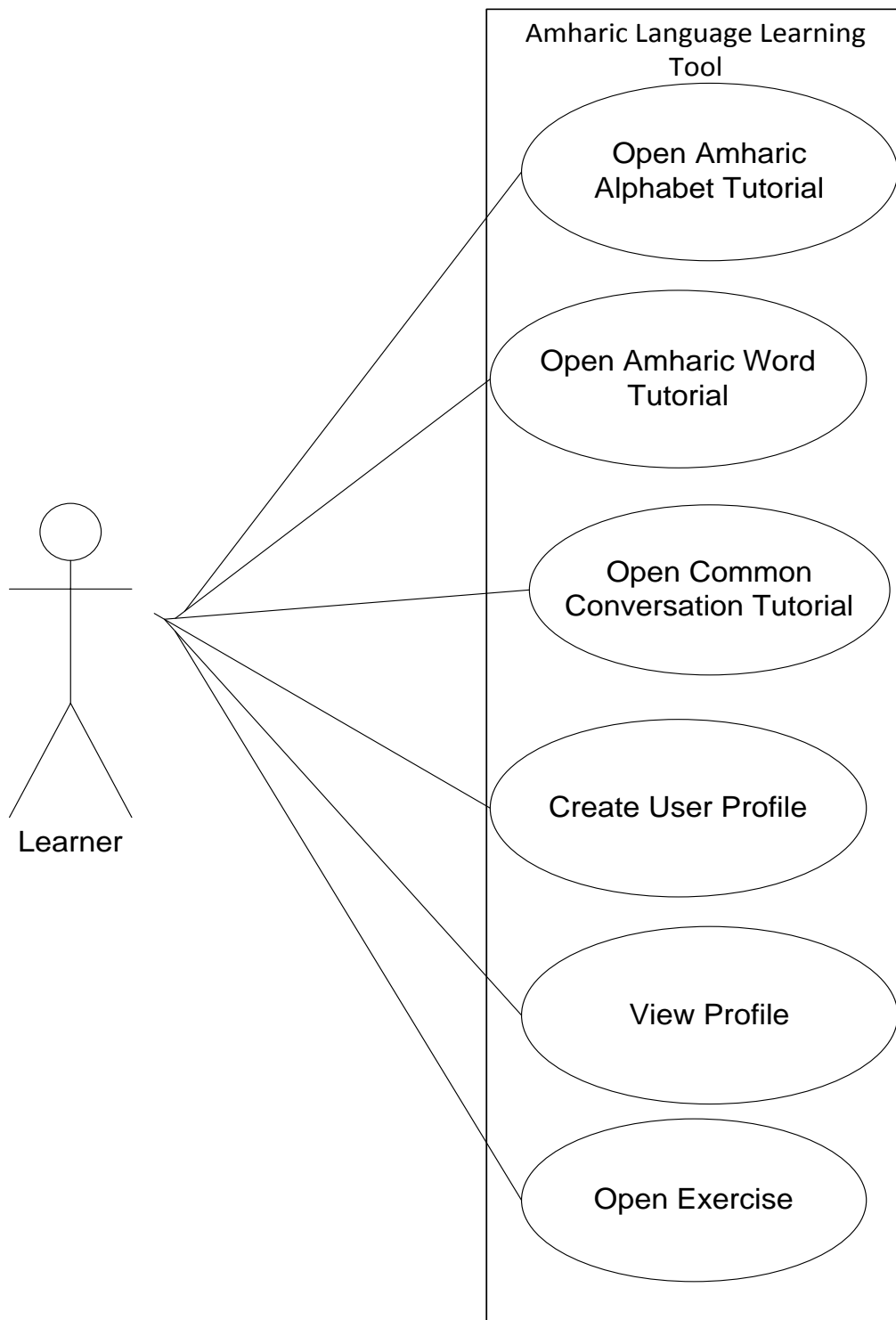
### **3.2.7. Student feedback and support**

The system must alert and motivate the learner during the exercises.

## **3.3. System Models**

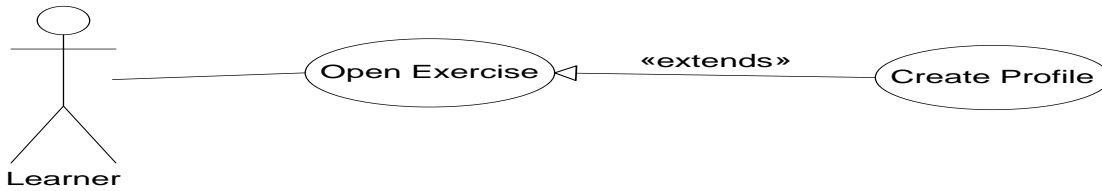
### **3.3.1. Use Case Model**

The following use cases details the Amharic language learning system.



**Figure 3.1 Mobile Based Amharic Language Learning Tool Use case Diagram**





**Figure 3.2 Extend relationship between open Exercise use case and Create profile use case**

### 3.3.2. Use case description

The following tables show the description for the above use case.

**Table 3.1 Use Case Description for Open Amharic Alphabet Tutorial**

<b>Name</b>	Open Amharic Alphabet Tutorial
<b>Actor</b>	Learner
<b>Description</b>	Allows the learner to take tutorial about the Amharic Alphabet
<b>Precondition</b>	None
<b>Flow of Events</b>	1. The learner wants to take Amharic alphabet tutorial.
	2. The system displays list of lessons for Amharic alphabet.
	3. The learner selects one of the listed lessons.
	4. The system will display a window with buttons with Amharic alphabet as label and will play the corresponding audios.
	5. The system acknowledges the completion of the lesson.

**Table 3.2 Use Case Description for Open Amharic Word Tutorial**

<b>Name</b>	Open Amharic Word Tutorial
<b>Actor</b>	Learner
<b>Description</b>	Allows the learner to take tutorial about Amharic words.
<b>Precondition</b>	The learner should finish the entire lesson on Amharic alphabet.
<b>Flow of Events</b>	1. The learner wants to take Amharic words tutorial.
	2. The system displays list of lessons for Amharic words.
	3. The learner selects one of the listed lessons.
	4. The system will display a window with pictures and the meaning of the picture both in Amharic and English
	5. The learner then selects each of the Amharic texts and the system, using text- to- speech will play the corresponding audio sounds.
	6. The system acknowledges the completion of the lesson.

**Table 3.3 Use Case Description for Open Common Conversation Tutorial**

<b>Name</b>	Open Common Conversation Tutorial
<b>Actor</b>	Learner
<b>Description</b>	Allows the learner to take common conversation tutorial.
<b>Precondition</b>	None
<b>Flow of Events</b>	1. The learner wants to take Amharic conversation tutorial.
	2. The system displays list of lessons for Amharic conversation.
	3. The learner selects one of the listed lessons.
	4. The system will display a window with Amharic and English version of common conversation.
	5. The learner then clicks each of the conversations and can listen to the corresponding audio.
	6. The system acknowledges the completion of the lesson.

**Table 3.4 Use Case Description for Open Exercise**

<b>Name</b>	Open Exercise
<b>Actor</b>	Learner
<b>Description</b>	Allows the learner to take exercise on each tutorial
<b>Precondition</b>	The user should finish the entire lesson Amharic alphabet, words and must have user profile.
<b>Flow of Events</b>	1. The learner wants to take exercise.
	2. The system will prompt the learner if he/she has a user profile. [Alt3]
	3. The system will display a window with list of exercise available.
	4. The learner then selects an exercise
	5. The system acknowledges the completion of the exercise.
	<b>Alternative 2[If the user doesn't have a user profile]</b> 2.1. The system displays a form to accept the user name.  2.2. The system will prompt the user the creation of user profile

**Table 3.5 Use Case Description for Create User Profile**

<b>Name</b>	Create User Profile
<b>Actor</b>	Learner
<b>Description</b>	Allows the learner to create a his /her own profile
<b>Precondition</b>	The user must not have a user profile created before
<b>Flow of Events</b>	1. The system displays a form to accept the user name.
	2. The system will prompt the user the creation of user profile
	3. The system will display a window with list of exercise available.

