



CENG491

Software Requirement Specification

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1. INTRODUCTION

This document is a software requirement specification for Augmentative and Alternative Application for Android that will be helping to ones who are speech- impaired people. Firstly we will give the purpose and scope of this document and then follow with an overall description of this selection system. After completing a general introduction to the system, we will address specific requirements for the system. In this last part of this document, we will basically address functional requirements as well as nonfunctional requirements.

1.1 PROBLEM DEFINITION

Because of some reasons, some people, speech-impaired, are not able to speak. This problem is the problem we attend to solve.

1.2 PURPOSE

This software requirement specification (SRS) document describes the functional and nonfunctional requirements of the AAC App for Android. Business opportunity and objectives is briefly summarized followed by detailed description of the system's scope, vision, features, functionality, interfaces and other related requirement issues.

1.3 SCOPE

Since this application is going to be designed for speech-impaired people, its first feature should be having a Text-to-Speech Engine. Moreover, the application should help the user in order to make the application more useful. In this manner, firstly the application will use the general features thanks to the Android OS such as Swype or phrase prediction. Secondly, it will be helping to the user by providing some pre-saved, mostly used and recently used phrase, words or sentences. It will also have an interface for setting. The user will be able to specify his/her application for herself/himself by choosing voice settings –sex or age specific voices-, application settings – initializing page, phrase prediction setting-.

1.4 OVERVIEW

In the next part of this document system will be described the in terms of product perspective, product functions, user characteristics, constraints, assumptions and dependencies. In third section all use cases, features of the system, functional requirements, user interfaces, event flow of features will be examined in detail.

1.5 USER AND LITERATURE SURVEY

The intended users of this product are only speech-impaired people. They use this application in order to express their request. After they use their own application in a certain machine they will be able to use application faster since application will have saved popular words and phrases according to the user.

According to our market research, there are two major products for same purpose.

Xpress by DynaVox[1]: is a portable augmentative communication device. Xpress has best features among similar. One of them is voice options. It offers users child and adult voices. In addition, accessing to internet allows users to navigate the web site and to copy images, text, audio and video directly from a web page onto a communication page. Also it provides Word/Phrase prediction and Word List. Owing to word/phrase prediction words and phrases anticipated based on the message you are creating. Word Lists provide easy access to words, organized by category that can be used to complete a message.

LightWRITERS[2]: by ZYGO Industries, Inc., SpringBoard[3] by Prentke Romich Company, Mercury[4] by Assistive Technology, Inc. , The Palmtop Portable IMPACT[5] by Enkidu, LINK[6] by Assistive Technology, Inc. are other examples for AAC devices. In addition to these devices there are many mobile application of AAC for Android and iOS. For instance, Voice4u [7] is an AAC application for both. It has two language options, English and Japanese. iAugComm[8] for Android and Proloquo2Go[9] is a product from AssistiveWare for iOS are also mobile applications of AAC. All devices and applications have almost same features.

1.6 DEFINITIONS AND ABBREVIATIONS

SRS: Software Requirement System

AAC : Augmentative Alternative Communication

OS : Operating System

IOS : iPhone Operating System

App : Application

USA : United State of America

TTS : Text to speech

1.7 REFERENCES

[1] Dynavox Xpress, <http://www.dynavoxtech.com/products/xpress/>

[2]ZYGO-USA for Augmentative and Alternative Communication Systems & Assistive Technologies ,
[http://www.zygousa.com/usa/index.php?page=shop.browse&category_id=6&option=com_virtuemart
&Itemid=11](http://www.zygousa.com/usa/index.php?page=shop.browse&category_id=6&option=com_virtuemart&Itemid=11)

[3] SpringBoard Lite, https://store.prentrom.com/product_info.php/cPath/11/products_id/8

[4], [5],[6] Augmentative Alternative Communication devices, <http://www.abilityhub.com/aac/aac-devices.htm>

[7]Voice4u, <http://voice4uaac.com/>

[8]AndroLib, <http://www.androlib.com/android.application.com-ideal-iaugcomm-jznA.aspx>

[9] About Proloquo2Go, <http://www.proloquo2go.com/About/>

2. OVERALL DESCRIPTION

In this section we will give a brief information about the AAC App software and its basic feature without describing in detail.

2.1 PRODUCT PERSPECTIVE

This application is based on Android OS which is an operating system for smartphones and tablet computers. It is developed by the Open Handset Allinced led by Google.

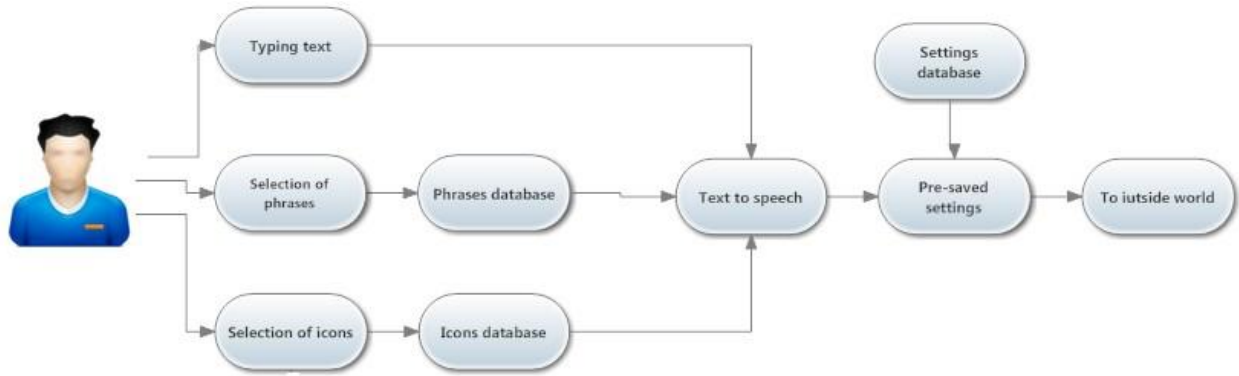
In addition to Google Support, by help of the contributors and developers from all over the world, Android operation system is becoming more and more crucial mobile system. In this, the usage of android applications is becoming more and more popular. In this manner, we can easily say that such kind of application can really help the people to make their life easier.

