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e-Learning For Kindergarten Kids

Bachelor of Science in Computer Science

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Certificate

We accept the work contained in the report 'e-learning for KG kid', written by Mehreen Kanwal AND Shahrooz Saleem as a confirmation to the required standard for the partial fulfillment of the degree of Bachelor of Science in Computer Science.

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Abstract

'e-learning For Kindergarten Kids' is basic study of use of Android for learning purpose for kindergarten. As children are keen of using phones and tablets, So app is designed by keeping their interest in mind so that kid do not get bored. Purpose of application is that kid learn in a play and do not feel studies as burden from start. Concepts of talking character and educational games are used in application. The catchy feature of application is Natural Language Processing i-e application speaks and listen to what child is saying like a teacher.

For making the kids concepts clear, application has two phases i-e learning and quiz. As name indicate learning phase teaches kid how to speak and quiz one checks if kid is able to speak what was taught.

Acknowledgments

First we offer warmest gratitude to our supervisor Dr Muzammil who gave us enough time and the idea of project which we follow through out project. Our all teachers who gave us the sound concepts of programming and designing.

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Acronyms and Abbreviations

e-learning	Electronic Learning (through internet)
KG	kindergarten
NAEYC	National Association For The Education Of Young Children
DFD	Data Flow Diagram
NLP	Natural Language Processing

Chapter 1

Introduction

Project is an interactive android application for Kindergarten kids. Basic idea of application is to use natural language processing for learning purpose(alphabets). Application have verbal cooperation/interaction with kids which is viewed as snappy and appealing angle for kids of KG standard or preschool. In first stage, all alphabets sets and things identified with that is to be teach. In second stage, checks whether child is able to learn the concepts or not.

1.1 Project Background/Overview

Application is basically mixture of learning and gaming phase. So that, kids can learn in a meaningful way.

1.2 Problem Description

As it is considered very difficult to teach KG (Kindergarten) standard kids and they have an interest in using tablets/phones.It is a good approach to have an application which will teach kids like a teacher and allows the kids to interact and respond. There are many educational games as well as talking character games which are developed for KG kids. But our application is a combination of two things in which character speaks and process the voice of the kid. Application through character interact and teach the kid as a teacher. The application comprises of three levels, i-e learning, quiz and bubble game. In learning, alphabets and the related object will be taught by using verbal contact with the kid. In the quiz, a kid was assessed how much he learns through two games. In bubble game, Kid has to click the bubble having alphabet shown on guess board to get scores.

1.3 Project Objectives

The core objectives which were designated as fundamental to the project are:

- Educate
- Application remove the need of tutors.
- Make the kids to speak right(pronunciation).
- Engage the child in a meaningful way(learning+game).

1.4 Project Scope

It is an android base application can be converted to the desktop. The scope of proposed system is limited we are going to cover only English part of Kindergarten course which can be extended to the whole course of KG. Alphabets and things related to alphabets taught by in learning phase. The quiz decides how much kid grasp the concepts. In application, using verbal contact with the kid along with touch. The success of this project for one experience will open doors for more subjects and for high-level education.

There are three modules:

- Learning Module.
- Quiz Module.
- Bubble Game Module.

1.4.1 Learning Module

Application will first speak and then allows kid to speak and check whether kid is right or not by natural language processing.

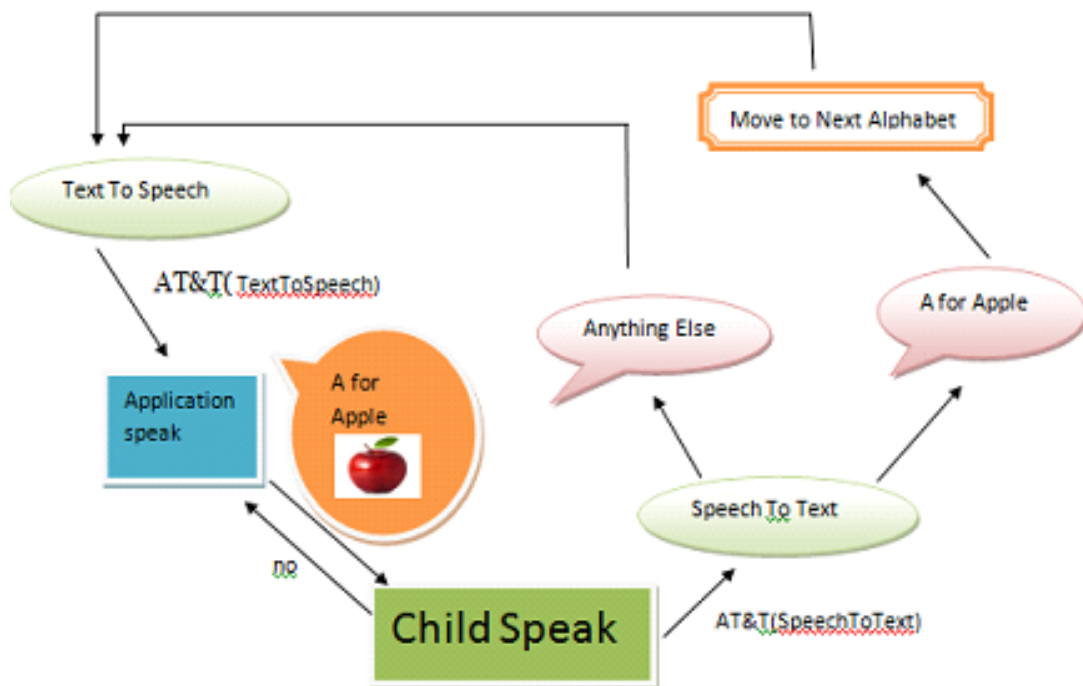


Figure 1.1: shows the flow of Learning Activity. First application speaks(text is converted to speech) and allows kid to speak. Speech of kid is converted to text and then compared ,if the kid speaks right then he can move to the next alphabet otherwise kid can repeat current alphabet

1.4.2 Quiz Module

In quiz, kid was shown with alphabet and check whether he able to guess the alphabet by saying that or not.

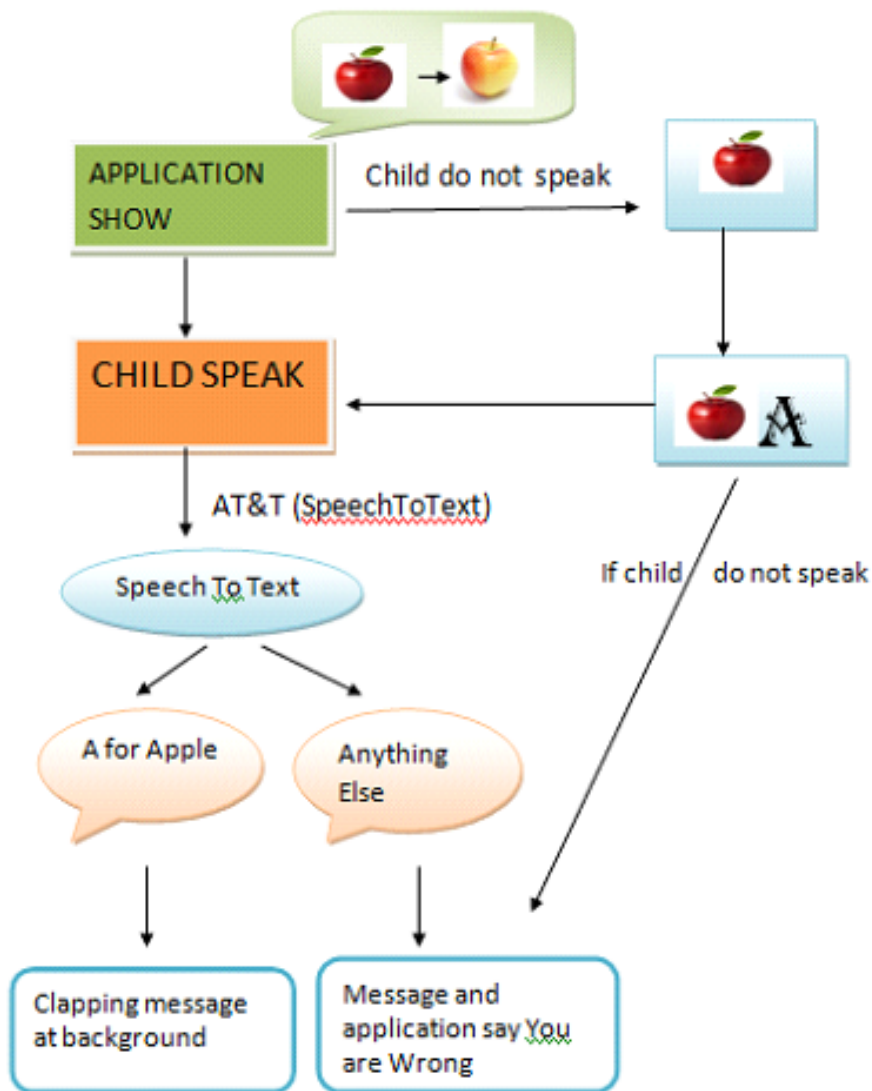


Figure 1.2: Shows the flow of Quiz Activity. Application shown random alphabet and start listen to kid. If the kid speaks right then shows a clapping message else image of related to that alphabet is shown as a clue and then again start to listen the kid. If kid is right this time, then shows a clapping message for him/her else play sad sound.

1.4.3 Bubble Game Module

In bubble game, Kid has to click the bubbles having alphabet shown on guess board to get scores.

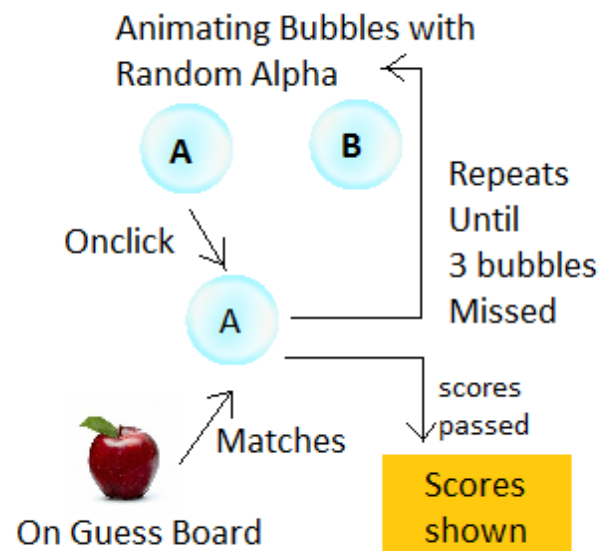


Figure 1.3: Shows the flow of Bubble Game. Random alphabet is display on guess board with animating bubbles having random alphabets in it. When kid clicks bubble with text shown on guess board he gets the score otherwise kid loses the chance. kid having three chances.

Chapter 2

Literature Review

2.1 Preschool Education

A preschool (also nursery school, pre-primary school, kindergarten outside the US and UK) is an educational establishment or learning space offering early childhood education to children between the ages of three and five.

2.1.1 Children's Perception Of World As Physical Things

Morrison [1] called preschool learning as pre-functional phase in which they view the world as physical things around. According to him children have perception that everybody thinks like them and teach them by coming to their level. Children do not appreciate discussion rather they are impressed by their believes.

2.1.2 Training Of Kids About Android

Stube and Patrick [2] suggested that it is necessary to train kids about world of Android so that kid will not feel learning as complex. He mentioned that it is proven that kids with preschool education show good performance in kindergarten. Learning abilities of kid are refined and all set for kindergarten, if he will be able to play game and read.

2.2 Natural Language Processing Importance

Natural language processing is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human (natural) languages. As such, NLP is related to the area of human–computer interaction.

2.2.1 Computer Tutors As Peers

Kersey [3] said In addition to building computer tutors, other uses of dialogue technology for teaching have been explored. Researchers have developed systems that play the role of student peers rather than expert tutors.

2.2.2 Spoken Dialog Systems

Zechner et al. [3] explained that spoken dialogue systems for teaching or assessing the speaking skills of second language learners in immersion-like situations have also seen increasing attention.

2.2.3 NLP And Education

A series of tutorial dialogue systems workshops began to span the Artificial Intelligence and Education and the Natural Language Processing communities [3]. Since 2003, ten workshops on the ‘Innovative Use of NLP for Building Educational Applications’.

2.2.4 Oral Language And Early Literacy Development

Infants pay attention to the sounds of speech and significant adults in their lives encourage this natural ability when they speak often to them. Toddlers begin to understand and produce speech to communicate their wants and needs and to interact with others. At age three, early literacy skills begin to develop and continue parallel to language skills development [4].

2.3 Use Of Technology And Media

In the age of social media, the teacher is no longer the center of learning. The student is. One of the most important things an educator can do is support students in developing a powerful learning network.

2.3.1 Early Software For Kids Education

Skinner [5] shared his views about his developed learning device, machine which is programmed so that it can teach the syllabus. Learner has to answer listed questions one by one. After doing so learner would be able to check if he is right or not and move to next one. This is helpful for kids and grownups also. Machine has good response time and just need teacher to set the curriculum according to kid age.

2.3.2 Technology Role In Learning

NAEYC 2012a [p.2] [5], Appositive use of technology and media would be enhancing innovative gaming , searching, indoor, communication skills and physical games. Use of technology can be kids use of android educational apps which opens up mind and improves the performance academically as well as physically.

2.4 Gaming Role In Learning

Games and learning is a field of education research that studies what is learned by playing video games, and how the design principles, data and communities of video game play can be used to develop new learning environments. Video games create new social and cultural worlds – worlds that help people learn by integrating thinking, social interaction, and technology, all in service of doing things they care about.

2.4.1 Games Improve Person Capabilities

Koster [2] explored that games are significant element in learning, gave chance to live out and look at in surroundings. Games polish skills of kid like knowledge, management of control, planning, endeavor, hunting and time management.

2.4.2 Importance Of Work On Educational Games

Squire and Barab [6] presented that games enhance enthusiasm and increase learning ability. He said games build the baseline of kid. Games make kid sharp and intelligent so that he can cope up with challenging situations.

2.4.3 Effectiveness Of Educational Games

Freitas [6] suggested that it is crucial need of time that vigorous experimental work should be done to prove effectiveness of educational games in learning. Psychological Study should be done about users for educational games so that it will be engaging and catchy in a meaningful way.