**Table 3.6 Use Case Description for Create User Profile**

<b>Name</b>	View Profile
<b>Actor</b>	Learner
<b>Description</b>	Allows the learner to take exercise on each tutorial
<b>Precondition</b>	The learner should have profile created
<b>Flow of Events</b>	1. The learner selects the view profile option and the exercise id and lesson id
	2. The system will display the corresponding profile
	3. The learner exits the window.

### 3.3.3. Sequence Diagram

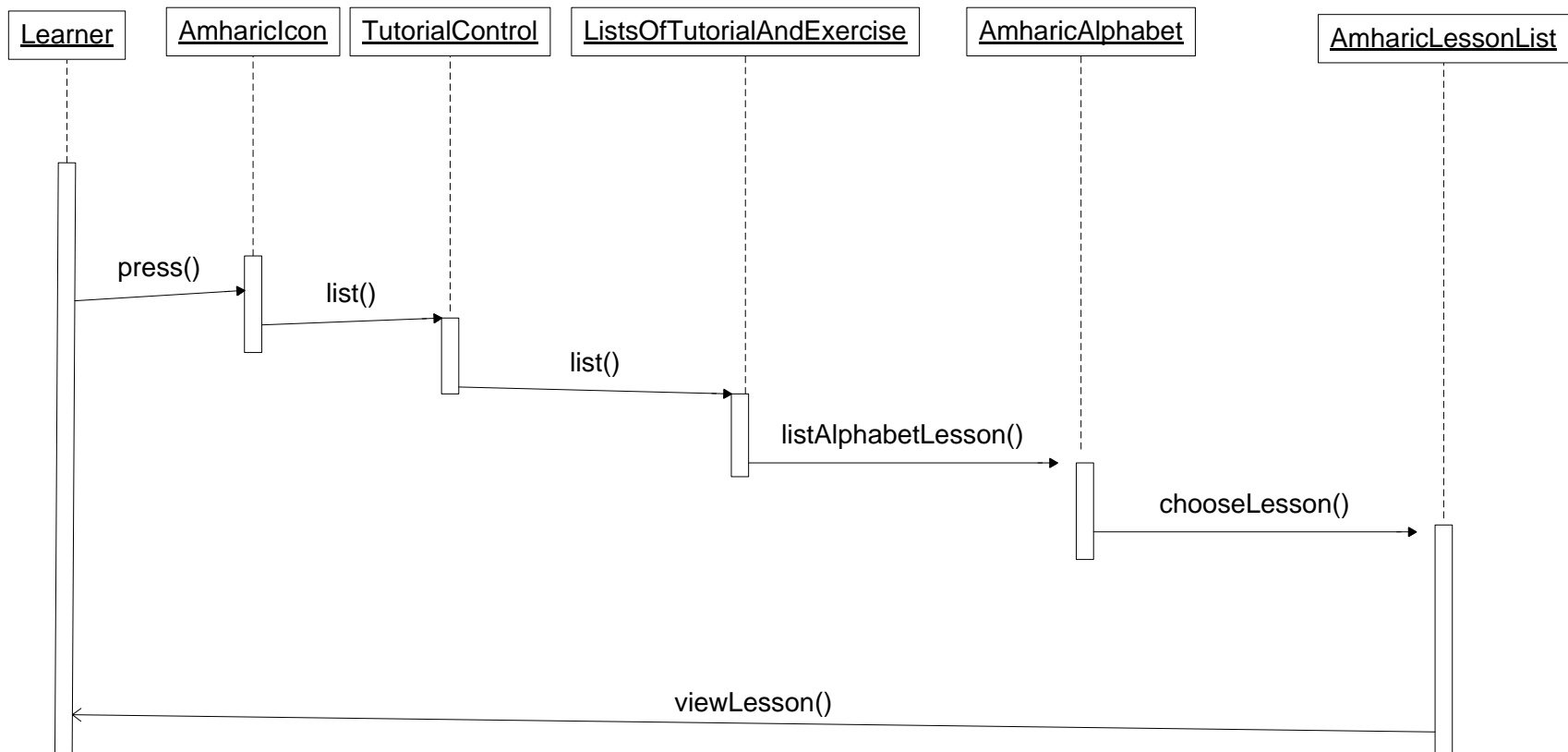
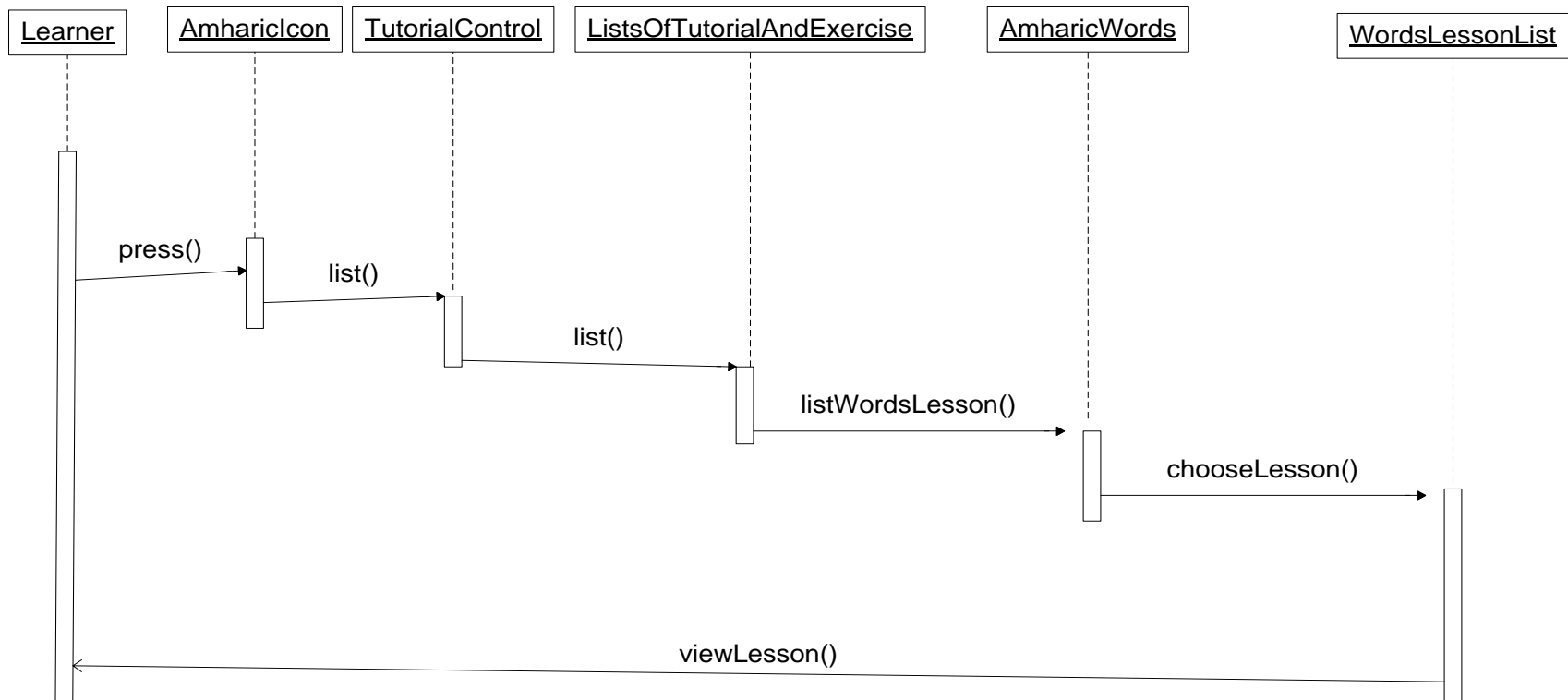
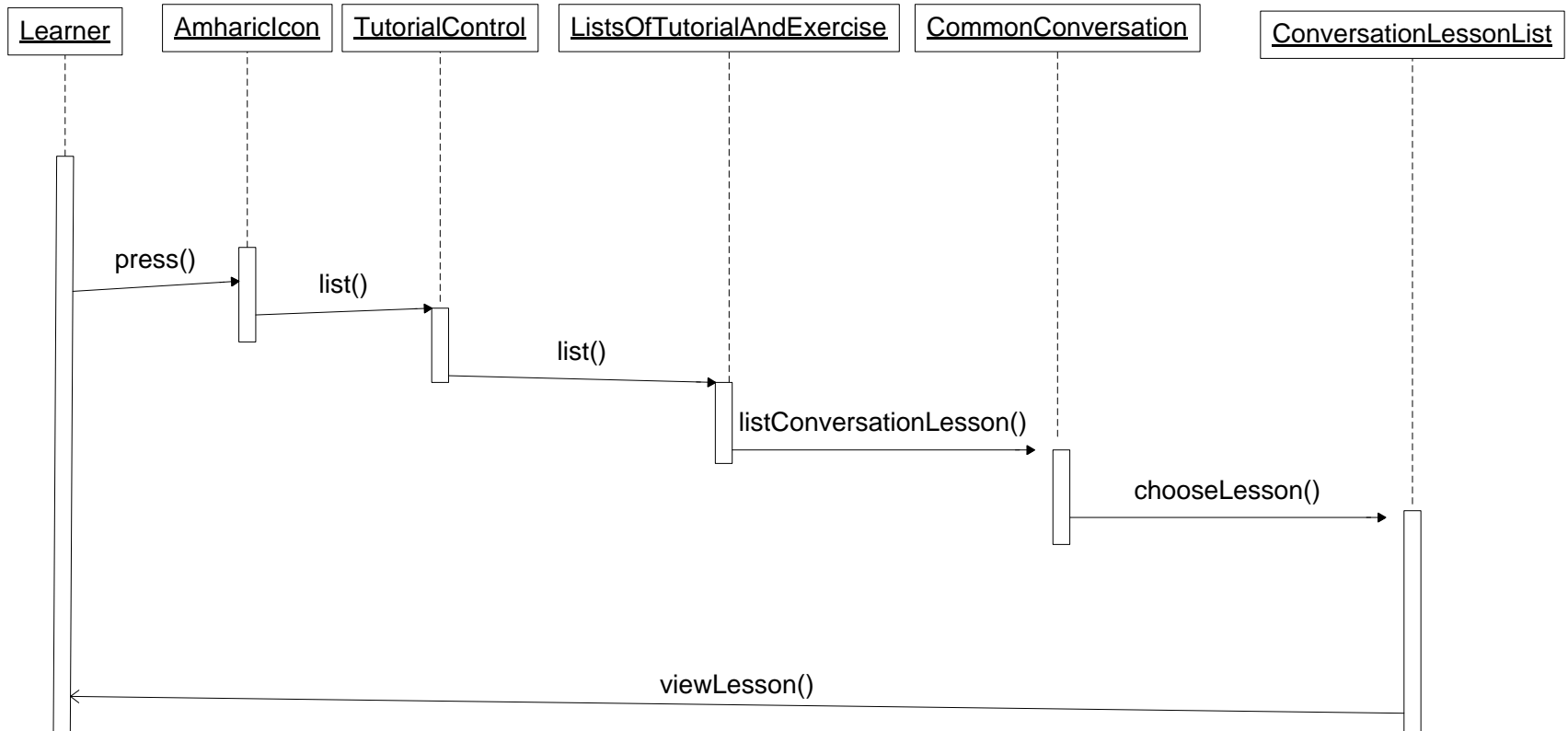