2.2 PRODUCT FUNCTIONS

The block diagram shows the general structure of the product. There is a database which holds three tables for each user. First one keeps user's icons and its explanations to express the situation, the second one keeps user's phrases to load them directly and the third one keeps application settings. Users can see and select what they want from these databases to express themselves. In the setting panel the application settings can be seen and modified.

People will use this application in a number of ways, including,

- To save new phrases in order to use later.
- To complete sentences by writing from flat screen.
- To set his/her settings.
- To convert to voices what he writes.
- To convert icons explanations to voice
- To convert the pre-loaded phrases to voice
- To save/edit/delete icons
- To save/edit/delete phrases
- To list recently/mostly used phrases
- To list recently/mostly used icons
- To be able to report the bugs
- To adjust voice volume or type



Block diagram

2.3 CONSTRAINTS, ASSUMPTIONS AND DEPENDENCIES

First of all this application is designed for mobile smartphones or tablet computers. For some features like accessing the setting menu the mobile machine should be in Android phone standarts so that it is guaranteed that it has the menu button when it is clicked the settings menu appears. Another restricton is this mobile machine should have the Android operating system with level of 2.2 at least.

In order that application stores some values such as user settings and syllables, it will be using a certain amount of memory. In this manner the machine should have the enough memory to hold whole information.

For reporting feature the machine should have the internet or wireless connection.

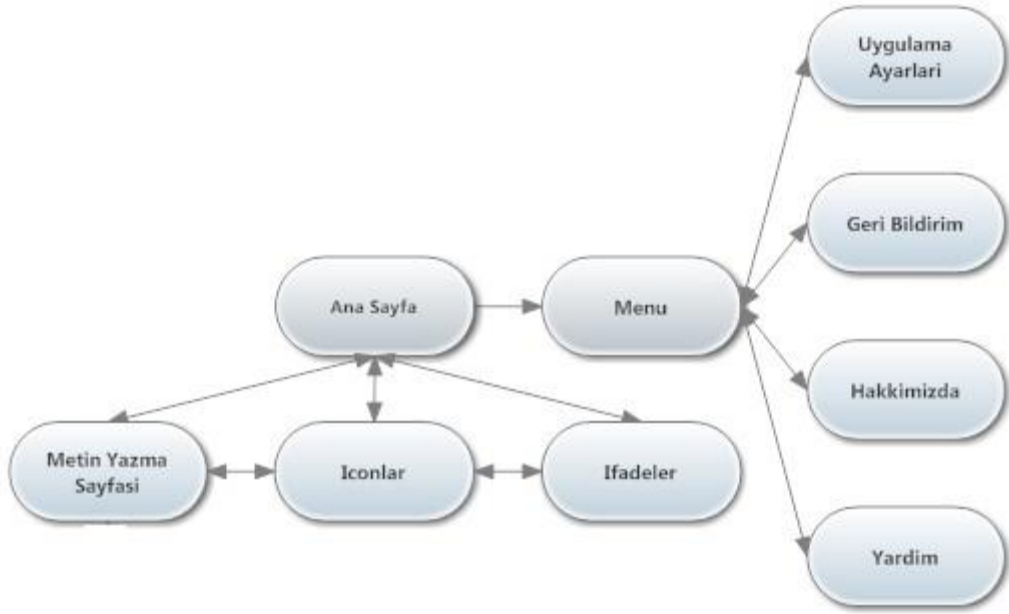
In addition to these requirements the application is fully designed in Turkish language.

3. SPECIFIC REQUIREMENTS

3.1 INTERFACE REQUIREMENTS

In this part user interface and its features will be described clearly. Since the application is wanted to be used fast it is tried to keep user interface as easy as possible.

3.1.1 GENERAL USER INTERFACE DIAGRAM



3.1.2 ANA SAYFA

According to the application's designing this page is designed for the selection of the pages in which the user selects the proper pre-speech page. In other words, the user can select one of three items: typing text page, icons page, phrase page. In order to do this functionality simply there will be there buttons. When they clicked the specified page is loaded.

3.1.3 METİN YAZMA SAYFASI

In this page there will be one textbox so that user can simply type what he/she wants and one text view to show what he writes. Except for these specific functionalities, in order to listen what user types there will be listen button and link buttons through to main page, icons page and phrase page.

3.1.4 İKONLAR

In this page there will be list to list pre-saved icons with phrases. There will be a text view to show the phrase of the icon.

For adding, deleting and editing these icons, there will be specified buttons.

For adding, after "ekle" button is clicked the invisible textbox, image button and "gönder" button will appear. Image button is for getting icons from the device or for taking picture.

For deleting an icon, if icon is selected then “sil” button will be enabled. After “sil” button is clicked there will be popup to control the answer twice.

For editing, selection from list is pre-request. After selection of an item, “düzenle” button will be enabled. If the button is clicked simply a textbox, image button and “gönder” button to save the prepared icon will appear. The image button opens a pop-up to select the images from the device or to take picture.

For searching, from the list there will a be text box, when it is focused and simply typed things, the loaded list just narrows itself according to the typed words. In this way, in order to deletion and edition the user can use search feature as well since search just narrows the main list.

In this page in order to narrow the list the user is able to choose one of the button from the “sık kullanılanlar” or “en son kullanılanlar” buttons.

In order to access to main page, typing text page or phrase page again there will be specified buttons as well.

For converting the phrase to voice there will be “dinle” button.

3.1.5 İFADELER

In this page there will be list to list pre-saved phrases. There will be a text view to show the phrase.

For adding, deleting and editing these phrases, there will be specified buttons.

For adding, after “ekle” button is clicked the invisible textbox and “gönder” button will appear.

For deleting a phrase, if icon is selected then “sil” button will be enabled. After “sil” button is clicked there will be popup to control the answer twice.

For editing, selection from list is pre-request. After selection of an item, “düzenle” button will be enabled. If the button is clicked simply a text box, and “gönder” button to save the prepared icon will appear

For searching, from the list there will a be text box, when it is focused and simply typed things, the loaded list just narrows itself according to the typed words. In this way, in order to deletion and edition the user can use search feature as well since search just narrows the main list.

In this page in order to narrow the list the user is able to choose one of the button from the “sık kullanılanlar” or “en son kullanılanlar” buttons.

In order to access to main page, typing text page or phrase page again there will be specified buttons as well.

For converting the phrase to voice there will be “dinle” button.