2.4.4 Research On Games

Becker [6] emphasize on more research should be done on learning techniques so that learning would be made easy for children. Games is a subject of great value as it is necessary for building sound thought and confident personality.

2.4.5 Growth Of Communication

Bracken and Nagle [2] said that it is markedly proven by researchers value of play in growth of communication skills of child. Writing, verbal skills, Pinpointing, analytical observation, vision and little bit administration qualities are improved by playing. It not only helpful for progress of studies but also essential for kids healthy activities.

2.4.6 Enhance Learning Sills

Johnston et al. [2] explore that children take pleasure in playing. Playing activities enhance learning capability. So use of android is considered good approach and children will be taught specific concepts without fear of studies.

2.4.7 Games necessary for Development of kids

Rieber [6] suggested that for development of kids and grownup, play has meaningful weight on learning. With play they develop mind with problem solving and decision making. Play teaches team coordination, hard working for what is difficult and develop passion for work.

2.4.8 Uphold commitment

Colarusso [6] suggested play uphold commitment and supervision of activities. Kid do not consider study as a boring activity an done with interest.

Chapter 3

Requirement Specifications

In this chapter we will be discussing about application need and requirements. Application will teach KG kid like a teacher i-e verbal interaction which is more natural. So that kid will learn fast without getting bore. As kids have keen interest in using phone, so keeping their interest in mind application will make kid to learn while playing. Application will teach as well as check how much kid grasp concepts by quiz.

3.1 Proposed System

Proposed system is an interactive android application developed for kindergarten kids. Purpose of application is to teach kids and check whether how much he learn through games. Basic idea of application is make learning interesting and catchy by using natural language processing. In Learning phase, character speaks and then listen to user and give responses to kid. In Quiz phase, it is judged how much kid learns in quiz phase on basis on scores.

3.2 Requirement Specifications

3.2.1 Functional Requirements

The main purpose of this project is to make kid of standard kindergarten to learn by Android phone without teacher. The functional requirements for my project are :

- Kid should interact with application verbally i-e application speak like a teacher and check whether kid speak right or not according to certain scale.
- Menu should include learning phase, quiz phase, settings and exit options.
- In learning phase, application teach kid with alphabets and things related to that sequence should be set according to psyche of kid i-e things which child grasp easily should be set start.

- In quiz phase, application show kid with alphabet if he will be able to speak then score is added and if not kid will be shown with thing and after certain time kid will not speak right then application will speak. High score should save.
- In bubble Activity, bubbles with random alpha are animating. Kid has to click one which is shown on guess board to get scores.
- Exit for quitting application with confirmation prompt.

3.2.2 Non-Functional Requirements

All those requirements which specify how a system will behave and constraints upon system's behavior. They include all those requirements which are not functional. Some of them are :

- Application should not hang or through exceptions.
- Application should be user friendly i-e easy to use, learn, memorize and interactive.

3.3 Use Cases

Use case is a list of actions or events, explaining the flow of events done by UML actor to get goal. A use case is an interaction that a user or the system has with the developed system that is being used. The term actor describes a person or the system that has a goal.

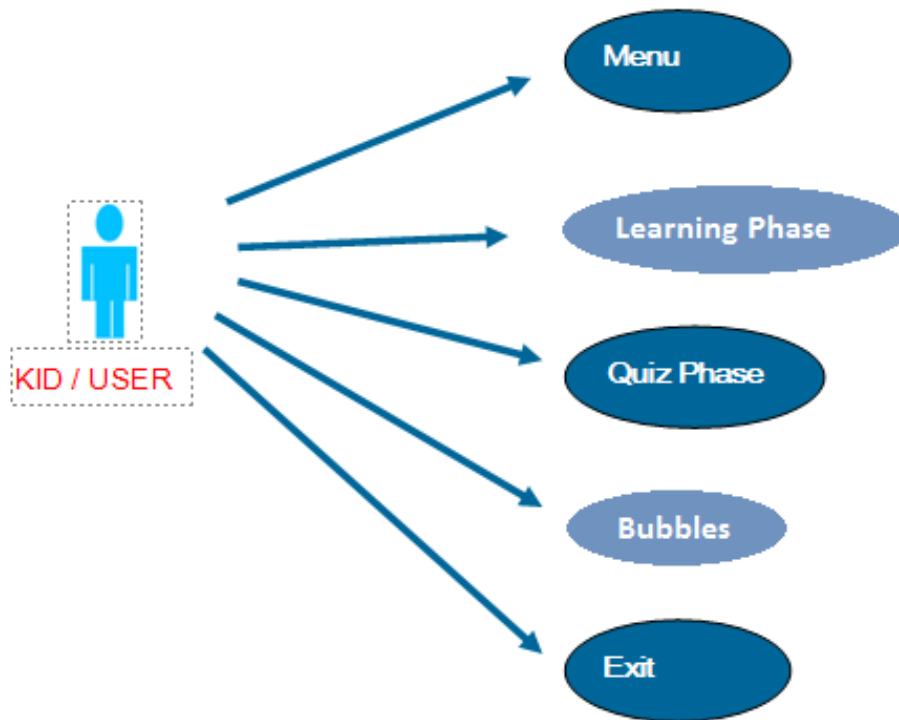


Figure 3.1: is Use Case Diagram, describes there is one actor which can interact with Menu, Learning phase, Quiz phase, Bubbles and Exit

Table 3.1: is Menu Use Case, describes the flow of event when user clicks icon to menu activity display.

Use Case ID	UC-1
Title	Menu
Description	Lead to basic menu screen.
Primary Actor	Kid/user
Pre-conditions	Application must be installed and open.
Post-conditions	user may press any button i-e learning, quiz, bubble or exit
Typical course of Events	<p>Step 1 User presses icon of application loading page opens up automatically leading to menu page.</p> <p>Step 2 From menu activity user can go to learning, Quiz, bubbles activities or Exit application.</p>
Includes	Android Phone with installed application
Related use cases	None
Assumptions	None

Table 3.2: is Learning Use Case, describes how user can interact with the Learning activity if he clicks Learning button from menu.

Use Case ID	UC-2
Title	Learning Phase
Description	Kid will learn alphabets and thing related to that alphabet.
Primary Actor	Kid/user
Pre-conditions	Application must be installed with dictionary of android and user should be on learning activity by pressing learning button from menu.
Post-conditions	user can press back button of phone to move to menu activity.
Typical course of Events	<p>Step 1 Alpha with related thing is displayed.</p> <p>Step 2 when user touches character it will speak according to alpha on display and start listening to user. Start listening brings about result or error.</p> <p>Step 3 On result, results are matched to alpha on display.</p> <p>Step 4 On error, again start listening.</p> <p>Step 5 User can press next button for moving to next alphabet.</p> <p>Step 6 User can press back button for moving to previous alphabet.</p>
Normal Flow	Kid/user will open application and on the learning activity.
Alternative Flow	None
Includes	Android Phone with installed application
Related use cases	Menu
Assumptions	Kid should be able to speak right and there must not have noise.

Table 3.3: is Quiz Use Case, describes how user can interact with the Quiz activity if he clicks Quiz button from menu.

Use Case ID	UC-3
Title	Quiz Phase
Description	Oral test is conducted by displaying things and response of child is checked.
Primary Actor	Kid/user
Pre-conditions	Application must be installed with dictionary of android and user should be on quiz activity by pressing quiz button from menu.
Post-conditions	User can press back button of phone to move to menu activity.
Typical course of Events	<p>Step 1 Random alpha is displayed and character start listening to user.</p> <p>Step 2 On error, again start listening.</p> <p>Step 3 On result, results are matched to alpha on display.</p> <p>Step 4 If not guessed, related thing to alpha is displayed as a clue to user.</p> <p>Step 5 If guessed, application sets another random alpha.</p> <p>Step 6 this repeats for 5 random alpha and then score are shown on score activity.</p>
Alternative Flow	None
Includes	Android Phone with installed application
Related use cases	Menu
Assumptions	Kid should be able to speak right and there must not have noise.

Table 3.4: is Bubble Use Case, describes how user can interact with the Bubble game if he clicks Bubble button from menu.

Use Case ID	UC-4
Title	Bubble Game
Description	User has to click the bubbles with text shown on guess board to get scores.
Primary Actor	Kid/user
Pre-conditions	Application must be installed and user should be on Bubble Activity by pressing bubble button from menu.
Post-conditions	user can press back button of phone to move to menu activity.
Typical course of Events	<p>Step 1 Random alpha and related thing is displayed on guess board.</p> <p>Step 2 Bubbles having random alpha as a text start animating.</p> <p>Step 3 When user click bubble, text of bubble is matched with alpha on guess board.</p> <p>Step 4 If user click right button he got scores else nothing happens.</p> <p>Step 5 User is given 3 chances for missing bubbles.</p> <p>Step 6 When chances becomes zero, score board is shown.</p>
Alternative Flow	None
Includes	Android Phone with installed application
Related use cases	Menu
Assumptions	None

Table 3.5: is Exit Use Case, describes user can exit application with confirmation message by clicking Exit button from Menu

Use Case ID	UC-5
Title	Exit
Description	Basic settings of applications can control by user.
Primary Actor	Kid/user
Pre-conditions	Application must be installed and open.
Post-conditions	None
Typical course of Events	<p>Step 1 User clicks Exit button from menu Activity.</p> <p>Step 2 Alert Dialog box is shown.</p> <p>Step 3 If user presses yes, application is exit else menu activity is shown.</p>
Alternative Flow	Back button of Android phone.
Includes	Android Phone with installed application
Related use cases	Menu

Chapter 4

System Design

4.1 System Architecture

A system architecture is the modeling or frameworks that defines the structural, behavioral views of a system. An architecture depiction may be An formal depiction Also representational of a system, composed as it were that helps thinking regarding those structures Also practices of the framework.

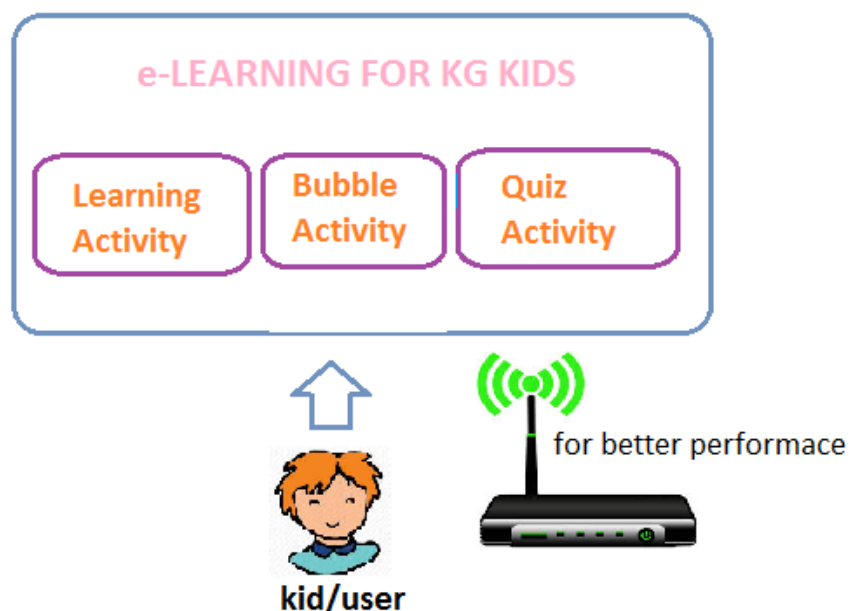


Figure 4.1: shows the structural view of application which comprises of 3 Activities i-e Learning, Quiz and Bubble. Kid/user can interact with application and by using wifi we can run application.

4.2 Design Methodology

Iterative approach about separating down those programming advancement of a expansive requisition under more modest chunks. Previously, iterative development, characteristic code is designed, produced Furthermore tried to repeater cycles. For each iteration, make designed, created Furthermore tried until there may be An fully practical product requisition prepared should be deployed to clients. As project consists of two basic modules of learning and quiz so we are going to use iterative approach so that after completion of one we approach second one.

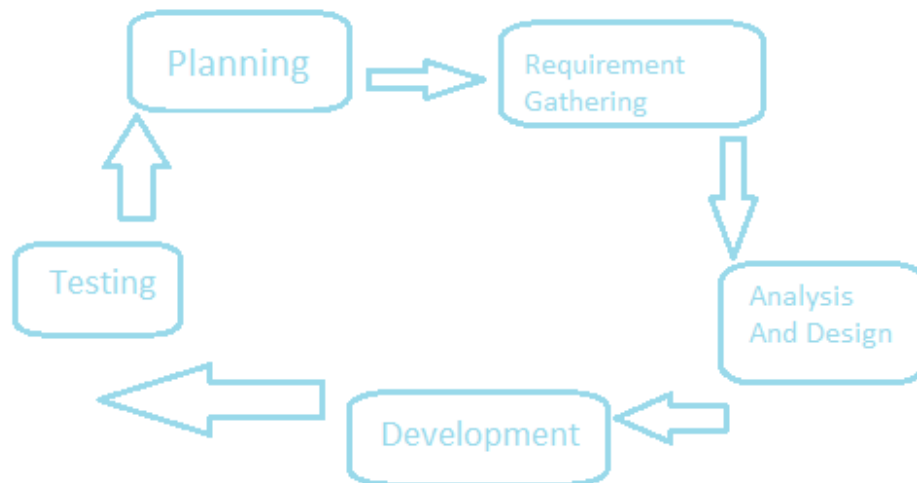


Figure 4.2: shows the life cycle for one module. Cycle repeats for all 3 modules. In life cycle planing, requirement gathering, analysis and design, development, testing is performed sequentially.

4.3 System Sequence Diagram

System sequence diagram is a sequence diagram that is build for a particular use case, the events that actors generate, their order, and possible inter-system events.