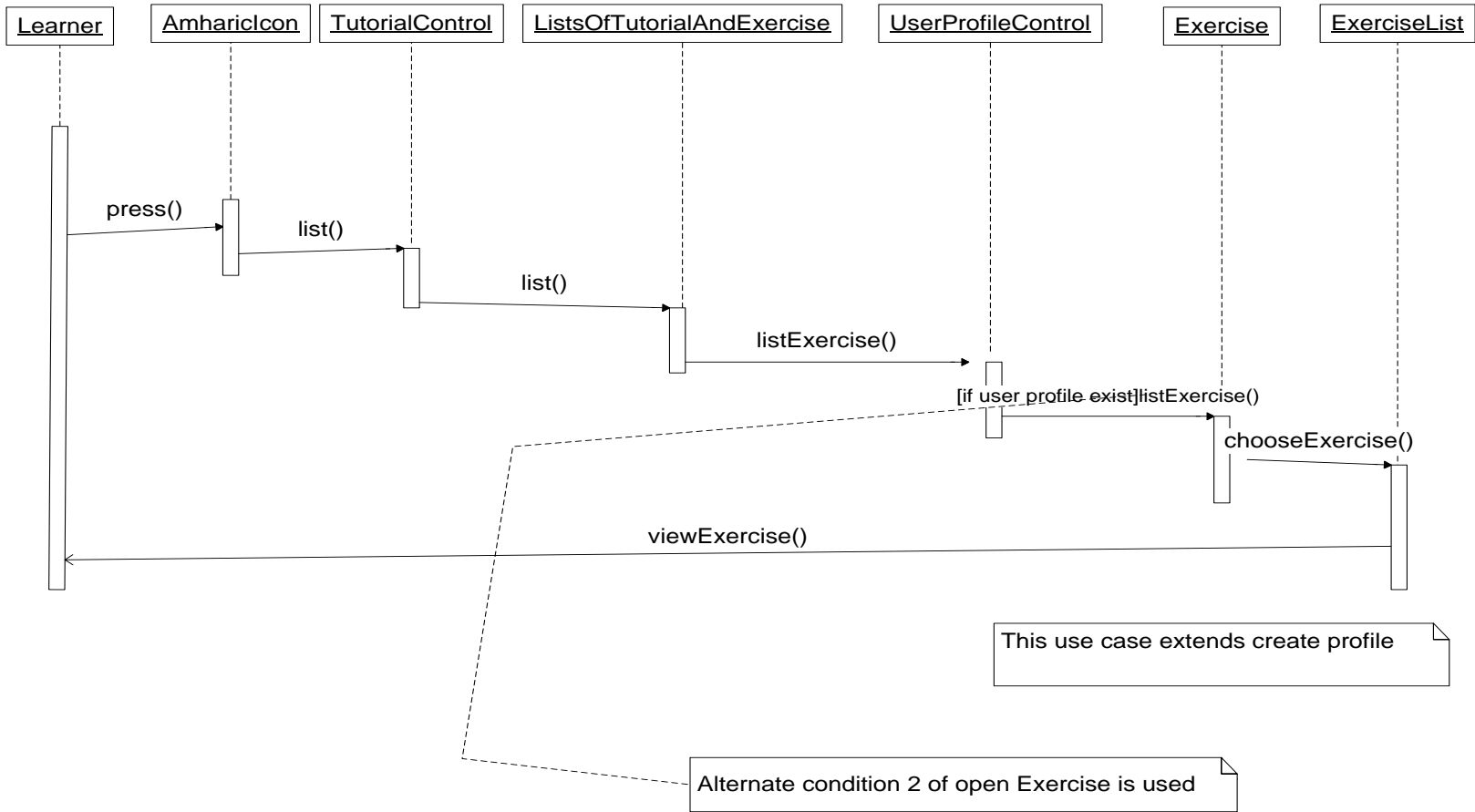
Figure 3.3: Sequence diagram for the use case “Open Amharic Alphabet Tutorial”