3.1.6 AYARLAR

In this page there will be a list containing link buttons to menu items; “Yardım”, “geribildirm”, “hakkımızda”, “uygulama ayarları”. This page is just a transit page.

3.1.7 YARDIM

In this page there will be a text explaining the usage, frequently asked questions and general possible problems by heading of them.

3.1.8 GERİ BİLDİRİM

In this page there will be a text box to write the ideas or defect’s explanations and a button named as “gönder” in order to send them to the application technical support team.

3.1.9 HAKKIMIZDA

In this page there will be explanation about the developers and contributors.

3.1.10 UYGULAMA AYARLARI

In this page there will be a radio button to to select voice type among the man voice and woman voice. In order to adjust the volume there will be two buttons.

3.2. FUNCTIONAL REQUIREMENTS

In this section each functional requirement will be introduced.

3.2.1. TYPING TEXT

3.2.1.1. DESCRIPTION AND PRIORITY

This functionality allows users to type text into the textbox at the “Metin Yazma”page. These texts are used to express user’s feelings converting them into speech.

3.2.1.2. STIMULUS/RESPONSE SEQUENCES

3.2.1.2. 1. BASIC DATA FLOW

1. Select “Metin Yazma” page button in main page.
2. “Metin Yazma” page will appear.
3. Type text into the textbox.

3.2.1.3. FUNCTIONAL REQUIREMENTS

There is no functional requirement for this functionality.

3.2.2 SEARCHING PRE-LOADED PHRASE

3.2.2.1. DESCRIPTION AND PRIORITY

This functionality allows users to searching pre-loaded phrases.

3.2.2.2. STIMULUS/RESPONSE SEQUENCES

3.2.2.2.1. BASIC DATA FLOW

1. Select “İfadeler” page button in main page.
2. “İfadeler” page will appear.
3. Type desired phrase name into the textbox.
4. Check database, whether desired phrase exist or not.
5. Select desired phrase from among searched results.
6. Click the “Dinle” button.
7. Listen the phrase.

3.2.2.2.2. ALTERNATIVE DATA FLOW

5. Pop up a warning as “Aradığınız kelimeye ilişkin sonuç bulunamadı” .
6. Click “Tamam” button.
7. Close the pop-up window.

3.2.2.3. Functional Requirements

REQ-1 database connection must be established.

3.2.3 ADDING NEW PHRASE

3.2.3.1. DESCRIPTION AND PRIORITY

This functionality allows users to adding new phrase to database.

3.2.3.2. STIMULUS/RESPONSE SEQUENCES

3.2.3.2.1. BASIC DATA FLOW

1. Select “İfadeler” page button in main page.
2. Phrases page will appear.
3. Select “Ekle” button.
4. An empty textbox will appear at the beginning of the phrase.
5. Type new phrase into the textbox.
6. Click “Gönder” button.
7. Check textbox, whether textbox is empty or not.
8. Check database, whether phrase already exist or not.
9. Add phrase into the database.

3.2.3.2.2. ALTERNATIVE DATA FLOW 1

9. Pop up a warning as “Eklemek istediğiniz ifade veritabanında mevcuttur.”
10. Click “Tamam” button.
11. Close the pop-up window.
12. No modification will be done in database.

3.2.3.2.3. ALTERNATIVE DATA FLOW 2

8. Pop up a warning as “Lütfen bir ifade yazınız.”.
9. Click “Tamam” button.
10. Close the pop-up window.
11. No modification will be done in database.

3.2.3.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.4 DELETING PHRASE

3.2.4.1. DESCRIPTION AND PRIORITY

This functionality allows users to deleting phrases

3.2.4.2. STIMULUS/RESPONSE SEQUENCES

3.2.4.2.1. BASIC DATA FLOW

1. Select “İfadeler” page button in main page.
2. “İfadeler” page will appear.

3. Select a phrase from list.
4. “Sil” button will be enabled.
5. Select “Sil” button.
6. Pop up a warning as “Bu ifadeyi silmek istediğinizden emin misiniz?”.
7. Click “Evet” button.
8. Close the pop-up window.
9. The phrase will be deleted from database.
10. “Sil” button will be disabled.

3.2.4.2.2. ALTERNATIVE DATA FLOW 1

7. Click “Hayır” button.
8. Close the pop-up window.
9. No modification will be done in database.

3.2.4.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.5 EDITING PHRASE

3.2.5.1. DESCRIPTION AND PRIORITY

This functionality allows user to editing phrase. This functionality mostly used when previously added phrase needs to change.

3.2.5.2. STIMULUS/RESPONSE SEQUENCES

3.2.5.2. 1. BASIC DATA FLOW

1. Select “İfadeler” page button in main page.
2. “İfadeler” page will appear.
3. Select a phrase from list.
4. “Düzenle” button will be enabled.
5. Click “Düzenle” button.
6. Selected item will appear in textbox.
7. Edit phrase.
8. Click “Gönder”.
9. Check textbox, whether textbox is empty or not.
10. Check database, whether phrase already exist or not.
11. The phrase will be edited.

3.2.5.2.2. ALTERNATIVE DATA FLOW 1

11. Pop up a warning as “Ekleme istediğiniz ifade veritabanında mevcuttur.”
12. Click “Tamam” button.
13. Close the pop-up window.
14. No modification will be done in database.

3.2.5.2.3. ALTERNATIVE DATA FLOW 2

10. Pop up a warning as “Lütfen bir ifade yazınız”.
11. Click “Tamam” button.
12. Close the pop-up window.
13. No modification will be done in database.

3.2.5.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.6 LISTING MOSTLY USED PHRASE

3.2.6.1. DESCRIPTION AND PRIORITY

This functionality allows user to view mostly used phrases list. Mostly used ten phrases are listed by system according to their frequency of use.

3.2.6.2. STIMULUS/RESPONSE SEQUENCES

3.2.6.2.1. BASIC DATA FLOW

1. Select “İfadeler” page button in main page.
2. “İfadeler” page will appear.
3. Click “Sık kullanılanlar” button.
4. Check database whether mostly used phrases list is empty or not.
5. View mostly used phrases list.

3.2.6.2.2. ALTERNATIVE DATA FLOW 1

5. Pop-up a warning as “Listede hiçbir ifade bulunmamaktadır.”
6. Click “Tamam” button.
7. Close the pop-up window.

3.2.6.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.7 LISTING RECENTLY USED PHRASE

3.2.7.1. DESCRIPTION AND PRIORITY

This functionality allows user to view list of recently used ten phrases.