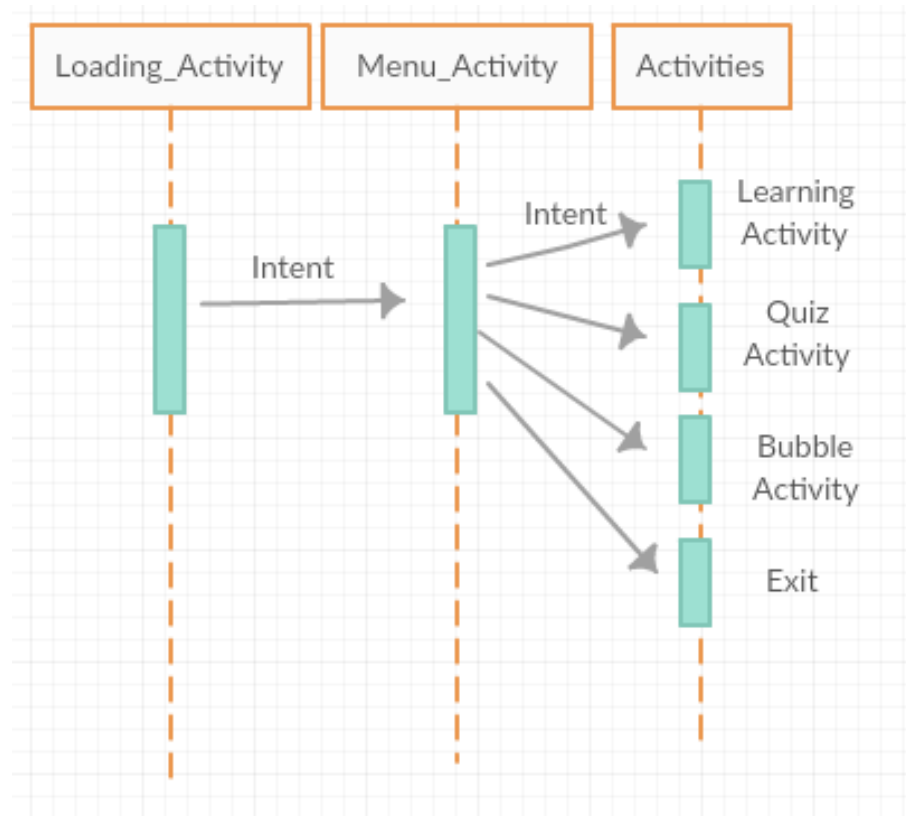


Figure 4.3: gives the high level view of inter-application events. User from Loading activity can go to Menu and from Menu Learning, Quiz, Bubble activities or exit. Call from one activity to other activity is through intents.

4.4 Sequence Diagrams

A Sequence diagram is an interaction diagram that describes the sequence of events and in what order particular action is performed according to time. Sequence diagram describes order of operations.

4.4.1 Learning Phase Sequence Diagram

Menu activity leads to Learning activity through intent. Application starts listen to user, then compare the results and speak accordingly.

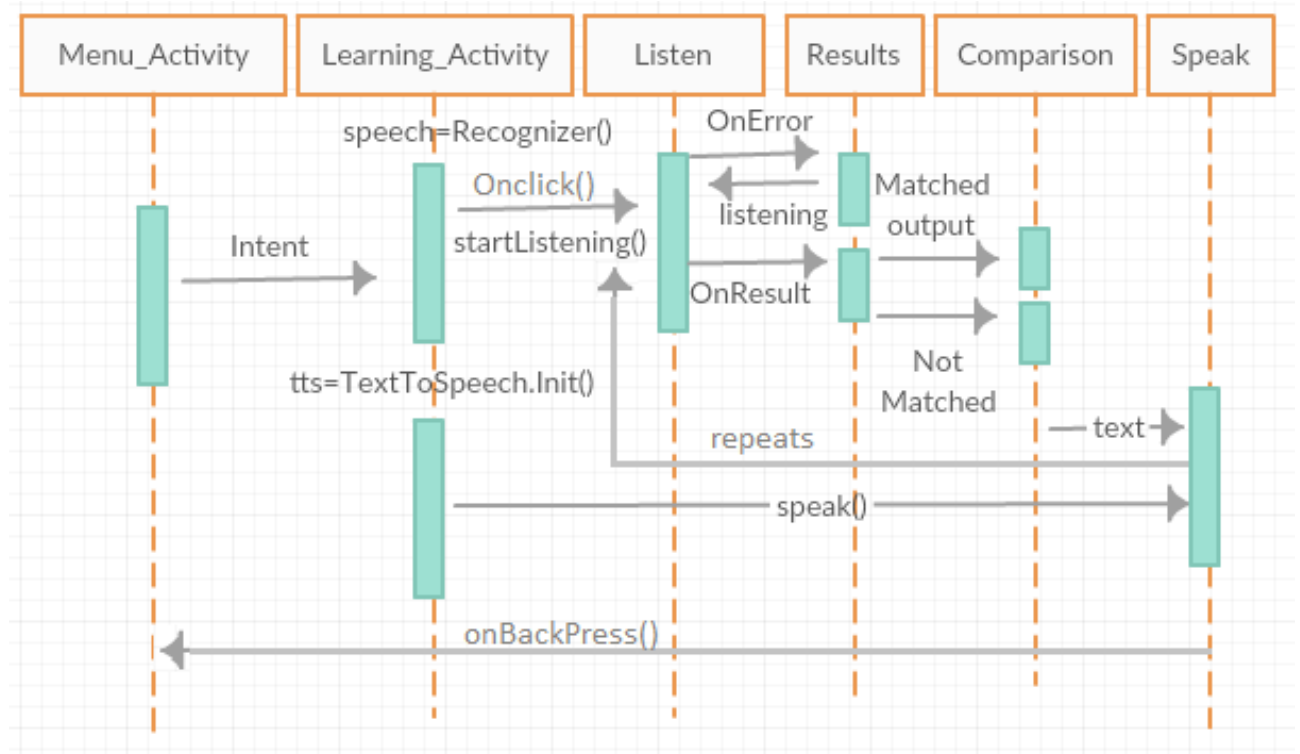


Figure 4.4: On create of Learning Activity SpeechRecognizer and TextToSpeech are initialized and Onclick of button invoke startListening() and produce results. OnError again startListening() is called and onResult comparison is done and response is done accordingly. This repeats Onclick() of button

4.4.2 Quiz Phase Sequence Diagram

Menu activity leads to Quiz activity through intent. Application starts listen to user, sets random alphabet image, compare the results. If user is right application speaks else show alphabet related thing, again listen to user, compare the results and speak accordingly.

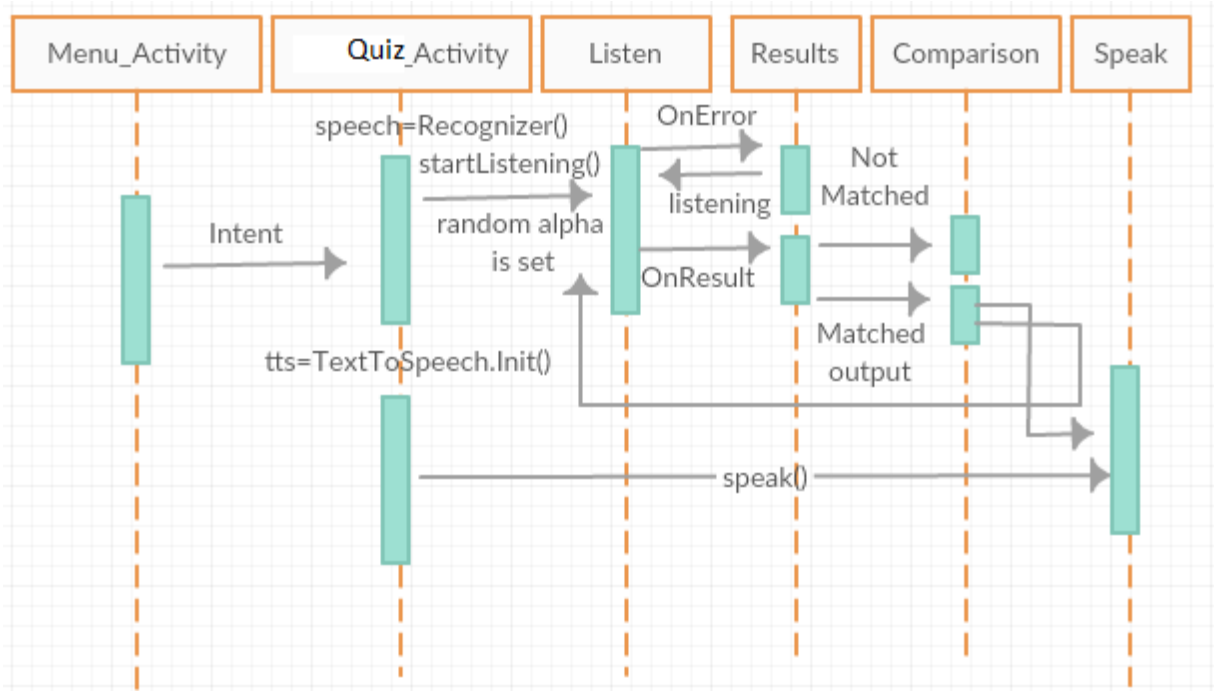


Figure 4.5: On create of Quiz Activity SpeechRecognizer and TextToSpeech are initialized, Random alphabet is shown and startListening() to kid and produce results. OnError again startListening() is called and onResult comparison is done. If application gets expected input it speaks else shown with alphabet related thing.

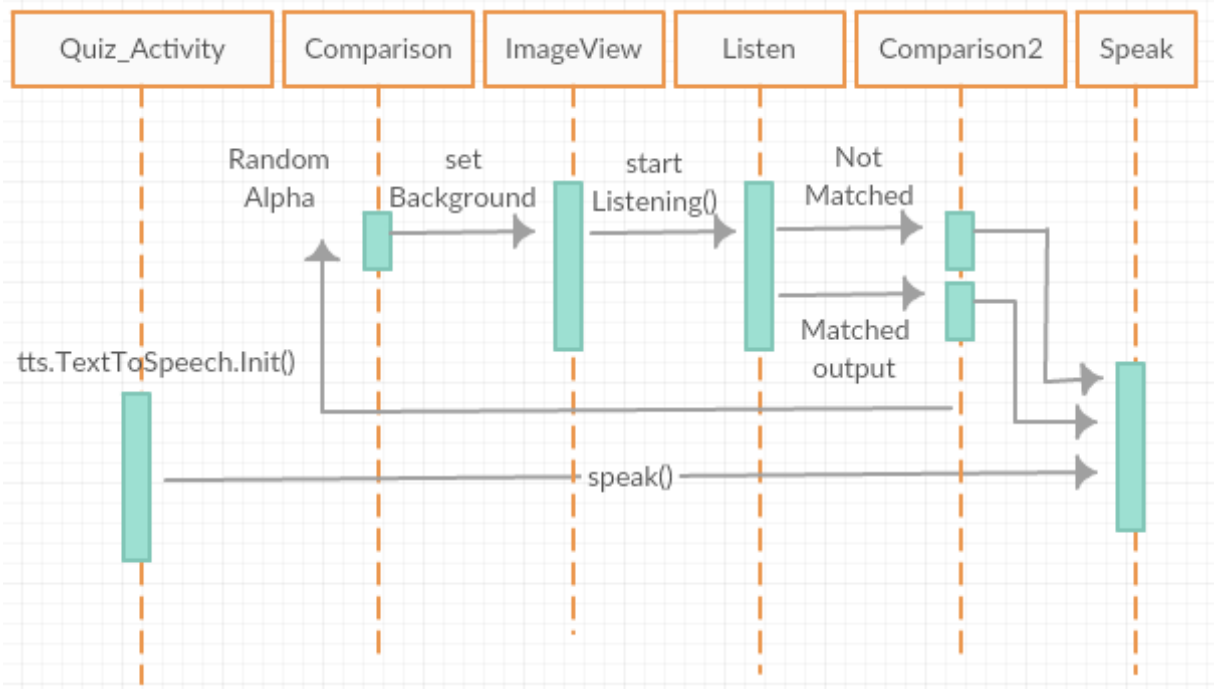


Figure 4.6: After setting alphabet related thing again startListening() to kid and onResults comparison2 is done and application speaks accordingly.

4.4.3 Bubble Game Sequence Diagram

Menu activity leads to Bubble game through intent. Animations of bubbles and random alphabet and thing related to that is shown on guess board. If kid clicks right bubble he get scores. If kid miss 3 chances scores are shown on score activity.

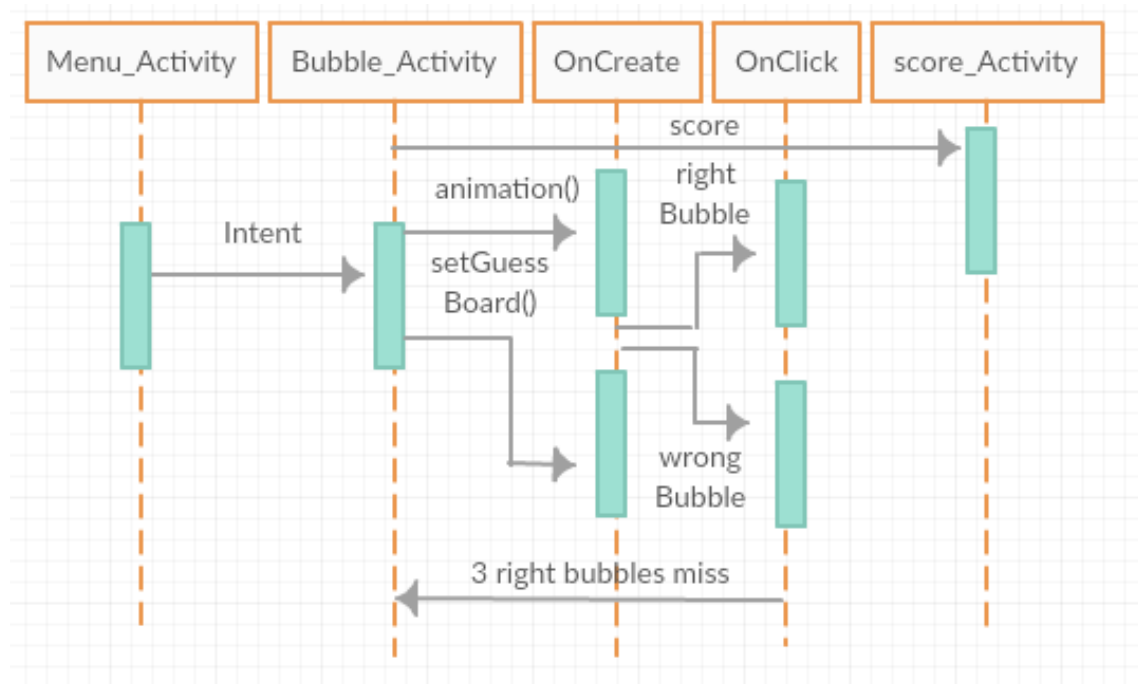


Figure 4.7: Oncreate of activity animations of bubbles are set along with setting guess board. If user clicks bubble with text shown on guess board he gets score else he loose chance. If he misses 3 chances score activity is shown.