**Figure 3.4 :Sequence diagram for the use case “Open Amharic Word Tutorial”**

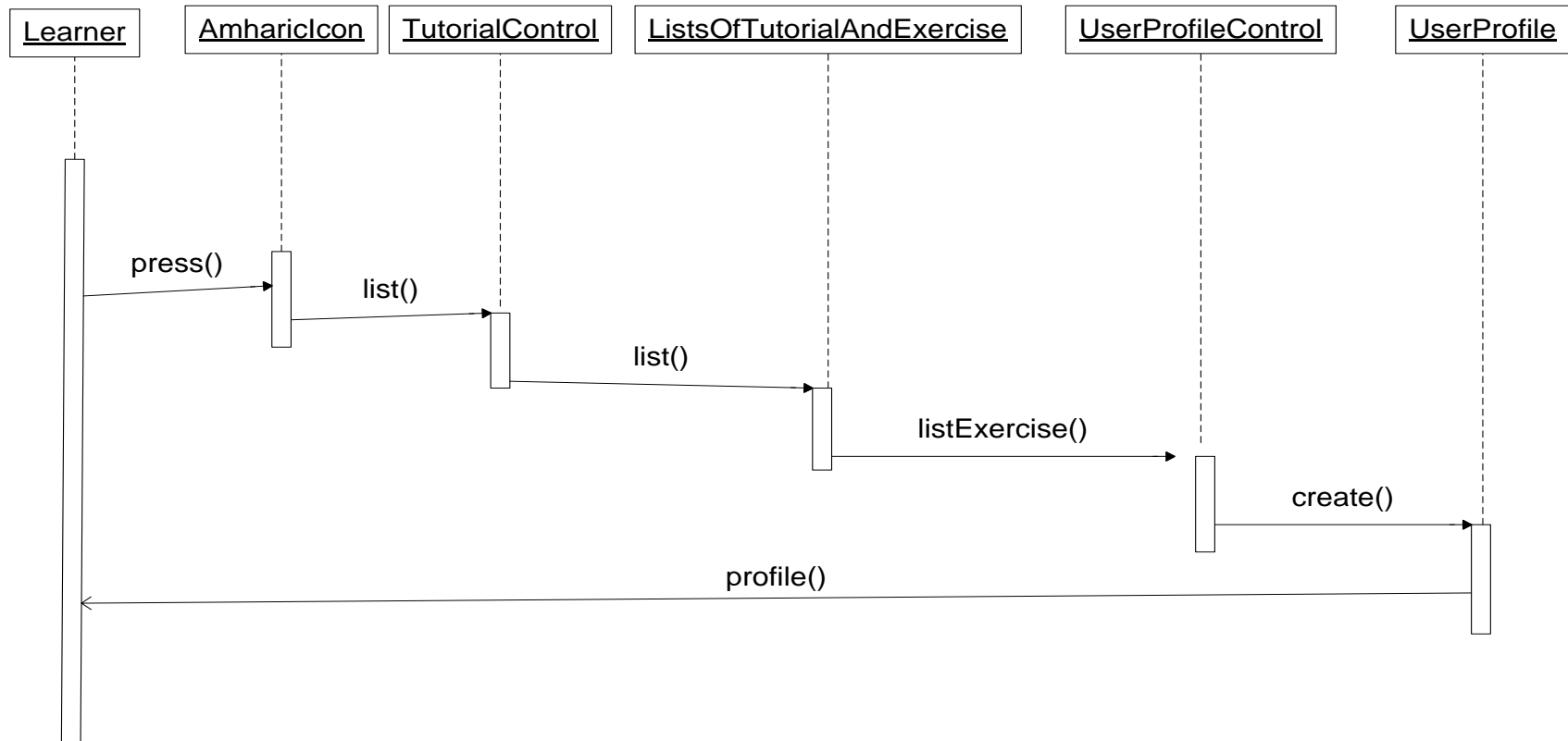


**Figure 3.5: Sequence diagram for the use case “Open common conversation tutorial”**



**Figure 3.6 : Sequence diagram for the use case “Open Exercise”**





**Figure 3.7: Sequence diagram for the use case “Create Profile”**

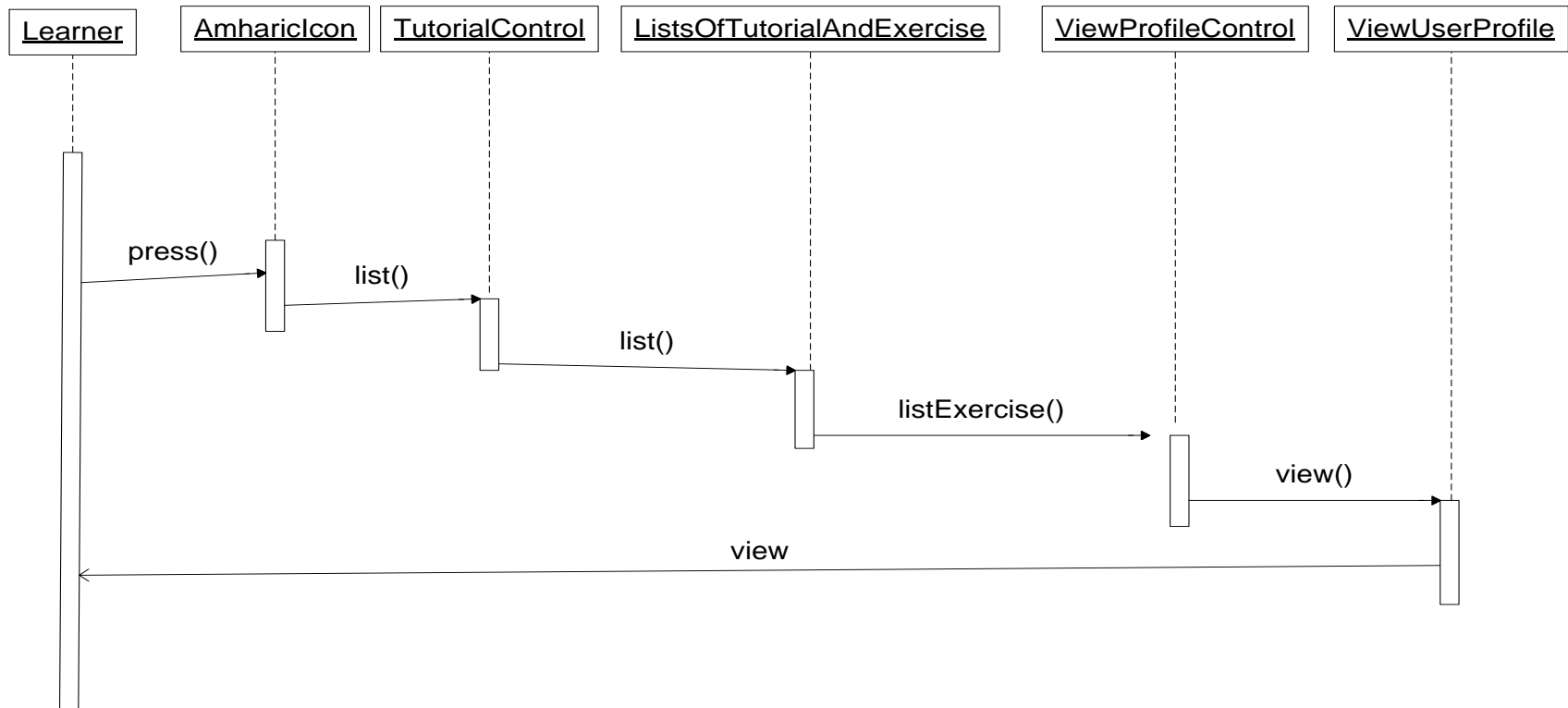


Figure 3.8: Sequence diagram for the use case “View Profile”

## **Chapter Four**

### **System Design**

#### **4.1. Designing Goals**

##### **Dependability Criteria**

The system shall be available for the learner as long as the learner mobile is working properly. The security of the system is related to the security of the mobile phone. Mobile phone security mechanisms such as pin code and password protection can also be used as security protection.