3.2.7.2. STIMULUS/RESPONSE SEQUENCES

3.2.7.2. 1. BASIC DATA FLOW

1. Select “İfadeler” page button in main page.
2. “İfadeler” page will appear.
3. Click “En son kullanılanlar” button.
4. Check database whether recently used phrases list is empty or not.
5. View recently used phrases list.

3.2.7.2. 2. Alternative Data Flow 1

5. Pop-up a warning as “Listede hiçbir ifade bulunmamaktadır.”
6. Click “Tamam” button.
7. Close the pop-up window.

3.2.7.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.8. SEARCHING PRE-LOADED ICON

3.2.8.1. DESCRIPTION AND PRIORITY

This functionality is used for searching pre-loaded icons in database. It enables user to choose icon and get related text to it and send to the text to speech engine.

3.2.8.2. STIMULUS/RESPONSE SEQUENCES

3.2.8.2.1. BASIC DATA FLOW

1. Select “İkonlar” page from main page.
2. Check database and list the icons.
3. Look desired icon in the list.
4. Select desired icon in the list.
5. Click “Dinle” button.
6. Listen the phrase.

3.2.8.2.2. ALTERNATIVE DATA FLOW 1

3. Type text into the textbox.
4. Look desired icon in the filtered list.
5. Select desired icon in the list.
6. Click ”Dinle” button.
7. Listen the text.

3.2.8.2.3. ALTERNATIVE DATA FLOW 2

3. Type text into the textbox
4. Look desired icon in the filtered list.
5. Check database, if filtered list is empty, pop-up a warning message “Aradığınız kelimeye ilişkin ikon bulunamamıştır!”.
6. Delete the text and type again in the textbox to find desired icon.

3.2.8.2.4. ALTERNATIVE DATA FLOW 3

3. Type text into the textbox.
4. Look desired icon in the filtered list.
5. If filtered list is empty or not include desired icon, delete the text.
6. Type again in the textbox to find desired icon.
7. Select desired icon in the list.
8. Click “Dinle” button.
9. Listen the text.

3.2.8.3. FUNCTIONAL REQUIREMENTS

REQ-1: Database connection must be established.

REQ-2: Turkish characters must be used while filling text boxes.

3.2.9. ADDING NEW ICON

3.2.9.1. DESCRIPTION AND PRIORITY

This functionality allows users to add new icons with their phrases into the database.

3.2.9.2. STIMULUS/RESPONSE SEQUENCES

3.2.9.2.1. BASIC DATA FLOW

1. Select icon’s page from main page.
2. Check database and list the icons.
3. Click the “Ekle” button.
4. An empty thumbnail place will appear at the left, an empty textbox will appear at the right side of thumbnail and a submit button will appear at the right side of empty textbox.
5. Click thumbnail.
6. Pop-up upload page.
7. Select “Kayıtlı Öğeler” from pop-up upload page.
8. Open file system for the device

9. Select the icon from user's android device.
10. Type text into the textbox
11. Click the submit button named "Gönder".
12. Check textbox if it is empty.
13. If it is not empty, check database, if phrase doesn't exist in database, add icon with its phrase in database.

3.2.9.2.2. ALTERNATIVE DATA FLOW 1

13. If text is empty pop-up a warning message "İfade boş olamaz!".
14. Click the "Tamam" button.
15. Close the pop up window.
16. Type again a unique phrase
17. Click the submit button named "Gönder".
18. Check textbox if it is empty.
19. If it is not empty, check database, if phrase doesn't exist in database, add icon with its phrase in database.

3.2.9.2.3. ALTERNATIVE DATA FLOW 2

13. If it is not empty, check database, if phrase exists in database, pop-up a warning message "Ekleme istediğiniz ifade veritabanında bulunmaktadır!".

14. Click the "Tamam" button.
15. Close the pop up window.
16. Type again a unique phrase
17. Click the submit button named "Gönder".
18. Check textbox if it is empty.
19. If it is not empty, check database, if phrase doesn't exist in database, add icon with its phrase in database.

3.2.9.2.4. ALTERNATIVE DATA FLOW 3

7. Select "Kamera" from pop-up upload page.
8. Capture an image from camera.
9. Captured image will appear with two buttons one of them is "Tekrar Çek", the other one is "Tamam".
9. If image not desired click "Tekrar Çek" button.
10. Capture image from camera.

11. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.

12. Click the “Tamam” button

13. Captured image will be shown in thumbnail version.

14. Type text into the textbox

15. Click the submit button named “Gönder”.

16. Check textbox if it is empty.

17. If it is not empty, check database, if phrase doesn't exist in database, add icon with its phrase in database.

3.2.9.2.5. ALTERNATIVE DATA FLOW 4

7. Select “Kamera” from pop-up upload page.

8. Capture an image from camera.

9. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.

9. If image not desired click “Tekrar Çek” button.

10. Capture image from camera.

11. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.

12. Click the “Tamam” button.

13. Captured image will be shown in thumbnail version.

14. Type text into the textbox

15. Click the submit button named “Gönder”.

16. Check textbox if it is empty.

17. If text is empty pop-up a warning message “İfade boş olamaz!”.

18. Click the “Tamam” button.

19. Close the pop up window.

20. Type again a unique phrase

21. Click the submit button named “Gönder”.

22. Check textbox if it is empty.

23. If it is not empty, check database, if phrase doesn't exist in database, add icon with its phrase in database.

3.2.9.2.6. ALTERNATIVE DATA FLOW 5

7. Select “Kamera” from pop-up upload page.
8. Capture an image from camera.
9. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
9. If image not desired click the “Tekrar Çek” button.
10. Capture image from camera.
11. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
12. Click the “Tamam” button
13. Captured image will be shown in thumbnail version.
14. Type text into the textbox
15. Click the submit button named “Gönder”.
16. Check textbox if it is empty.
17. If it is not empty, check database, if phrase exists in database, pop-up a warning message “Eklemek istediğiniz ifade veritabanında bulunmaktadır!”.
18. Click the “Tamam” button.
19. Close the pop up window.
20. Type again a unique phrase
21. Click the submit button named “Gönder”.
22. Check textbox if it is empty.
23. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.9.3. FUNCTIONAL REQUIREMENTS

REQ-1: Database connection must be established.