4.4.4 Exit Sequence Diagram

On click of exit button of Menu, confirmation dialog is shown. If user confirm that he wants to leave by clicking "Yes" application exits.

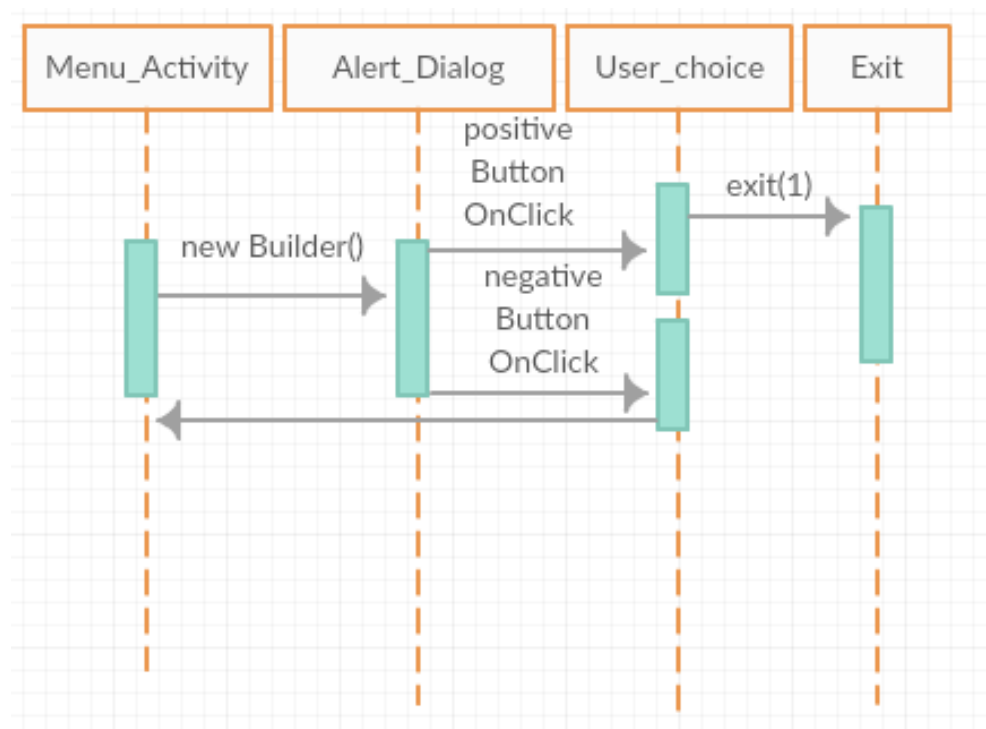


Figure 4.8: Exit button on Menu shows `AlertDialog` by `Builder`. If user clicks Yes application exits.

4.5 Class Diagrams

Class diagram in the Unified Modeling Language (UML) is static structure diagram that explains the overall system by showing the system's classes, (private, public and protected) attributes, functions (or operations), and entities relationship.

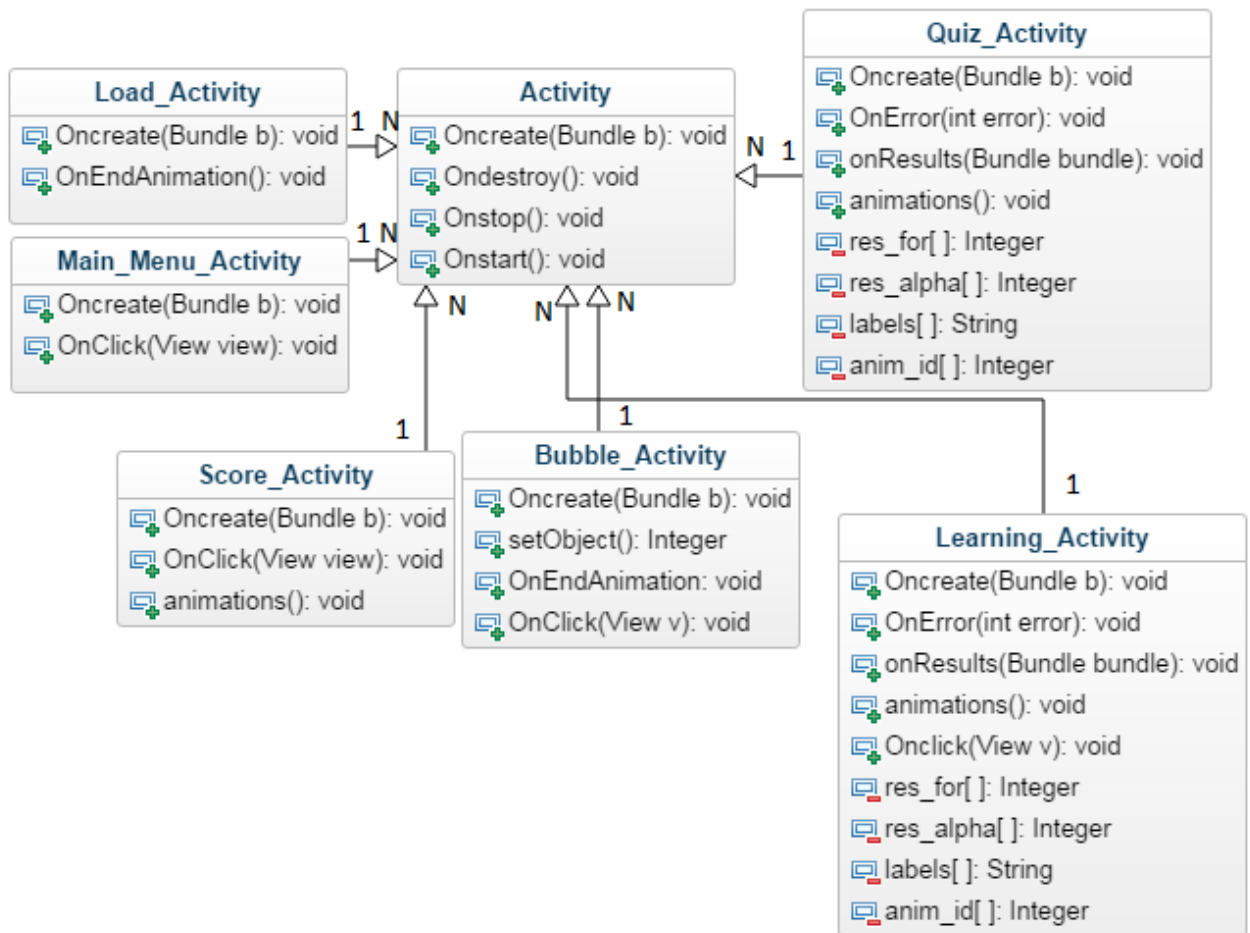


Figure 4.9: Activity is parent class of Load, Score, Quiz, Learning and Bubble activities.

4.6 Activity Diagrams

Activity diagram in UML explains dynamic structure of system. It is basically a pseudo code to represent the flow between activities. Activity is event or operation.

4.6.1 Main Menu Activity Diagram

Loading activity calls Main menu which can call learning, Quiz, Bubble or Exit.

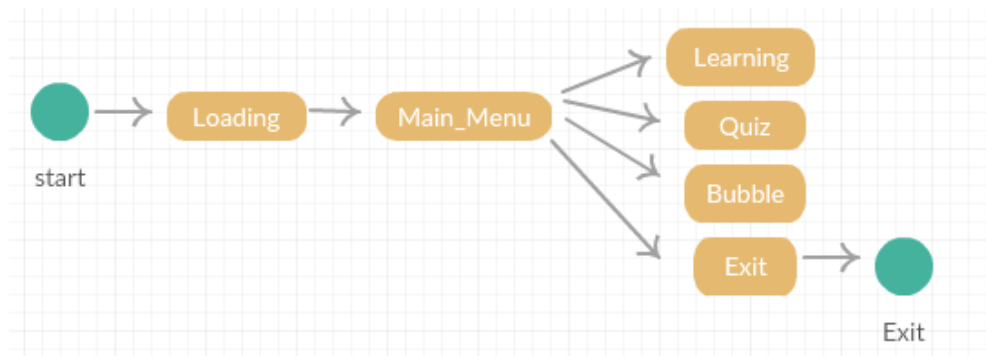


Figure 4.10: Sequence of processes is from loading to Main menu and then can go to any of four options i-e learning, Quiz, Bubble and Exit.

4.6.2 learning phase Activity Diagram

When character is clicked character first speaks and then listen to user. If user is right the character speaks "right" else "wrong".

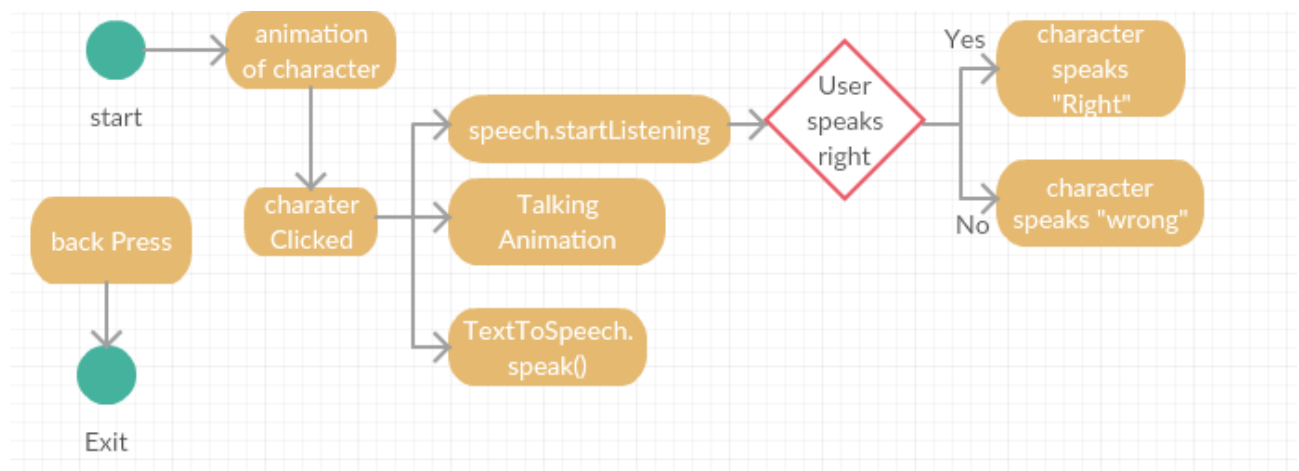


Figure 4.11: Starts with animation of character. When character clicked speech.startListening, Talking Animation of character and speak is done. If user speaks "right" character speaks right else "wrong"

4.6.3 Quiz phase Activity Diagram

On start, animating character, random alphabet is shown and application starts listen to user. If user speaks wrong alphabet related gif is shown and again listen to user. On right answer character speaks "right".

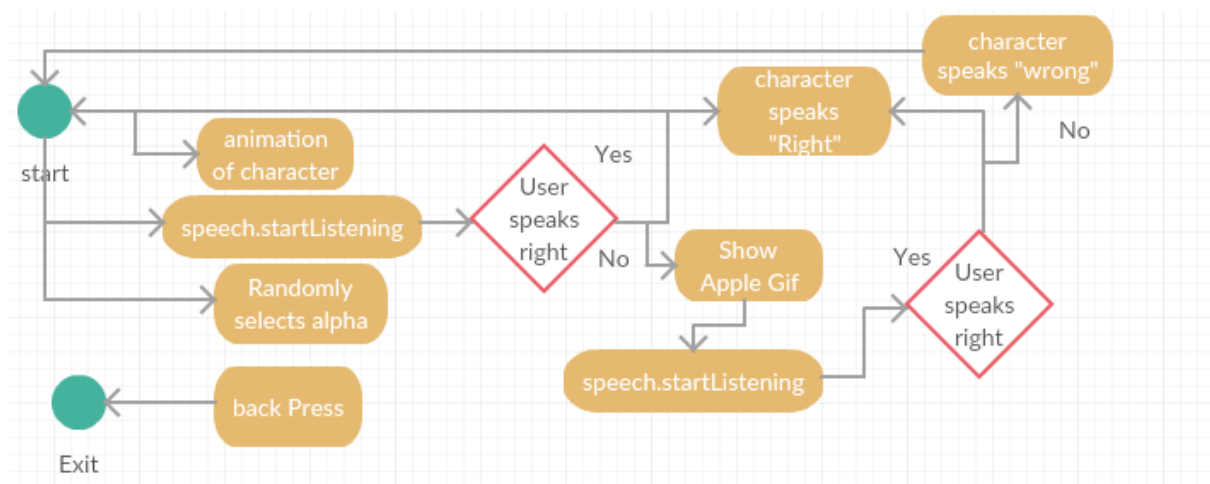


Figure 4.12: When Quiz Activity starts random alphabet is shown, character animates and listen to user. If user speaks right character speaks else show alphabet related gif and again start listen to user. Character speaks according to user input.

4.6.4 Bubble Game Activity Diagram

Random alphabet is shown on guess board along with bubbles animation. If user clicks right bubble he got scores. Scores are shown on Score activity if user misses 3 chances.