##### **Maintenance criteria**

The system is developed using object oriented approach and, therefore, adding new functionality or modifying some parts of the system will not affect the other parts of the system.

##### **End User Criteria**

The system is developed with easy to use and interactive user interface. Since the system runs on a mobile phone for better management of the small screen, the right type and amount of interactive user interfaces are used.

#### **4.2. Designing Model**

##### **4.2.1. Class Diagram**

The following figures, Figuer4.1 and Figure4.2, depict the classes that are identified in the system and their interaction respectively.

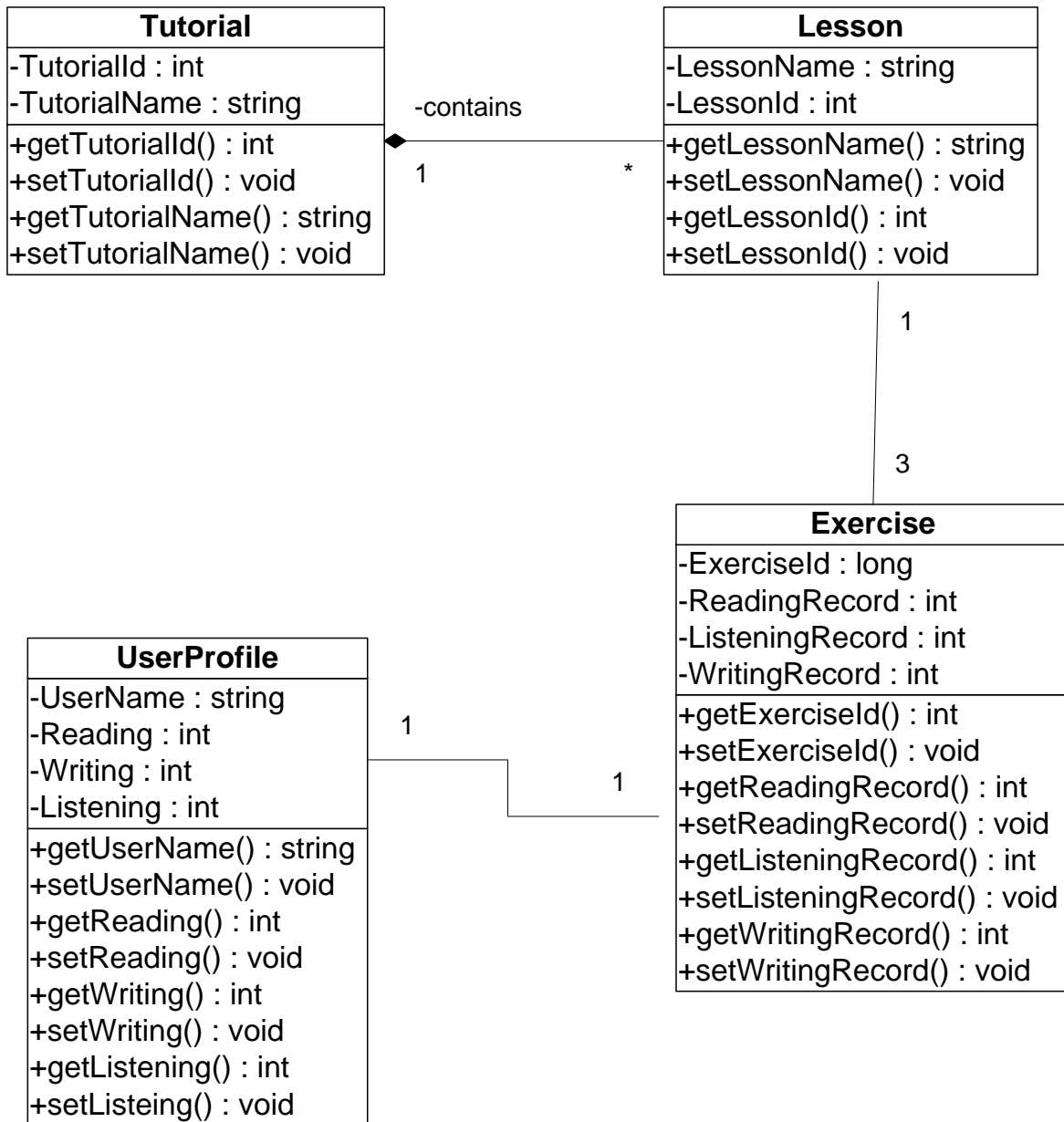
<b>Tutorial</b>
-TutorialId : int -TutorialName : string
+getTutorialId() : int +setTutorialId() : void +getTutorialName() : string +setTutorialName() : void

<b>Lesson</b>
-LessonName : string -LessonId : int
+getLessonName() : string +setLessonName() : void +getLessonId() : int +setLessonId() : void

<b>UserProfile</b>
-UserName : string -Reading : int -Writing : int -Listening : int
+getUserName() : string +setUserName() : void +getReading() : int +setReading() : void +getWriting() : int +setWriting() : void +getListening() : int +setListeing() : void

<b>Exercise</b>
-Exerciseld : long -ReadingRecord : int -ListeningRecord : int -WritingRecord : int
+getExerciseld() : int +setExerciseld() : void +getReadingRecord() : int +setReadingRecord() : void +getListeningRecord() : int +setListeningRecord() : void +getWritingRecord() : int +setWritingRecord() : void

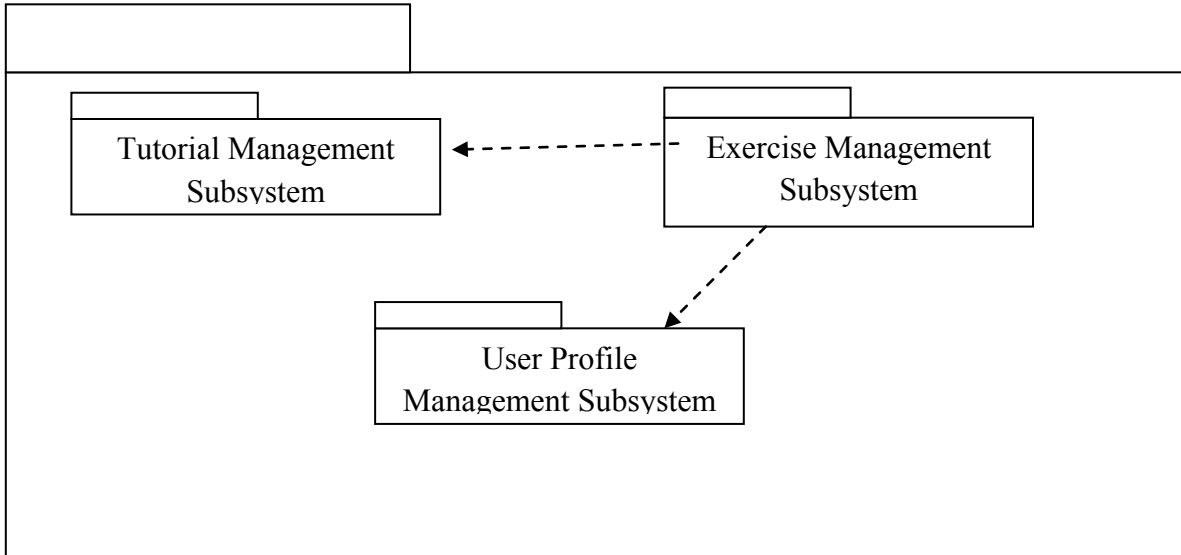
**Figure 4.1: Identified classes of the system**