REQ-2: Turkish characters must be used while filling text boxes.

3.2.10. DELETING ICON

3.2.10.1. DESCRIPTION AND PRIORITY

This functionality allows users to delete icons with their phrases from the database

3.2.10.2. STIMULUS/RESPONSE SEQUENCES

3.2.10.2.1. BASIC DATA FLOW

1. Select icon’s page from main page.

2. Check database and list the icons.
3. Select icon from the list
4. “Sil” button will be enabled.
5. Click “Sil” button.
6. Pop up a warning message “Bu ikonu silmek istediğinizden emin misiniz?”.
7. Click “Evet” button.
8. Close pop-up window.
9. Icon will be deleted with its phrase from database.
10. “Sil” button will be disabled.

3.2.10.2.2. ALTERNATIVE DATA FLOW

1. Select icon’s page from main page.
2. Check database and list the icons.
3. Select icon from the list
4. “Sil” button will be enabled.
5. Click “Sil” button.
6. Pop up a warning message “Bu ikonu silmek istediğinizden emin misiniz?”.
7. Click “Hayır” button.
8. Close pop-up window.
9. No modification will be done in database.

3.210.3. FUNCTIONAL REQUIREMENTS

REQ-1: Database connection must be established.

3.2.11. EDITING ICON

3.2.11.1. DESCRIPTION AND PRIORITY

This functionality allows users to edit icons with their phrases from the database

3.2.11.2. STIMULUS/RESPONSE SEQUENCES

3.2.11.2.1. BASIC DATA FLOW

1. Select icon’s page from main page.
2. Check database and list the icons.
3. Select icon from the list
4. “Düzenle” button will be enabled

5. Click thumbnail.
6. Pop-up upload page.
7. Select “Kayıtlı Öğeler” from pop-up upload page.
8. Open file system for the device
9. Select the icon from user’s android device.
10. Edit text into the textbox
11. Click the submit button named “Gönder”.
12. Check textbox if it is empty.
13. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.11.2.2. ALTERNATIVE DATA FLOW 1

13. If text is empty pop-up a warning message “İfade boş olamaz!”.
14. Click the “Tamam” button.
15. Close the pop up window.
16. Type again a unique phrase
17. Click the submit button named “Gönder”.
18. Check textbox if it is empty.
19. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.11.2.3. ALTERNATIVE DATA FLOW 2

13. If it is not empty, check database, if phrase exists in database, pop-up a warning message “Eklemek istediğiniz ifade veritabanında bulunmaktadır!”.

14. Click the “Tamam” button.
15. Close the pop up window.
16. Type again a unique phrase
17. Click the submit button named “Gönder”.
18. Check textbox if it is empty.
19. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.11.2.4. ALTERNATIVE DATA FLOW 3

7. Select “Kamera” from pop-up upload page.

8. Capture an image from camera.
9. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
9. If image not desired click “Tekrar Çek” button.
10. Capture image from camera.
11. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
12. Click the “Tamam” button
13. Captured image will be shown in thumbnail version.
14. Edit text into the textbox
15. Click the submit button named “Gönder”.
16. Check textbox if it is empty.
17. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.11.2.5. ALTERNATIVE DATA FLOW 4

7. Select “Kamera” from pop-up upload page.
8. Capture an image from camera.
9. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
9. If image not desired click “Tekrar Çek” button.
10. Capture image from camera.
11. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
12. Click the “Tamam” button.
13. Captured image will be shown in thumbnail version.
14. Edit text into the textbox
15. Click the submit button named “Gönder”.
16. Check textbox if it is empty.
17. If text is empty pop-up a warning message “İfade boş olamaz!”.
18. Click the “Tamam” button.
19. Close the pop up window.

20. Type again a unique phrase
21. Click the submit button named “Gönder”.
22. Check textbox if it is empty.
23. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.11.2.6. ALTERNATIVE DATA FLOW 5

7. Select “Kamera” from pop-up upload page.
8. Capture an image from camera.
9. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
9. If image not desired click the “Tekrar Çek” button.
10. Capture image from camera.
11. Captured image will appear with two buttons one of them is “Tekrar Çek”, the other one is “Tamam”.
12. Click the “Tamam” button
13. Captured image will be shown in thumbnail version.
14. Type text into the textbox
15. Click the submit button named “Gönder”.
16. Check textbox if it is empty.
17. If it is not empty, check database, if phrase exists in database, pop-up a warning message “Ekleme istediğiniz ifade veritabanında bulunmaktadır!”.
18. Click the “Tamam” button.
19. Close the pop up window.
20. Type again a unique phrase
21. Click the submit button named “Gönder”.
22. Check textbox if it is empty.
23. If it is not empty, check database, if phrase doesn’t exist in database, add icon with its phrase in database.

3.2.11.3. FUNCTIONAL REQUIREMENTS

REQ-1: Database connection must be established.

REQ-2: Turkish characters must be used while filling text boxes.

3.2.12. LISTING MOSTLY USED ICON

3.2.12.1. DESCRIPTION AND PRIORITY

This functionality allows user to view mostly used icons' list. Mostly used ten icons with phrases are listed by system according to their frequency of use.

3.2.12.2. STIMULUS/RESPONSE SEQUENCES

3.2.12.2.1. BASIC DATA FLOW

1. Select "İkonlar" page button in main page.
2. "İkonlar" page will appear.
3. Click "Sık kullanılanlar" button.
4. Check database whether mostly used phrases list is empty or not.
5. View mostly used phrases list.

3.2.12.2.1. ALTERNATIVE DATA FLOW

5. Pop-up a warning as "Listede hiçbir ifade bulunmamaktadır."
6. Click "Tamam" button.
7. Close the pop-up window.

3.2.12.3. FUNCTIONAL REQUIREMENTS

REQ-1: Database connection must be established.

3.2.13. LISTING RECENTLY USED ICON

3.2.13.1. DESCRIPTION AND PRIORITY

This functionality allows user to view list of recently used ten phrases.

3.2.13.2. STIMULUS/RESPONSE SEQUENCES

3.2.13.2.1. BASIC DATA FLOW

1. Select "İkonlar" page button in main page.
2. "İkonlar" page will appear.
3. Click "En son kullanılanlar" button.
4. Check database whether recently used phrases list is empty or not.
5. View recently used phrases list.