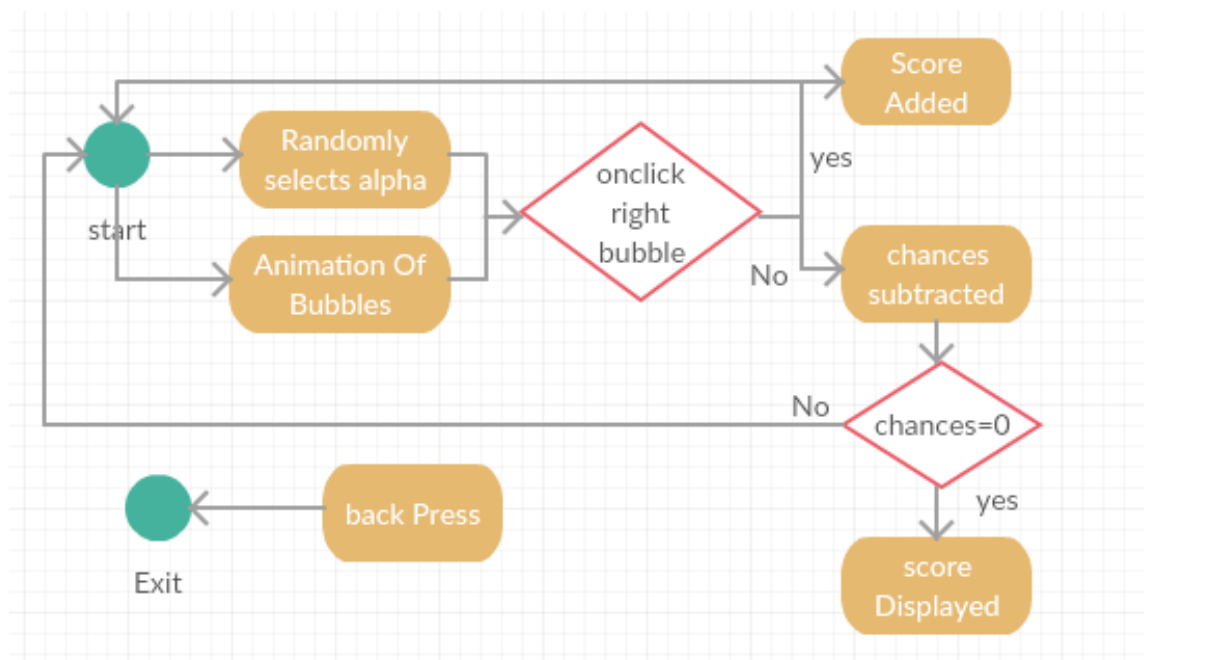


Figure 4.13: On start random alphabet is shown on guess board and bubbles start animating. if user clicks right bubble scores added else chances subtracted. If chances reaches to zero Score activity is shown.

4.7 Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated.

4.7.1 Level 0

Level 0 of DFD diagram, a simple representation of the whole system. As application is Android based so we have activities which are called and results are stored in shared preferences.

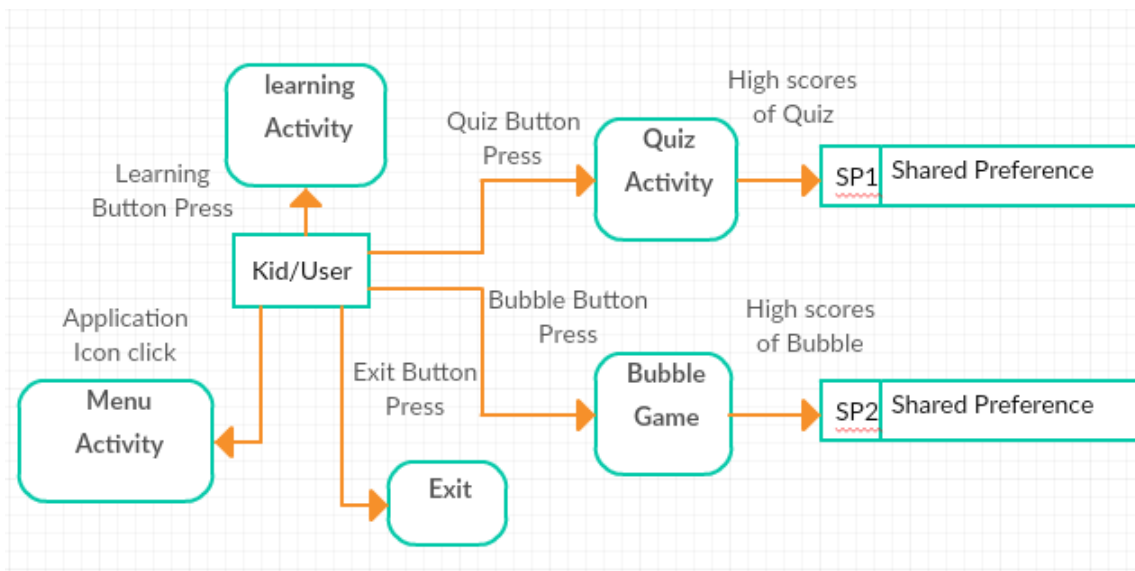


Figure 4.14: Kid/User can go to any of activity by clicking on respective buttons. High scores of Quiz and Bubble game is stored in shared preferences of their own.

4.7.2 Level 1

To elaborate further from level 0, we drill down to a level 1 diagram with lower level functions decomposed from the major functions of the system.

4.7.2.1 Menu DFD

When kid open the application loading screen is shown which opens up menu automatically.

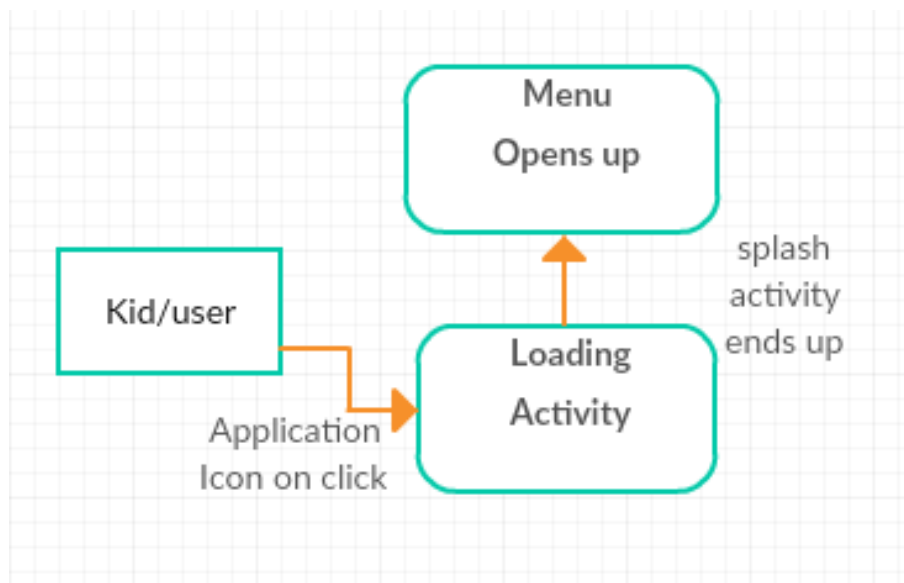


Figure 4.15: On click of application icon loading activity is shown. When splash activity ends up Menu opens up.

4.7.2.2 Learning DFD

When kid or user clicks character, character speaks and start listen to user. Gifs setting is changed when next or back buttons are clicked.

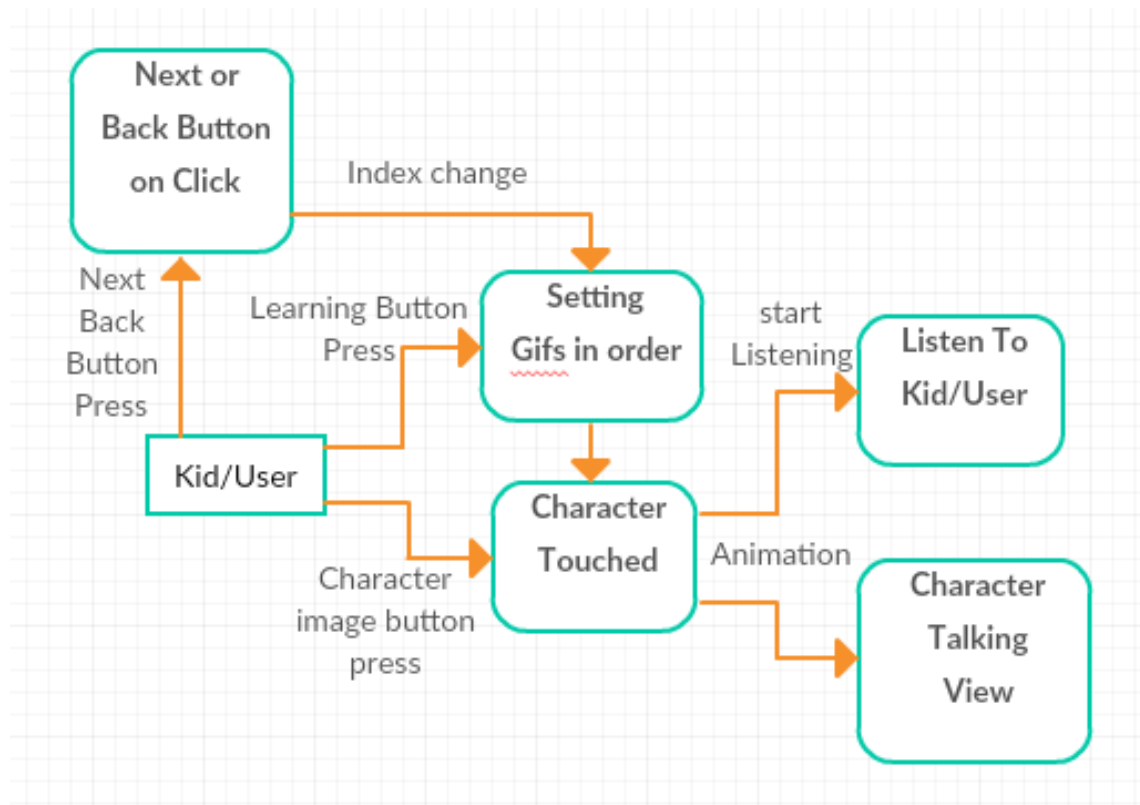


Figure 4.16: On create of learning activity gifs are set. When character is clicked, application start listen to user and character talking animation starts. When next or back buttons are clicked, index change and gifs are set accordingly.

4.7.2.3 Quiz DFD

On create of Quiz activity, random gifs are set and start listen to user/kid. If user is able to speak right scores are added. Scores are then compared to high scores stored in shared preferences. If scores are more then update shared preferences.

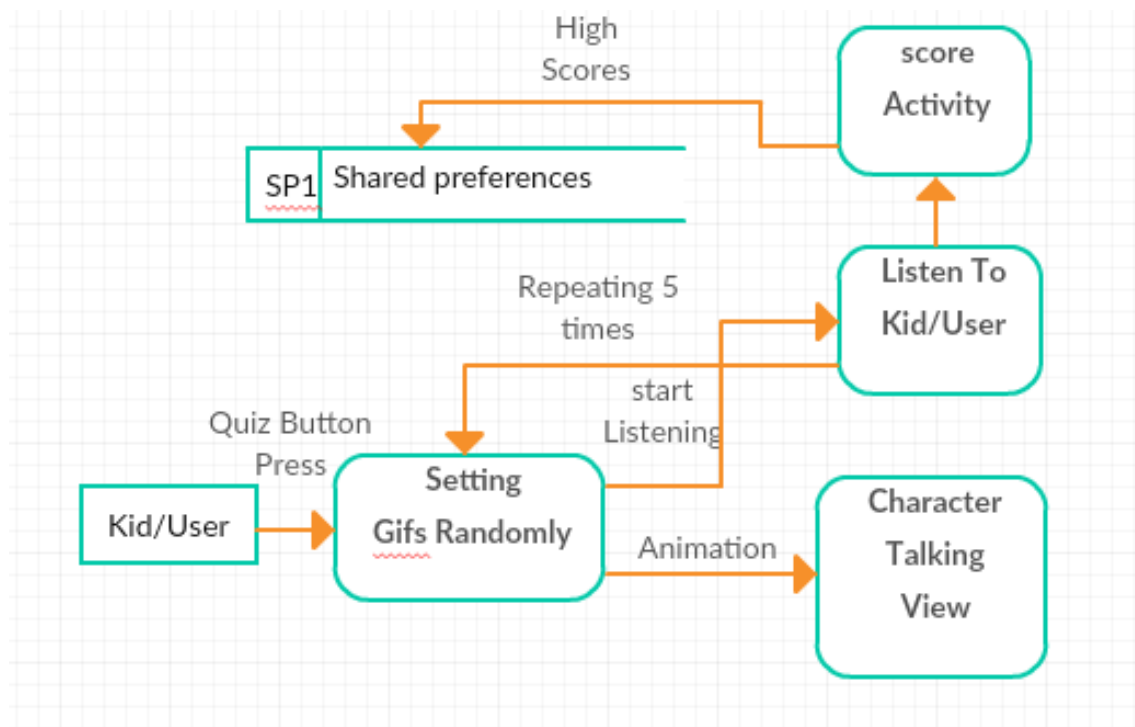


Figure 4.17: Gifs are set randomly and start listen to user and compare the results. This repeats 5 times and at end score activity is shown with scores.

4.7.2.4 Bubble DFD

On create of Bubble game, random gifs are set and start animation of bubbles. If user is able to click right bubbles scores are added. Scores are then compared to high scores stored in shared preferences. If scores are more then update shared preferences.