**Figure 4.2: Class Diagram**

#### 4.2.2. Sub-System Decomposition

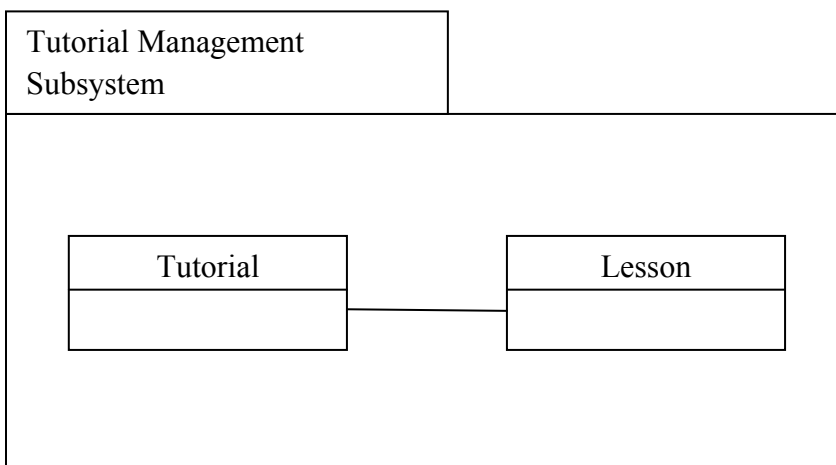
The proposed system will have three sub-systems. These are tutorial management subsystem, exercise management subsystem and user profile subsystem.



**Figure 4.3: Subsystem decomposition**

##### *4.2.2.1. Tutorial management subsystem*

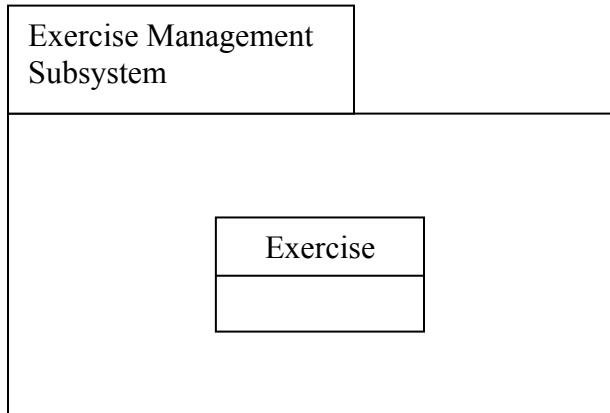
In this subsystem different tutorials are included. The tutorials are divided in to three categories i.e. Amharic Alphabet Tutorial, Amharic Words Tutorial and Common Conversation. Each category has lessons.



**Figure 4.4: Tutorial Management Subsystems**

#### ***4.2.2.2.Exercise Management subsystem***

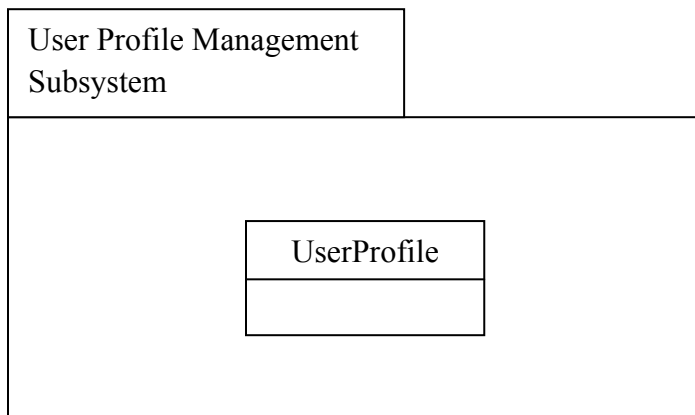
This subsystem contains the exercises for the tutorials. It is divided into three categories. Each category has three exercises which also contain exercises for the three skills i.e. Listening, Reading and Writing.



**Figure 4.5: Exercise Management Subsystem**

#### ***4.2.2.3.User profile management subsystem***

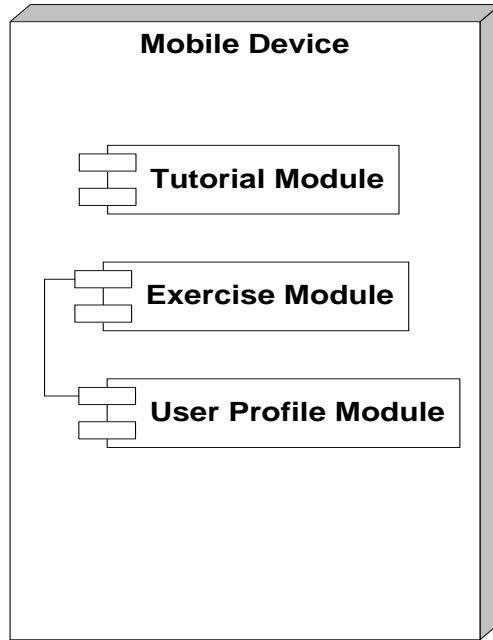
The user profile management is used to manage the user profile. By user profile we mean each time a user takes exercise its score will be counted and stored in the built in database (sqlite) in the device. The learner can retrieve his/her scores any time he/she wants.



**Figure 4.6: User Profile Management Subsystems**

#### **4.2.3. Hardware Software Mapping**

The system will be deployed on Android device, therefore, all our modules described above will be represented in one node i.e. the mobile device.



**Figure 4.7: Deployment Diagram**

#### 4.2.4. Persistent Data Management

This system will make use of the built in sqlite to store user profile. The following figure show the table schema used for this data management.

<b>User Profile</b> «table»
UserName «PK»
Listening
Reading
Writing

**Figure 4.8: Persistent data management**



## Chapter Five

### Implementation

This chapter contains two sections. We will present the development tools used in the first section and the next section will detail the implementation of the system.

#### 5.1. The system development tools

##### 5.1.1. Android Development Tools (ADT)

Android Development Tools (ADT) is a plug-in for the Eclipse IDE that is designed to build Android applications.

ADT extends the capabilities of Eclipse to quickly set up new Android projects, create an application UI, add components based on the Android Framework API, debug applications using the Android SDK tools, and even export signed (or unsigned) .apk files in order to distribute application.

##### 5.1.2. Eclipse Helios IDE

Eclipse version Helios is used as integrated development environment.

#### *Why Eclipse?*

- In keeping with the Open Handset Alliance's theme of truly opening the mobile development market, Eclipse is one of the most fully featured, free, Java IDEs available. Eclipse is also very easy to use.
- The Open Handset Alliance has released an Android plug-in for Eclipse that allows creating Android-specific projects, compiling them, and using the Android Emulator to run and debug them [14].

## 5.2. Implementation



**Figure 5.1: Mobile main screen**

Figure 5.1 is the Android mobile home screen from which the Amharic Language Learning tool is launched. The main screen of the system, i.e. the Amharic Language Learning tool is depicted in figure 5.2. This is the first screen that appears after the learner selects the Amharic icon. It contains the main categories of the tutorials and exercises. The user can also view his/her profile by selecting view profile from the main screen of the application.