3.2.13.2.2. ALTERNATIVE DATA FLOW 1

5. Pop-up a warning as "Listede hiçbir ifade bulunmamaktadır."
6. Click "Tamam" button.
7. Close the pop-up window.

3.2.13.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.14. CONVERTING TEXT TO SPEECH

3.2.14.1. DESCRIPTION AND PRIORITY

This functionality uses an algorithm to parse the text input into syllables form. Then it takes the voices form of syllables from the database and concatenates them.

3.2.14.2. STIMULUS/RESPONSE SEQUENCES

3.2.14.2.1. BASIC DATA FLOW

1. Text is sent to logical controller.
2. Text is parsed into syllables form.
3. Voices which are mapped to appropriate syllable are taken from the database.
4. If all syllables have appropriate voice in database, they all will be put in a list.
5. Voices in list are concatenated.
6. Concatenated voice is executed to the outside.

3.2.14.2.1. ALTERNATIVE DATA FLOW

4. If not all syllables have appropriate voice in database, the ones which have data will be put in list.
5. Voices in list are concatenated.
6. Concatenated voice is executed to the outside.

3.2.14.3. FUNCTIONAL REQUIREMENTS

REQ-1 database connection must be established.

3.2.15 CHOOSING VOICE TYPE

3.2.15.1. DESCRIPTION AND PRIORITY

Choosing voice type feature of the application provides user two different alternatives which are male and female voices. Using this feature user can select the appropriate one for himself.

3.2.15.2.1 BASIC DATA FLOW

1. Select the “Menu” button on the device.
2. Select the “Uygulama Ayarları” button.
3. Click the “Ses Tipi Seçimi” button.
4. Choose the appropriate one by clicking “Erkek” or “Kadın” button.

3.2.16 ADJUSTING VOLUME

3.2.16.1 DESCRIPTION AND PRIORITY

User can set the voice level using “Yukarı” and “Aşağı” buttons.

3.2.16.2.1 Basic Data Flow

1. Select the “Menu” button on the device.
2. Select the “Uygulama Ayarları” button.
3. Click the “Ses Seviyesi” button.
4. Choose the appropriate level by clicking “Yukarı” or “Aşağı” button.

3.2.17 REPORTING DEFECTS

3.2.17.1 DESCRIPTION AND PRIORITY

The user can report defects of the application via sending mail to technical support team.

3.2.17.2.1 BASIC DATA FLOW

1. Select the “Menu” button on the device.
2. Select the “Uygulama Ayarları” button.
3. Click the “Geri bildirim” button.
4. Write into defect explanation textbox and sent mail by clicking “Gönder” button.

3.3. NON-FUNCTIONAL REQUIREMENTS

3.3.1 PERFORMANCE REQUIREMENTS

First of all, the system should satisfy some performance constraints, such as reacting within a reasonable response time, in order to be used effectively. Visual GUI should be user friendly with a reasonable response time. The system should also have sufficient memory to hold all Turkish syllables’ voices and more than a hundred phrases and icons. However storage of the system should be reasonable considering the devices that can be use this application. Finally, only one user can be supported by the system since application can be used on personal mobile devices which is not like the application runs on internet allowing more than one user at the same time.

3.3.2 DESIGN CONSTRAINTS

Android SDK with Java programming language will be used in development of the main application which runs on android tablets. There will be a database (SQLite) to store all Turkish syllables’ voices and more than a hundred phrases and icons. In order to convert texts to voice we will be using some text-to-speech engines and some libraries to make it more understandable.

The system shall run on a portable device which also supports a camera. Also, the processor speed, the quality of the graphics card should be sufficient enough to be able to run the program. The system is portable since the purpose of the application is make easier speech impaired people social life. Also the devices can use this applications are portable.

Due to the system will run on a single device and it will not be dependent to a bigger system or any other device, there will not be any security or reliability problems.

4. DATA MODEL AND DESCRIPTION

This section describes information domain for software.

4.1 DATA DESCRIPTIONS

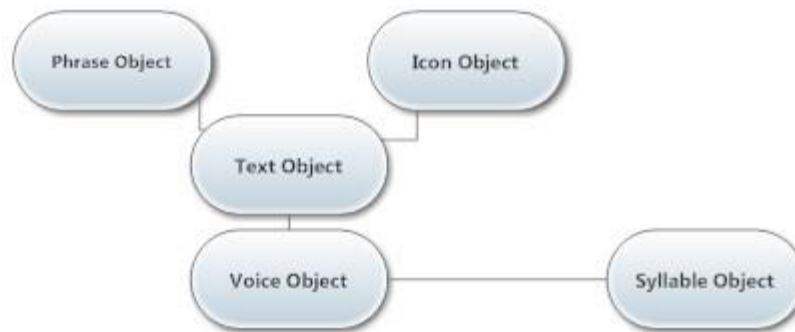
There will be 5 types of data objects in the system namely, phrase data objects, icons data objects, text object, voice object and syllable object.