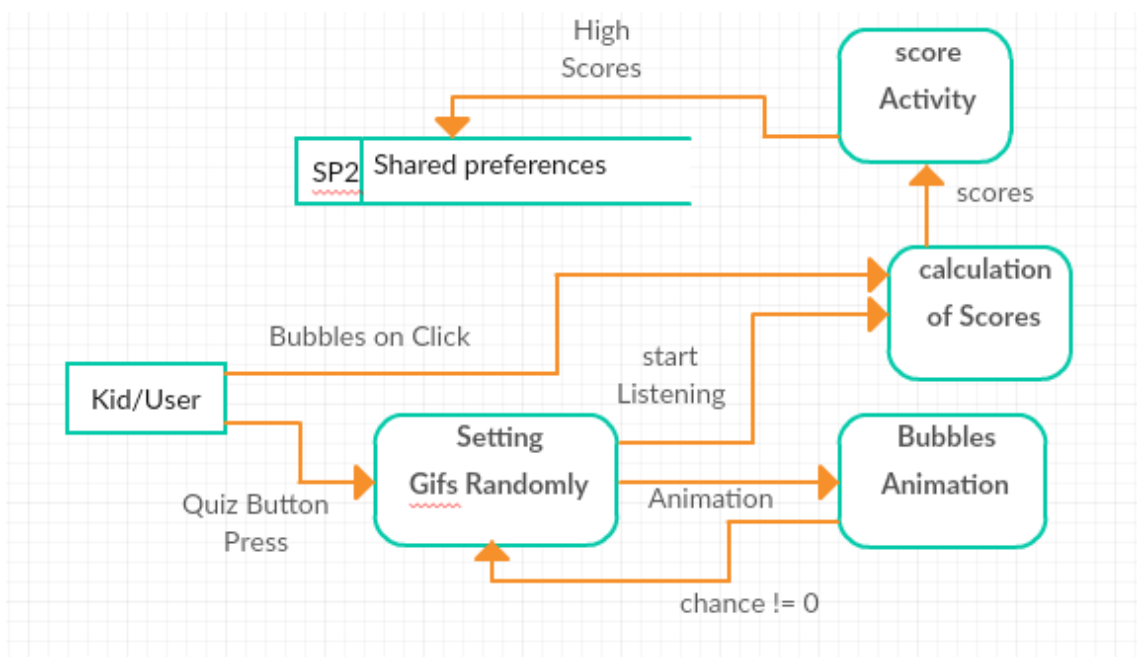


Figure 4.18: Bubbles are animating with set guess board with random alphabet gif. Scores are calculated if user clicks right bubbles.

4.7.2.5 Exit DFD

If kid/user wants to exit application he is shown with confirmation dialog box.

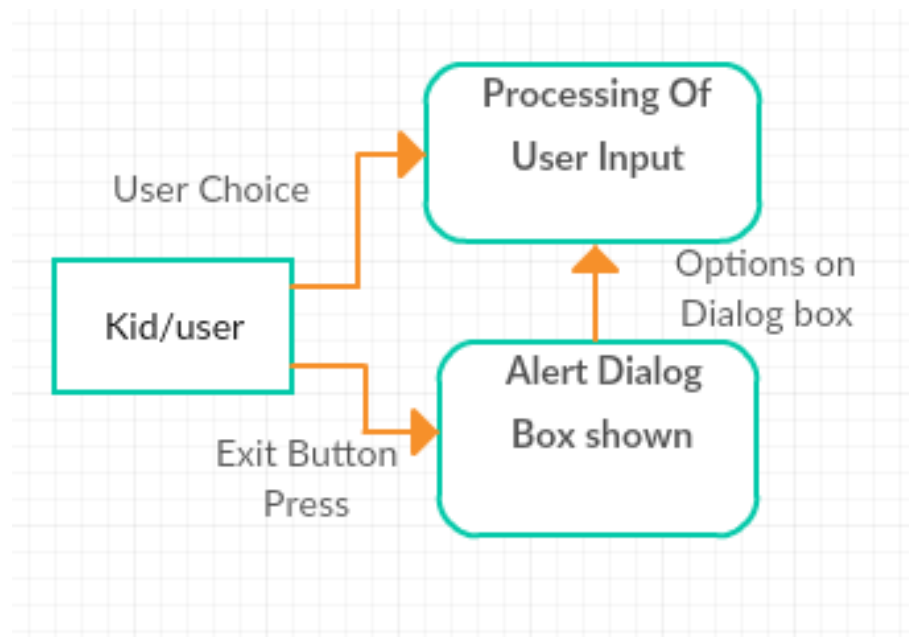


Figure 4.19: Alert dialog box is shown if user confirms the exit then application exits.

4.7.3 Data Dictionary

4.7.3.1 Documenting The External Entities

Entity 1 Entity name : user

Description: User can go to any of the learning, quiz activity, bubble games or exit application.

Alternate name(s) : Kid

Input data flows : User can press buttons or speak out.

Output data flows : corresponding handlers deals with user action accordingly.

4.7.3.2 Documenting The Process

Process number : 1

Process name or label : Menu Activity

Process description : User when clicked the app icon splash activity leads to menu activity.

Process number : 2

Process name or label : Learning Activity

Process description : When learning Button is clicked from menu Gifs are set. Character touched leads to start listening to user and Animation of character. Next or Back button on click set the Gifs of next or previous alphabet accordingly.

Process number : 3

Process name or label : Quiz Activity

Process description : When quiz Button is clicked from menu Gifs are set randomly. Application start listen to user and Animation of character is set. This repeats 5 times and then scores are shown in score Activity.

Process number : 4

Process name or label : Bubble Activity

Process description : When bubble Button is clicked from menu Gifs are set randomly and bubbles start animating. When user click Bubbles, scores are calculated. If chances are over scores are shown in score Activity.

Process number : 5

Process name or label : Exit

Process description : When bubble Button is clicked from menu alert dialog box is shown. If yes press application exit else menu activity is shown.

4.7.3.3 Documenting The Data Stores

Data store ID : SP1

Description : High scores of quiz activity is stored.

Aliases : shared preference of quiz

Attributes : key value pair is stored and can be edited when scores becomes more then stored value.

Data store ID : SP2

Description : High scores of bubbles game is stored.

Aliases : shared preference of bubbles

Attributes : key value pair is stored and can be edited when scores becomes more then stored value.

Chapter 5

System Implementation

“e-learning for Kindergarten kids” is android based learning application implemented using Android Studio.

5.1 Tools and Technology Used

5.1.1 Android Studio

It is used for basic development of application. The official IDE for Android. Android Studio is a best tool for building android applications. Provided with debugging, editing, building. Easy deployment and performance checking characteristics. Android studio will be In view of IntelliJ IDEA, which does every last one of purpose that shroud for ADT plug-in do, for ton additional extra offers. The beginning adaptation for Android studio offers.

- Gradle-based build support.
- Android-specific refactoring and quick fixes
- Lint tools for better performance.
- ProGuard and app-signing capabilities
- Template-based wizards.

5.1.2 Photo Shop

Adobe Photoshop might have been initially made Concerning illustration a advantageous What’s more capable path to modify photographs. Its mossycup oak fundamental Characteristics incorporate undoubtedly cropping What’s more straightening photographs that

were Possibly scanned mineral brought with a computerized Polaroid. Under- alternately overexposed photographs could make effortlessly saved for the modify force of the Polaroid crude Furthermore other plug-ins. Photographs taken Previously, was troublesome lighting circumstances camwood a chance to be idealized Eventually Tom's perusing a couple clicks of a mouse. Filters and plug-ins camwood a chance to be used to aggravate the picture appear to be of age or change should dark and white. It is used for images dealing out i-e for resizing, background removal and user interface designing.

5.1.3 Crazy Talk

The rich implant content library, you camwood likewise decide to extend your outline possessions from the well-themed add-on content packs that might accelerate your preparation All the more proficiently. Previously, CrazyTalk Animator's Marketplace, you likewise might get nothing reward content download, alternately get huge varieties of community oriented assets starting with worldwide 2D specialists. For extracting images of animated character.

5.1.4 Android Phone

For deploying application and testing.

5.2 Processing Logic

Android studio is used java based for functionality and user interface xml.

5.2.1 Loading Activity

On end of animation loading activity moves to main menu activity.

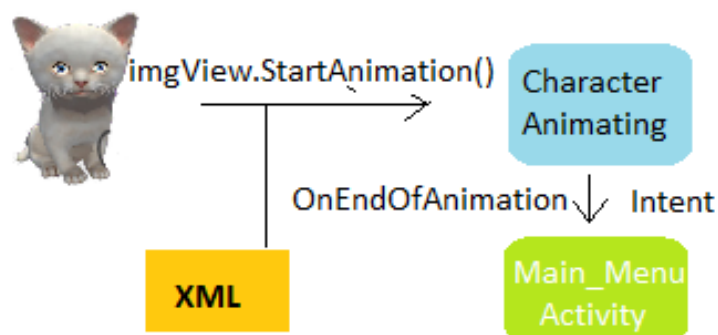


Figure 5.1: Imageview.startAnimation() runs the animation set of items in XML and onEndOfAnimation() Intent is called for Main menu Activity.

5.2.2 Main Menu Activity

4 Image Buttons are used

- Learning button on click opens learning activity.
- Quiz button on click opens Quiz activity.
- Bubbles button on click opens Bubbles activity.
- Exit button on click asks for confirmation and then exit if user press OK.

Through Intent.

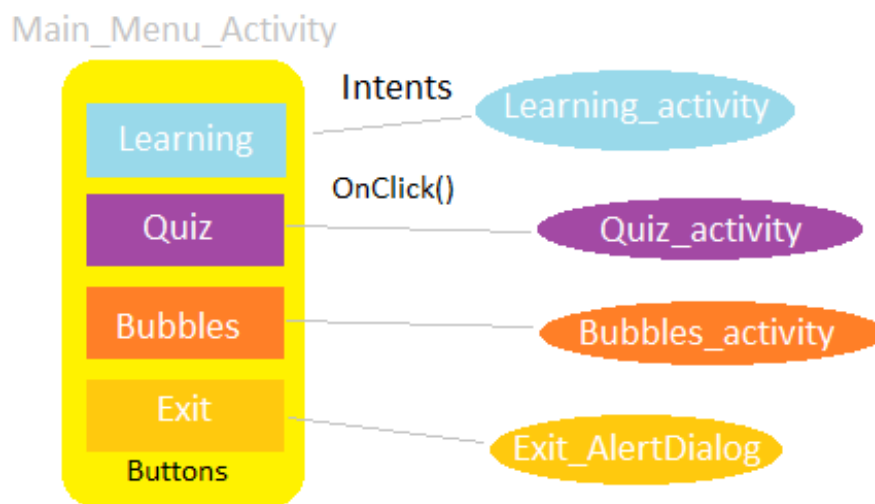


Figure 5.2: Button onClick() opens respective activity through Intent.

5.2.3 Learning Activity

TextToSpeech object for converting text to speech and SpeechRecognizer for speech to text.

Setting image Views of alphabets When next or back arrow button are pressed respective alphabet is displayed with related gif by simply indexing arrays accordingly. Gifs are set in web View by using html files for each gif. [7]

Setting Character Animation For character talking animations we made images of talk by using crazyTalk tool and process those images accordingly. Xml file is made for every animation and run by using imageView.post method casted with AnimationDrawable. [8]

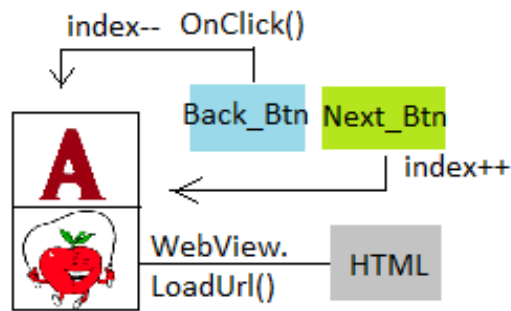


Figure 5.3: Gifs are set in webView by loadUrl function which is given Html file as arguments. On next button click index is incremented. On back button click index is decremented.

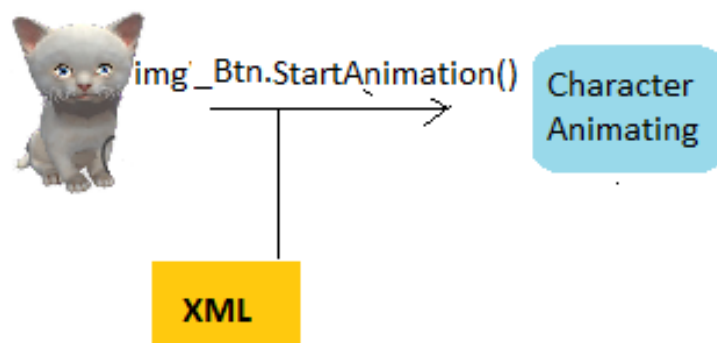


Figure 5.4: ImageButton.startAnimation() uses Xml file (animation set have items i-e images).

When Character is clicked Character should first speak (i-e animation and voice) and after that start listening to user all results are send in form of bundle in OnResult() and the results are then checked if it is what kid is expected to say if yes character speak “right” else “wrong”.

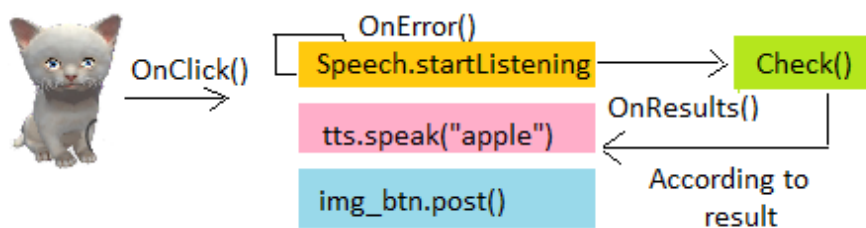


Figure 5.5: Onclick() of character speech.startListening(), tts.speak(), imgbtn.post() method is used for animation of character. OnResults check() is called and according to results application speaks.

5.2.4 Quiz Activity

Random Alphabet Selection Alphabet is selected randomly and set to image view and start listening user response if user is not able to respond then image related gif is shown

and then character speak “wrong” else “right” and choose another random alphabet. Kid has to guess 5 alphabet and they are not repeating.

Calculation of scores If kid speaks expected answer early he will have more scores. Score activity is displayed with scores there at time out of last alphabet.

Character Animation Character is animating same as using XMLs side by side.