**Figure 5.2: Amharic Language Learning Tool Main Screen**



**Figure 5.3: Alphabet Lesson one**

Figure 5.3 depicts a lesson from the alphabet tutorial. The user can listen to the audios related to each alphabet by selecting the first row.



**Figure 5.4: Amharic Word Lesson**

Figure 5.4 shows a lesson from Amharic words tutorial. Each tutorial contains a picture and the corresponding meaning of the picture both in Amharic and English. When the learner selects the Amharic words concatenative text-to-speech will be applied and the corresponding audios will be played for each character. In this part of the tutorial, we have tried to present the user with different kind of media such as picture and text.



**Figure 5.5: User Profile prompt**

If the learner selects the Exercise from the home screen of the application he/she will be asked if he/she have a profile. Figure 5.5 shows the prompt that will appear.

If the learner answers yes it will direct it to the exercises but if the learner don't have profile user profile will be automatically created.



**Figure 5.6: Writing Word Exercise**

Figure 5.6 depicts a sample word writing exercise.

## Chapter Six

### Conclusion and Future Work

There are many tourists visiting Ethiopia each year. They need to learn the working language for communication. This people may not have the time to sit and study the language in a class room but using mobile phone they can learn the language wherever and whenever it is suitable for them.

In this project we have shown possible application of mobile based Amharic language learning. In doing so we have tried to design a mobile based Amharic language learning tool. This tool will make learning the language easier.

The system contains tutorials and the corresponding exercises. Different lessons and exercises were designed for the Amharic alphabet, words and conversation. They are designed based on the observations made.

As a future work, this language learning tool can be also extended to other languages that are found in Ethiopia. We can also design it in a client-server manner so that new lessons can be added to the system and the learner can download it whenever it is possible and use it next time. Since the tool uses a text to speech method to teach the words we can incorporate the best text-to-speech methods for Amharic language in the future.

This tool works only on android mobile phone therefore we can also extend it to incorporate other mobile phone platforms on the future.

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pp:11



## Appendix A

This screen shot displays the lesson list of the amharic alpabet. It is displayed when the user selects the Amharic alphabet for the application home screen.



The following screen will be displayed once the learner chooses Amharic words.



The following screen shot displays the Amharic alphabet writing lesson.



If the user put the right letter in the text box it will be prompted to get the other one right.



## Appendix B

The following code sample shows the Amharic.java file which is used to display the application main screen.

```
package language_learning.Amharic;

import android.app.ListActivity;

import android.content.Intent;

import android.os.Bundle;

import android.view.View;

import android.widget.*;

public class Amharic extends ListActivity {

    @Override

    public void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);

        setListAdapter(new ArrayAdapter<String>(this,R.layout.main, mStrings));

        getListView().setTextFilterEnabled(true);

    }

    @Override

        protected void onItemClick(ListView l, View v, int position, long id) {

            super.onItemClick(l, v, position, id);

            long a;

            a=this.getListAdapter().getItemId(position);

            if (a==0)

            {

                Intent i = new Intent(v.getContext(),lesson.class);

                startActivityForResult(i, 0);

            }

        }

    }
```

```

        if (a==1)
        {
            Intent i = new Intent(v.getContext(),aaa.class);
            startActivityForResult(i, 0);
        }
        if (a==3)
        {
            Intent i = new Intent(v.getContext(),alertdialog.class);
            startActivityForResult(i, 0);
        }
    }

    private String[] mStrings = {"Amharic Alphabet","Amharic Words","Common
Conversation","Exercise"};
}

```

This is the layout of the application main screen

```

<?xml version="1.0" encoding="utf-8"?>
<TextView xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:padding="10dp"
    android:textSize="16sp" >
</TextView>

```

The following code sample is of r the Manifest file in the project where all the functions get their permission.

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="language_learning.Amharic"
    android:versionCode="1"
    android:versionName="1.0">

    <supports-screens>
        android:xlargeScreens="true"
        android:largeScreens="true"
        android:normalScreens="true"
        android:smallScreens="false"
    </supports-screens>

    <application android:icon="@drawable/image"
        android:label="@string/app_name">
        <activity android:name=".Amharic"
            android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity android:name=".aa"></activity>
            <intent-filter>
                <action android:name="android.intent.action.aa" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".aaa"></activity>
            <intent-filter>
                <action android:name="android.intent.action.aaa" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".aaaa"></activity>
            <intent-filter>
                <action android:name="android.intent.action.aaaa" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".adjectives"></activity>
            <intent-filter>
                <action android:name="android.intent.action.adjectives" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".simpleprep"></activity>
            <intent-filter>
                <action android:name="android.intent.action.simpleprep" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".lesson"></activity>
            <intent-filter>
                <action android:name="android.intent.action.lesson" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
    </application>
</manifest>
```

```

<activity android:name=".lessonone"></activity>
    <intent-filter>
        <action android:name="android.intent.action.lessonone" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".lessonstwo"></activity>
    <intent-filter>
        <action android:name="android.intent.action.lessonstwo" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".lessonthree"></activity>
    <intent-filter>
        <action android:name="android.intent.action.lessonthree" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

<activity android:name=".lessonfour"></activity>
    <intent-filter>
        <action android:name="android.intent.action.lessonfour" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
    <activity android:name=".lessonfive" /> <intent-filter>
    <action android:name="android.intent.action.lessonfive" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
    <activity android:name=".lessonsix" />
<intent-filter>
    <action android:name="android.intent.action.lessonsix" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
    <activity android:name=".lessonseven" />
<intent-filter>
    <action android:name="android.intent.action.lessonseven" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

    <activity android:name=".fruit"></activity>
        <intent-filter>
            <action android:name="android.intent.action.fruit" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".vegetables"></activity>
        <intent-filter>
            <action android:name="android.intent.action.vegetables" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".spices"></activity>
        <intent-filter>
            <action android:name="android.intent.action.spices" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".grains"></activity>
        <intent-filter>
            <action android:name="android.intent.action.grains" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

```

```

<activity android:name=".cookedfood"></activity>
    <intent-filter>
        <action android:name="android.intent.action.cookedfood" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".drinks"></activity>
    <intent-filter>
        <action android:name="android.intent.action.drinks" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".householditems"></activity>
    <intent-filter>
        <action android:name="android.intent.action.householditems"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".clothes"></activity>
    <intent-filter>
        <action android:name="android.intent.action.clothes" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".wildanimals"></activity>
    <intent-filter>
        <action android:name="android.intent.action.wildanimals" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".partsofthebody"></activity>
    <intent-filter>
        <action android:name="android.intent.action.partsofthebody"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".nature"></activity>
    <intent-filter>
        <action android:name="android.intent.action.nature" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".persons"></activity>
    <intent-filter>
        <action android:name="android.intent.action.persons" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".abstracts"></activity>
    <intent-filter>
        <action android:name="android.intent.action.abstracts" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

<activity android:name=".places"></activity>
    <intent-filter>
        <action android:name="android.intent.action.places" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".fruittutorial"></activity>
    <intent-filter>
        <action android:name="android.intent.action.fruittutorial" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

```

```

        </intent-filter>
    <activity android:name=".fruittutorialpart2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.fruittutorialpart2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".vegetablestutorial"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.vegetablestutorial" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".vegetablestutorial2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.vegetablestutorial2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".vegetablestutorial3"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.vegetablestutorial3" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".spicestutorial"></activity>
        <intent-filter>
            <action android:name="android.intent.action.spicestutorial"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".spicestutorial2"></activity>
        <intent-filter>
            <action android:name="android.intent.action.spicestutorial2"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".spicestutorial3"></activity>
        <intent-filter>
            <action android:name="android.intent.action.spicestutorial3"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".spicestutorial4"></activity>
        <intent-filter>
            <action android:name="android.intent.action.spicestutorial4"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".graintutorial"></activity>
        <intent-filter>
            <action android:name="android.intent.action.graintutorial" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

```