4.1.1 DATA OBJECTS

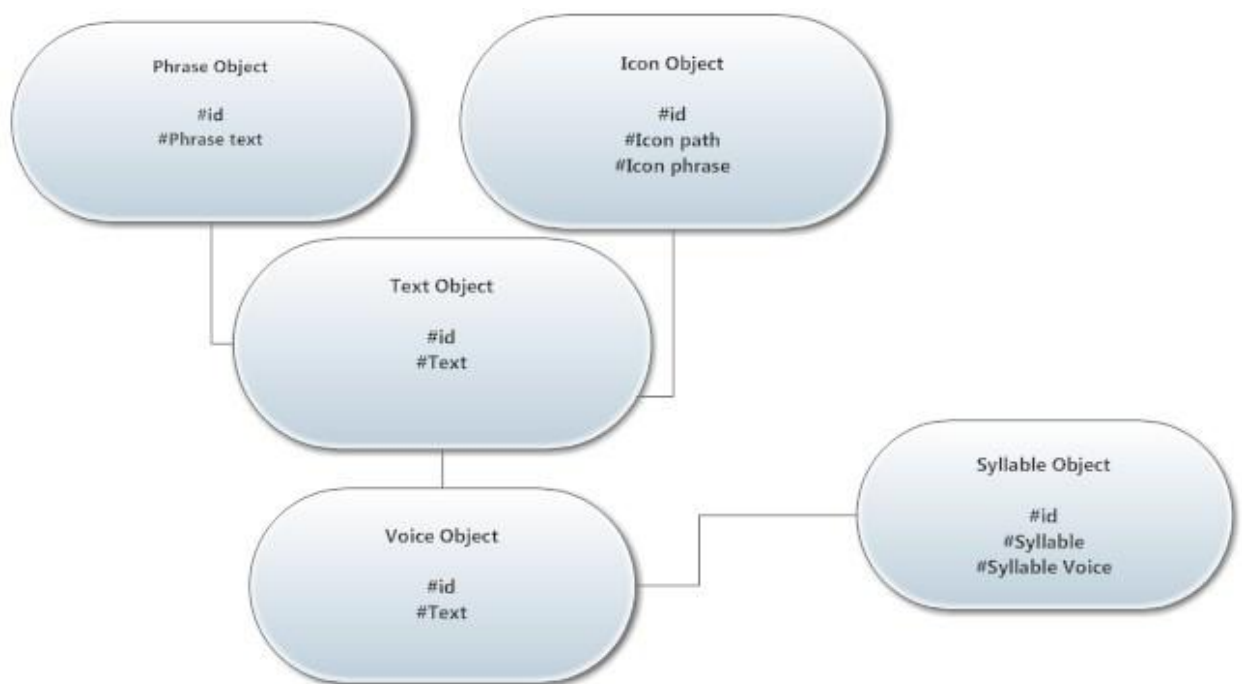
- ✓ Phrase objects: This object holds information about phrases which is used to explain actions. Objects have their text and id's.
- ✓ Icon object : This object holds information about icons which is used to explain action by help of icons. Objects have their text, id and a path describing image place associated with this icon.
- ✓ Text object : This object is an object to hold the specified text. Since text can come from different locations, from phrases, icons or flat user typed text, the application needs such kind of object to construct same object.
- ✓ Voice object : This object is an object to convert the specified text to speech. It takes a text as a field. Its voice method uses the syllable object.
- ✓ Syllable object : This object is used for converting texts to speech. It has strong communication with the database.

4.1.2 RELATIONSHIPS

Voice object is the last part of the application to convert the texts to voice and uses syllable objects. Since it converts texts it needs a text object. Text objects can be constructed from phrase objects, icon objects or simple strings.



4.1.3 COMPLETE DATA MODEL



4.1.4 DATA DICTIONARY

Icon : The symbols or pictures describing a certain situation.

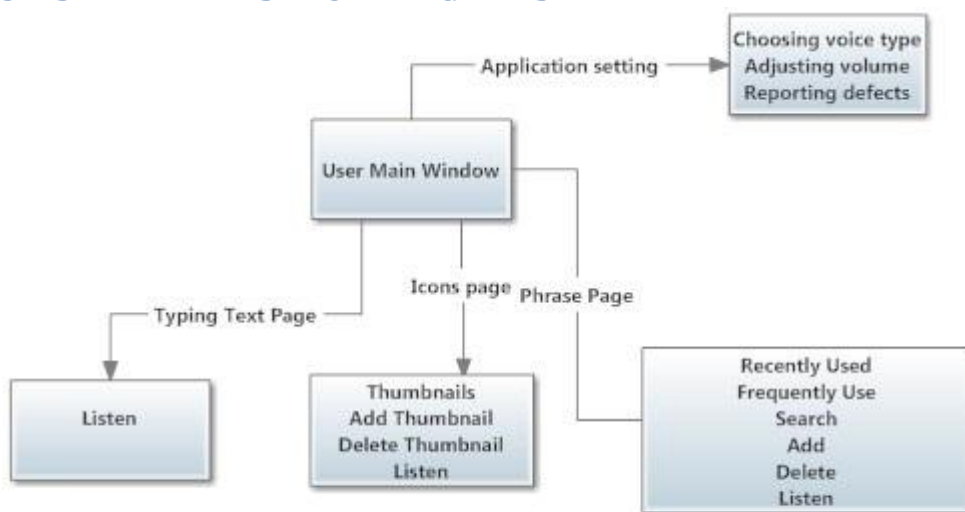
Swype : Swype is an input method for touchscreens in order to type input easily. Swype allows users to enter words by sliding a finger or stylus from letter to letter, lifting only between words. It uses error-correcting algorithms and a language model to guess the intended word. It also includes a tapping predictive text system in the same interface.

5 BEHAVIORAL MODEL AND DESCRIPTION

5.1 DESCRIPTION FOR SOFTWARE BEHAVIOR

After clicking the application, system goes one state which state is User Main Window. In User Main Window state, there is three choices: Typing Text Page, Icons Page, Phrase Page. There is connection between these three pages. User can change state without going back User Main Window. In the Typing Text Page, user types characters and then the voice are loaded incase “Dinle” button is pressed. In the Icons Page, there are some thumbnails which are determined by user and device default. Thumbnails are chosen and voice is loaded. In this state, thumbnails can be added by user via capturing phobos and can be removed from the list of thumbnails. In the Phrase Page, there is a list of all phrases which can be narrowed by clicking the options which are recently used, frequently used options and also by searching. In addition this, phrases are edited by using “ekle” and “sil” buttons.

5.2 STATE TRANSITION DIAGRAMS



6. PLANNING

6.1 TEAM STRUCTURE

HANDE team has no permanent leader, decisions on problems and approach are made by group consensus. Every member's opinion is important to each other and the experience and knowledge of developments tools are nearly the same. Thus, our team's structure is decided as “Democratic de-centralized” structure. We plan to divide the workload equally. Also each member has his or her own role, which are also exchangeable, assigned based on the fundamental rules constructing the team.

There are 5 main roles in our team which are explained below:

- The Initiator:** The one who comes up with new ideas.
- The Devil's Advocate:** The one who looks for potential flaws in an idea.
- The Optimist:** The one who tries to maintain a positive frame of mind and facilitates solution searches.

- The Timekeeper:** The one who tracks time spent on each portion of the meeting.
- The Gate Keeper:** The one who ensures that each member gives input on an issue.

Baha : Devil’s Advocate

Doğuş: Initiator, Optimist

Eray: Gate Keeper

Hande: Timekeeper

6.2 ESTIMATION (BASIC SCHEDULE)

The gantt chart that shows the basic time schedule of the project is as follows with the tasks and dates included.