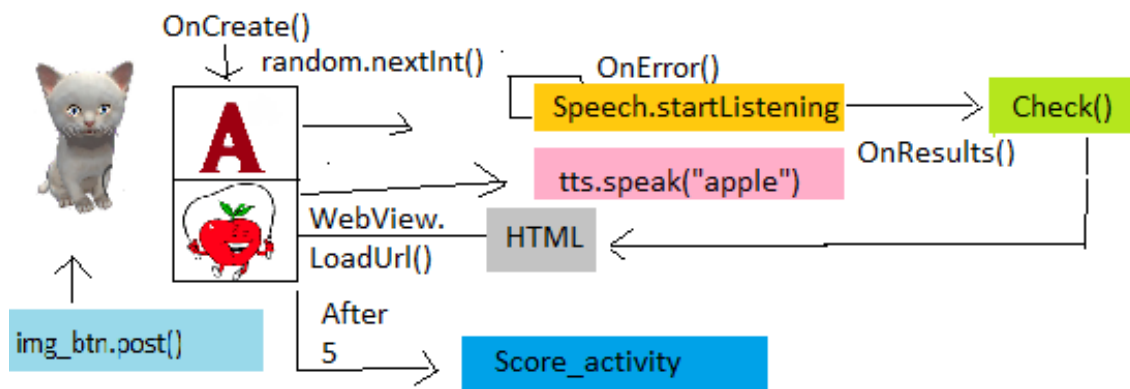


Figure 5.6: Random alphabet gif is selected with character animation and scores are calculated accordingly.

5.2.5 Bubbles Activity

Random guess board is set Random alpha is set with related gif which are change after one animation is complete of bubbles.

Random Text On Bubbles Randomly text is set on 5 image buttons having bubble images. Such that every second button have alpha which is set on guess board.

Animations of Bubbles Bubbles are animating by using XML having animation set. That Xml is associated by using Animation class.

Calculation of scores User have to click buttons having bubbles and scores are calculated accordingly and shown in score activity after missing of 3 bubbles.

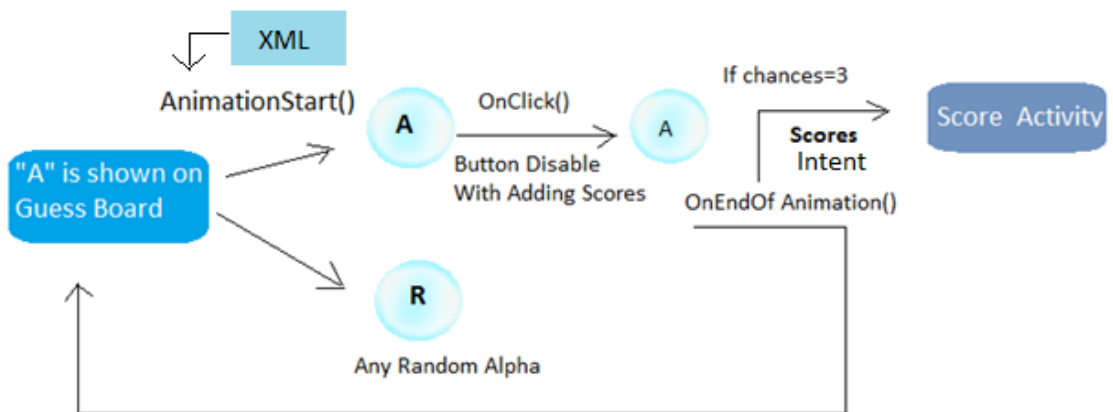


Figure 5.7: Random gif is set on guess board and random text on bubbles is set. Onclick of bubbles scores are calculated.

5.2.6 Exit

AlertDialog.Builder is used for confirmation on positive Button click system.exit(1) else nothing happens

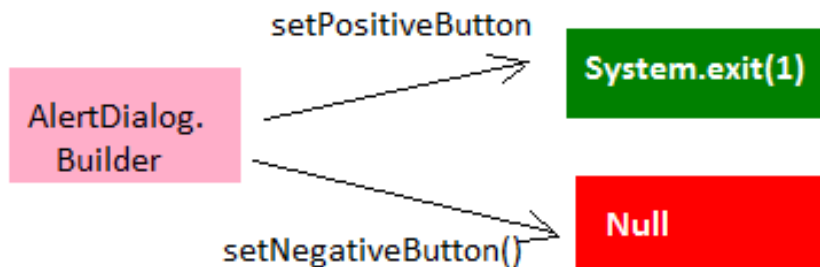


Figure 5.8: AlertDialog.Builder() creates dialog with positive button click exits(1) else nothing happens.

Chapter 6

System Testing and Evaluation

6.1 Introduction

We follow iterative approach for building the project and use bottom up approach for testing. So each module is tested i-e unit testing. After integration of module integration tests are done. When application is developed it is tested as whole i-e system testing. We are going to perform functional testing for basic functionality. As the project is android base game so it must have user friendly and catchy interface, to achieve so we perform interface and usability tests. Black box and white box testing techniques are used where required.

6.2 Objectives And Tasks

The purpose of game is making learning easy for child. We want to test the functionality of application and each module. Make our application interface catchy and attractive. As kid is the user so it is easy to use and appealing. Basic tasks are :

- Learning Activity Testing.
- Quiz Activity Testing.
- Bubble Game Testing.
- Exit Testing.

6.3 Testing Strategy

6.3.1 Unit Testing

Unit testing is a software development process in which units (smallest independent module), are tested. Testing technique can be performed manually or automatically. Testing of all modules.

6.3.2 Integration Testing

Integration testing is the phase in software testing in which units are combined and tested. It is performed when units are tested. Integration of every module results in expected results.

6.3.3 System Testing

System Testing is software testing in which integrated software is tested. It is performed to evaluate the system requirements. Done when whole system is complete and integration testing was performed. As whole the project is running fine.

6.3.4 Blackbox Testing

Black-box testing examines the functionality of an application without going into code and internal working. Just checking the output which we get at a certain input. We tested our project on valid and invalid inputs and check the output after completion of module.

6.3.5 Whitebox Testing

White Box Testing involves the detail testing in which tester has to go into the code and check the overall flow. We tested each module by running code and observe output at every point.

6.3.6 Compatibility Testing

Compatibility testing is used to ensure compatibility of the application with different hardware platforms. We have tested application on different android versions it is good for jellybean and above all versions and different sizes.

6.3.7 Usability Testing

Usability testing is a way in which application is tested by end user. To get user feedback and where they got confusions. What they want is actually what build and easy to use,

fun to use and learn ability. By checking other applications we made application interface usable. Tested by different users.

6.3.8 Interface Testing

Interface Testing is performed to test whether application or modules communicate correctly. It is to verify the interaction between modules. All things are running fine all buttons and flow of application.

6.3.9 Installation Testing

Installation testing is a kind of quality assurance work in the software industry that focuses on what customers will need to do to install and set up the new software successfully. Tested after uninstalling and then installing.

6.4 Test Cases

6.4.1 Learning Activity Test Cases

Test Case	Description	Procedure	Expected Result
<u>TC1-01</u> Setting web Views of alphabets	Alphabets and related thing gifs are displayed on web views	When activity loads "A" and Apple gif should be shown.	Gifs with alpha A are displayed When activity loads.
		When next or back arrow button are pressed respective alphabet is displayed with related gif.	On next button click next alpha is shown. On back Button click previous alpha is shown.
<u>TC1-02</u> Setting Character Animation	Character should Animate as idle Or talking animation	When nothing is done by user character idle animations displayed.	Idle animation When user do nothing
		When character clicked talking animations.	Talking animation when character clicked.

<p><u>TC1-03</u> When Character is clicked</p>	<p>Character should first speak and start listen to user and check if user is right.</p>	<p><u>Character speak.</u></p>	<p>Character should speak as well as talking animation.</p>
		<p><u>Start listen to user.</u></p>	<p>Start listening to user and get results.</p>
		<p>Verify user input.</p>	<p>If result matches character speak "right" Else "wrong".</p>

Figure 6.1: explains the test cases of Learning activity module.

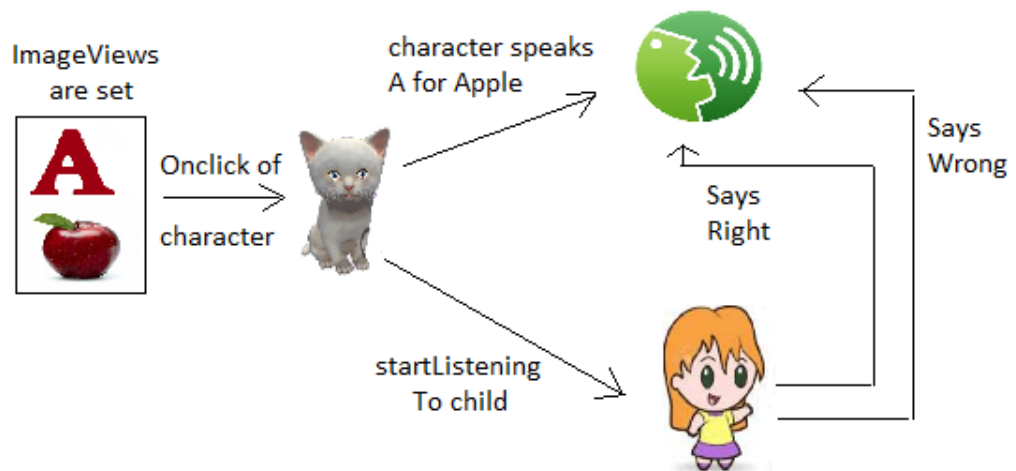


Figure 6.2: Correct gifs should be set, character should animate, comparison and response should be right on speech of kid/user.

6.4.2 Quiz Activity Test Cases

Test Case	Description	Procedure	Expected Result
TC2-01 Random Alphabet Selection	Random Alphabet is selected and Gif of alpha is displayed on start activity.	Quiz activity loads with random alpha.	Random alpha gif is displayed.
		When one alpha is Gussed again load with random alpha.	Random alpha display which is not shown before.
TC2-02 Listening user	Start listening to user.	Start Listen to user.	StartListen to user brings right results.
TC2-03 Calculation of scores	Results of user speech are compared and scores are calculated.	User guess right, Scores are added according to time.	In first attempt scores should be 50 and then subtracted as 5 chances are given.
		Else no scores added.	On wrong guess, No scores added in total.

<u>TC2-04</u> Score Activity Opens	When 5 random alpha is shown to user scores are shown on score activity.	Score are passed to score activity as well compared with stored High scores.	Correct scores shown on score activity.
		If scores are more than high scores then High scores updated.	High score update should be when scores are more than High scores.
<u>TC2-04</u> Character Animation	Character should Animate as idle Or talking animation	Character should speak and animate.	On right answer animation and speak after third chance.

Figure 6.3: explains the test cases of Quiz activity module.

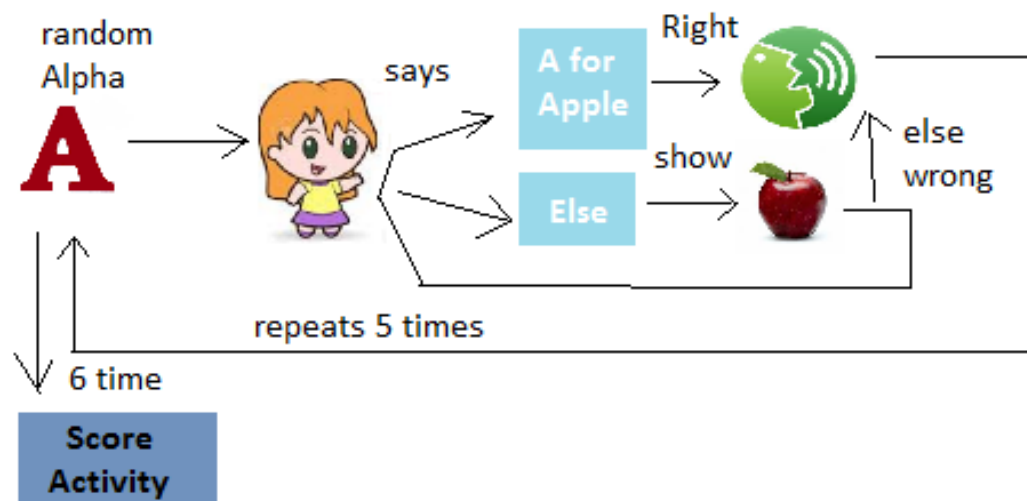


Figure 6.4: Random gifs should be set, character should animate, comparison and response should be right on speech of kid/user. After 5 alphabets correct scores should be passed to Score activity.

6.4.3 Bubble Game Test Cases

Test Case	Description	Procedure	Expected Result
<u>TC3-01</u> Random guess board is set	Random alpha is set with related gif which are change after one animation is complete of bubbles.	When activity opens random <u>alpha gif</u> is shown.	On create of Activity guess board should be <u>set</u> with alpha.
		When bubbles animation ends random alpha gif is shown.	On End of bubbles <u>Animation again</u> guess board is set.
<u>TC3-02</u> Random Text On Bubbles	Random Text is shown before start of <u>animation</u> .	Animating bubbles have alphabet as <u>text</u> .	At least 2 bubbles have same alpha as shown on <u>guess board</u> .

Test Case	Description	Procedure	Expected Result
TC3-01 Random guess board is set	Random alpha is set with related gif which are change after one animation is complete of bubbles.	When activity opens random alpha gif is shown.	On create of Activity guess board should be set with alpha.
		When bubbles animation ends random alpha gif is shown.	On End of bubbles Animation again guess board is set.
TC3-02 Random Text On Bubbles	Random Text is shown before start of animation.	Animating bubbles have alphabet as text.	At least 2 bubbles have same alpha as shown on guess board.

Figure 6.5: explains the test cases of Bubble Game module.

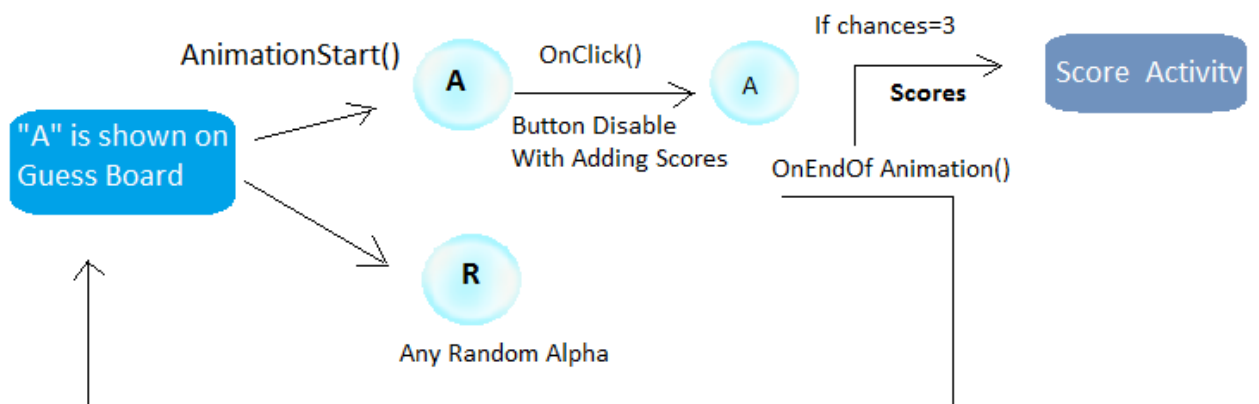


Figure 6.6: Bubbles should animate and correct scores should be passed to Score activity.