```

<activity android:name=".graintutorial2"></activity>
    <intent-filter>
        <action android:name="android.intent.action.graintutorial2"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".graintutorial3"></activity>
    <intent-filter>
        <action android:name="android.intent.action.graintutorial3"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".graintutorial4"></activity>
    <intent-filter>
        <action android:name="android.intent.action.graintutorial4"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".exerciselist"></activity>
    <intent-filter>
        <action android:name="android.intent.action.exerciselist" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".alphabetlessonlistexe"></activity>
    <intent-filter>
        <action
android:name="android.intent.action.alphabetlessonlistexe" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".lessononeexercise"></activity>
    <intent-filter>
        <action
android:name="android.intent.action.lessononeexercise" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".alrtdialog"></activity>
    <intent-filter>
        <action android:name="android.intent.action.alrtdialog" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".profile"></activity>
    <intent-filter>
        <action android:name="android.intent.action.profile" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".alpha_lesson_one_listening"></activity>
    <intent-filter>
        <action
android:name="android.intent.action.alpha_lesson_one_listening" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".alpha_lesson_two_listening"></activity>
    <intent-filter>
        <action
android:name="android.intent.action.alpha_lesson_two_listening" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

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        <activity
android:name=".alpha_lesson_one_listening_part_two"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.alpha_lesson_one_listening_part_two" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
        <activity android:name=".lesstwoexercise"></activity>
            <intent-filter>
                <action
android:name="android.intent.action.lesstwoexercise" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".cooked_food_tutorial"></activity>
            <intent-filter>
                <action
android:name="android.intent.action.cooked_food_tutorial" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".cooked_food_tutorial2"></activity>
            <intent-filter>
                <action
android:name="android.intent.action.cooked_food_tutorial2" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".drinks_tutorial"></activity>
            <intent-filter>
                <action android:name="android.intent.action.drinks_tutorial"
/>
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".drinks_tutorial2"></activity>
            <intent-filter>
                <action android:name="android.intent.action.drinks_tutorial2"
/>
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".drinks_tutorial3"></activity>
            <intent-filter>
                <action android:name="android.intent.action.drinks_tutorial3"
/>
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>

        <activity android:name=".house_hold_items_tutorial"></activity>
            <intent-filter>
                <action
android:name="android.intent.action.house_hold_items_tutorial" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".house_hold_items_tutorial2"></activity>
            <intent-filter>
                <action
android:name="android.intent.action.house_hold_items_tutorial2" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        <activity android:name=".house_hold_items_tutorial3"></activity>

```

```

        <intent-filter>
        <action
android:name="android.intent.action.house_hold_items_tutorial3" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

        <activity android:name=".house_hold_items_tutorial4"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.house_hold_items_tutorial4" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

        <activity android:name=".house_hold_items_tutorial5"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.house_hold_items_tutorial5" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

        <activity android:name=".house_hold_items_tutorial6"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.house_hold_items_tutorial6" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

        <activity android:name=".house_hold_items_tutorial7"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.house_hold_items_tutorial7" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
        <activity android:name=".clothes_tutorial"></activity>
        <intent-filter>
        <action android:name="android.intent.action.clothes_tutorial"
/>
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
        <activity android:name=".clothes_tutorial2"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.clothes_tutorial2" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
        <activity android:name=".clothes_tutorial3"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.clothes_tutorial3" />
        <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

        <activity android:name=".wild_animals_tutorial"></activity>
        <intent-filter>
        <action
android:name="android.intent.action.wild_animals_tutorial" />
        <category android:name="android.intent.category.LAUNCHER" />

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```

        </intent-filter>
    <activity android:name=".wild_animals_tutorial2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.wild_animals_tutorial2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".wild_animals_tutorial3"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.wild_animals_tutorial3" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".wild_animals_tutorial4"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.wild_animals_tutorial4" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".wild_animals_tutorial5"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.wild_animals_tutorial5" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".parts_of_the_body_tutorial"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.parts_of_the_body_tutorial" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".parts_of_the_body_tutorial2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.parts_of_the_body_tutorial2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".parts_of_the_body_tutorial3"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.parts_of_the_body_tutorial3" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".parts_of_the_body_tutorial4"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.parts_of_the_body_tutorial4" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>

    <activity android:name=".parts_of_the_body_tutorial5"></activity>
        <intent-filter>

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```

        <action
android:name="android.intent.action.parts_of_the_body_tutorial5" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
    <activity android:name=".parts_of_the_body_tutorial6"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.parts_of_the_body_tutorial6" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial2"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial2"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial3"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial3"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial4"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial4"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial5"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial5"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial6"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial6"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".nature_tutorial7"></activity>
        <intent-filter>
            <action android:name="android.intent.action.nature_tutorial7"
/>
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_list_exercise"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_list_exercise" />
            <category android:name="android.intent.category.LAUNCHER" />

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```

        </intent-filter>
    <activity android:name=".word_exercise_one_list"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_one_list" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_one_writing"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_one_writing" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_one_writing2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_one_writing2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_two_writing"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_two_writing" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_two_writing2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_two_writing2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_two_list"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_two_list" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_three_list"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_three_list" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_three_writing"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_three_writing" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".word_exercise_three_writing2"></activity>
        <intent-filter>
            <action
android:name="android.intent.action.word_exercise_three_writing2" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    <activity android:name=".color_tutorial"></activity>

```

```

        <intent-filter>
        <action android:name="android.intent.color_tutorial" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".color_tutorial2"></activity>
    <intent-filter>
    <action android:name="android.intent.color_tutorial2" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".color_tutorial3"></activity>
    <intent-filter>
    <action android:name="android.intent.color_tutorial3" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".size_tutorial"></activity>
    <intent-filter>
    <action android:name="android.intent.size_tutorial" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".size_tutorial2"></activity>
    <intent-filter>
    <action android:name="android.intent.size_tutorial2" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

<activity android:name=".size_tutorial3"></activity>
    <intent-filter>
    <action android:name="android.intent.size_tutorial3" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".size_tutorial4"></activity>
    <intent-filter>
    <action android:name="android.intent.size_tutorial4" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".alpha_lesson_one_reading_writing"></activity>
    <intent-filter>
    <action
android:name="android.intent.alpha_lesson_one_reading_writing" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".alpha_lesson_two_reading_writing"></activity>
    <intent-filter>
    <action
android:name="android.intent.alpha_lesson_two_reading_writing" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".lessonthreeexercise"></activity>
    <intent-filter>
    <action android:name="android.intent.lessonthreeexercise" />
    <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

<activity android:name=".alpha_lesson_three_reading_writing"></activity>
    <intent-filter>
    <action
android:name="android.intent.alpha_lesson_three_reading_writing" />

```

```

        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".conversationlist"></activity>
    <intent-filter>
        <action android:name="android.intent.conversationlist" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".greetings_tutoria_list"></activity>
    <intent-filter>
        <action android:name="android.intent.greetings_tutoria_list"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".formal_informal_anytime"></activity>
    <intent-filter>
        <action android:name="android.intent.formal_informal_anytime"
/>
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
<activity android:name=".informal_anytime"></activity>
    <intent-filter>
        <action android:name="android.intent.informal_anytime" />
        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>

</application>
</manifest>

```



## Declaration

This project is my original work and has not been submitted as partial requirement for a degree in any university.

Name: Axsumawit Tassew Melese

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Confirmed by advisor:

Name: Fistum Admasu (PhD)

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Place and date of submission: Addis Ababa, June,2011.