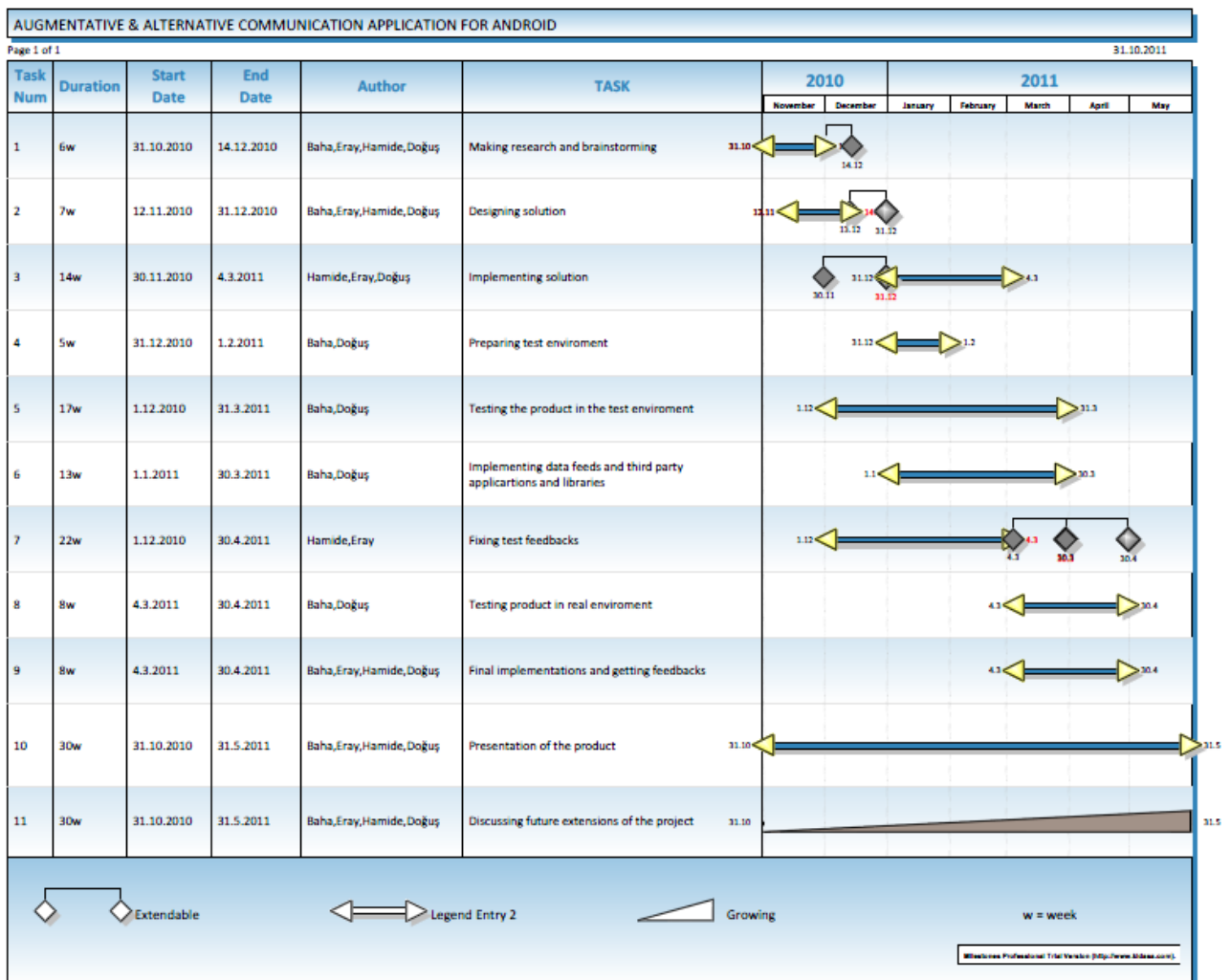


Figure: Gantt Chart

6.3 PROCESS MODEL

We will use Waterfall process model throughout our system development since we first completed requirements specification and then plan to design and this design should be a plan for implementing the requirements given.

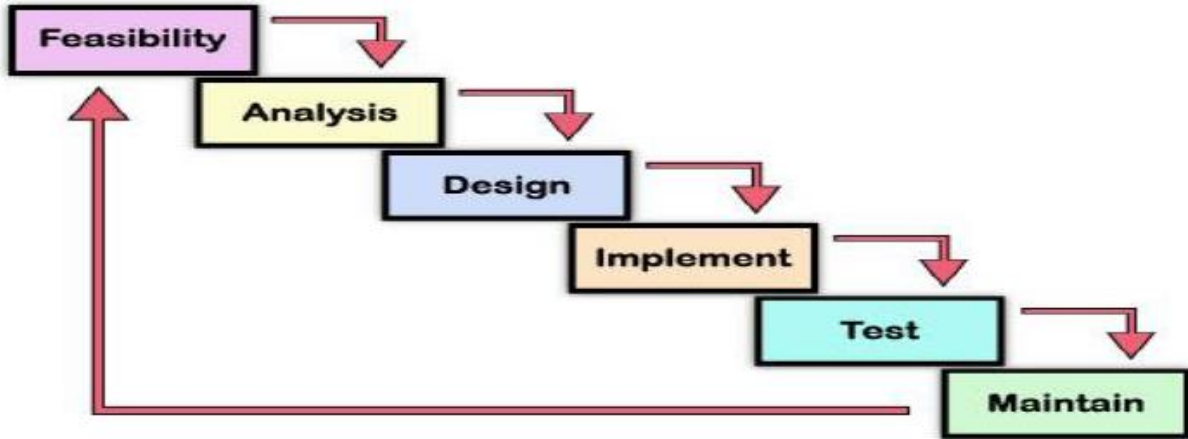


Figure: Waterfall Model shows the software development processes.

7. CONCLUSION

This report is prepared to show an AAC Application for Android project's requirement details in terms of several aspects. Firstly, a brief description of the applications is introduced. Then, a marketing and technology research is carried out and the results are established. And at the body part, the requirement details of the project are described and Behavioral Model and Description is introduced. As a last work, project's planning is presented. Thus, this report focused on the aspects which are seemed to be important.