6.4.4 Exit Test Cases

Test Case	Description	Procedure	Expected Result
<u>TC4-01</u> Alert Dialog Box show	Exit button of menu shows dialog box.	When exit button from Menu is press opens Dialog box.	Exit button show dialog box.
<u>TC4-02</u> User Choice executes right	When positive button press application exit.	When Ok press application exit cancel shows menu activity.	Application exits on user confirmation

Figure 6.7: explains the test case of Exit module.

Chapter 7

Conclusion And Future Enhancements

We are able to develop interactive educational android application for kindergarten. Application teaches alphabets and things related to that. There are two games which are score based to check how much kid learns. Application is able to recognize user speech with 80 percent accuracy. Character is given emotions to give more natural look and feel to application. Character is also given speech feature as for kindergarten kids speaking thing is more attractive. Gifs and background music are set to give an attractive and catchy interface.

We have used android platform and study new concepts of natural language processing and animations in android. Passed meaningful time in grasping usage of tools i-e android studio, crazy talk and Photoshop. Learnt how to research and explore certain things and deal with errors. As our project is a team effort, we got skilled at how to divide and manage the workload. We done our project because of team effort, devotion and dedication. Throughout project take in planning, team coordination, developing personal attitude towards team work. Meeting deadlines given by supervisor gave us experience to manage our time effectively. Learnt about project life cycle like planning, designing, implementation, testing of each module, project management and testing strategies. During phase of project, all our experiences were luckily excellent. We conclude that “Time management is key thing for a successful project”.

The project can be made a complete product which cover the curriculum of KG. Other concepts can be taught to children with pre school such as verbs, shapes and phrases etc. Other than studies, applications can be given an additional features where user can do things by verbal contact rather than typing.

Appendix A

API Classes Description

TextToSpeech

```
public class TextToSpeech
```

```
extends Object
```

```
java.lang.Object
```

```
↳ android.speech.tts.TextToSpeech
```

interface	TextToSpeech.OnInitListener Interface definition of a callback to be invoked indicating the completion
------------------	---

of the TextToSpeech engine initialization.

```
TextToSpeech(Context context, TextToSpeech.OnInitListener listener)
```

The constructor for the TextToSpeech class, using the default TTS engine.

```
int
```

```
setLanguage(Locale loc)
```

Sets the text-to-speech language.

```
int
```

```
setPitch(float pitch)
```

Sets the speech pitch for the TextToSpeech

```
int
```

```
setSpeechRate(float speechRate)
```

Sets the speech rate.

```
int
```

```
speak(CharSequence text, int queueMode,  
Bundle params, String utteranceId)
```

Speaks the text using the specified queuing strategy and speech parameters, the text may be spanned with TtsSpans.

SpeechRecognizer

```
public class SpeechRecognizer
```

```
extends Object
```

```
java.lang.Object
```

```
↳ android.speech.SpeechRecognizer
```

<code>void</code>	<code>startListening(Intent recognizerIntent)</code> Starts listening for speech.
<code>void</code>	<code>stopListening()</code> Stops listening for speech.

<code>int</code>	<code>ERROR_CLIENT</code> Other client side errors.
<code>int</code>	<code>ERROR_INSUFFICIENT_PERMISSIONS</code> Insufficient permissions
<code>int</code>	<code>ERROR_NETWORK</code> Other network related errors.
<code>int</code>	<code>ERROR_NETWORK_TIMEOUT</code> Network operation timed out.
<code>int</code>	<code>ERROR_NO_MATCH</code> No recognition result matched.
<code>int</code>	<code>ERROR_RECOGNIZER_BUSY</code> RecognitionService busy.
<code>int</code>	<code>ERROR_SERVER</code> Server sends error status.
<code>int</code>	<code>ERROR_SPEECH_TIMEOUT</code> No speech input

Random

public class Random
 extends [Object](#) implements [Serializable](#)

[java.lang.Object](#)

↳ [java.util.Random](#)

▼ Known Direct Subclasses

[SecureRandom](#), [ThreadLocalRandom](#)

<code>int</code>	<code>nextInt(int n)</code> Returns a pseudorandom, uniformly distributed <code>int</code> value between 0 (inclusive) and the specified <code>n</code> (exclusive) of this random number generator's sequence.
------------------	--

AnimationDrawable

public class AnimationDrawable
 extends [DrawableContainer](#) implements [Runnable](#), [Animatable](#)

[java.lang.Object](#)

↳ [android.graphics.drawable.Drawable](#)

↳ [android.graphics.drawable.DrawableContainer](#)

↳ [android.graphics.drawable.AnimationDrawable](#)

XML attributes

<code>android:drawable</code>	Reference to a drawable resource to use for the frame.
<code>android:duration</code>	Amount of time (in milliseconds) to display this frame.
<code>android:oneshot</code>	If true, the animation will only run a single time and then stop.

<code>void</code>	<code>run()</code> This method exists for implementation purpose only and should not be called directly.
<code>void</code>	<code>setOneShot(boolean oneShot)</code> Sets whether the animation should play once or repeat.
<code>boolean</code>	<code>setVisible(boolean visible, boolean restart)</code> Sets whether this AnimationDrawable is visible.
<code>void</code>	<code>start()</code> Starts the animation from the first frame, looping if necessary.
<code>void</code>	<code>stop()</code> Stops the animation at the current frame.

Appendix B

User Manual

B.1 Scope And Purpose

It's an interactive application for Kindergarten Kids. Basic Purpose is to engage the kids in a meaningful way. It's game base learning which have three activities i-e learning , quiz and bubbles game.

B.2 Process Overview

This application is managing three activities and one basic main menu activity.

- Getting Started(Loading page)
- Welcome Page
- Main Menu
- Learning Activity
- Quiz Activity
- Bubbles Game

B.2.1 Getting Started(Loading page)

B.2.2 Welcome Page

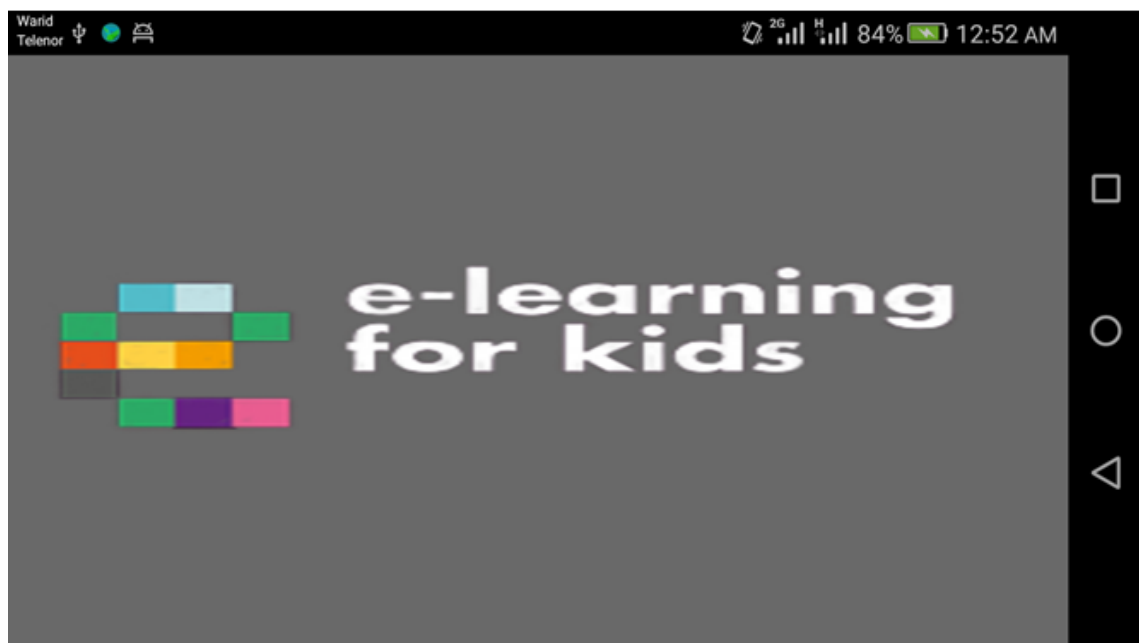


Figure B.1: Loading Manual

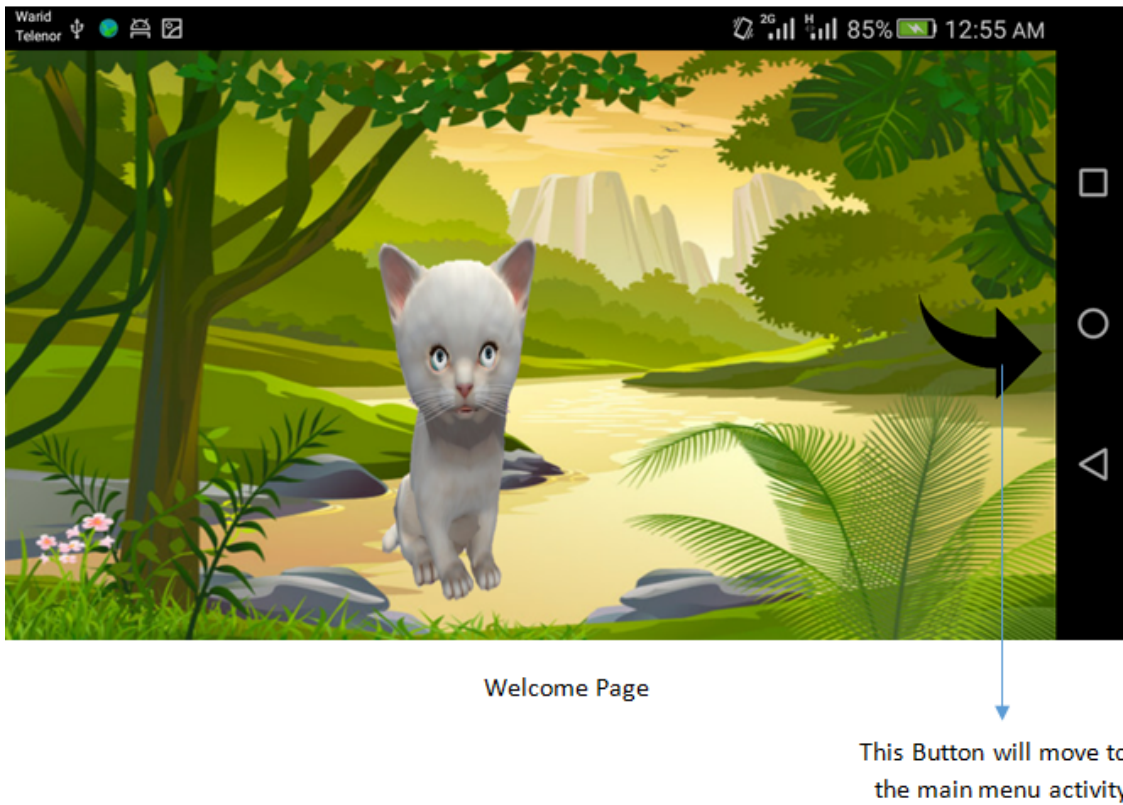


Figure B.2: Welcome Manual

B.2.3 Main Menu

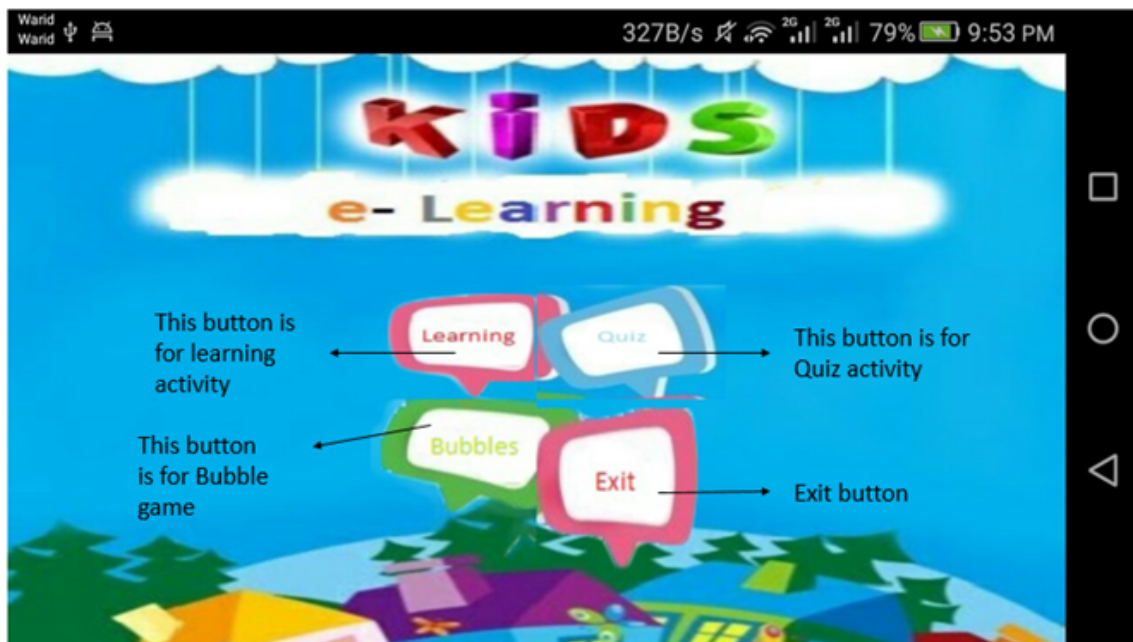


Figure B.3: Learning Manual

B.2.4 Learning Activity



Figure B.4: Learning Manual

B.2.5 Quiz Activity

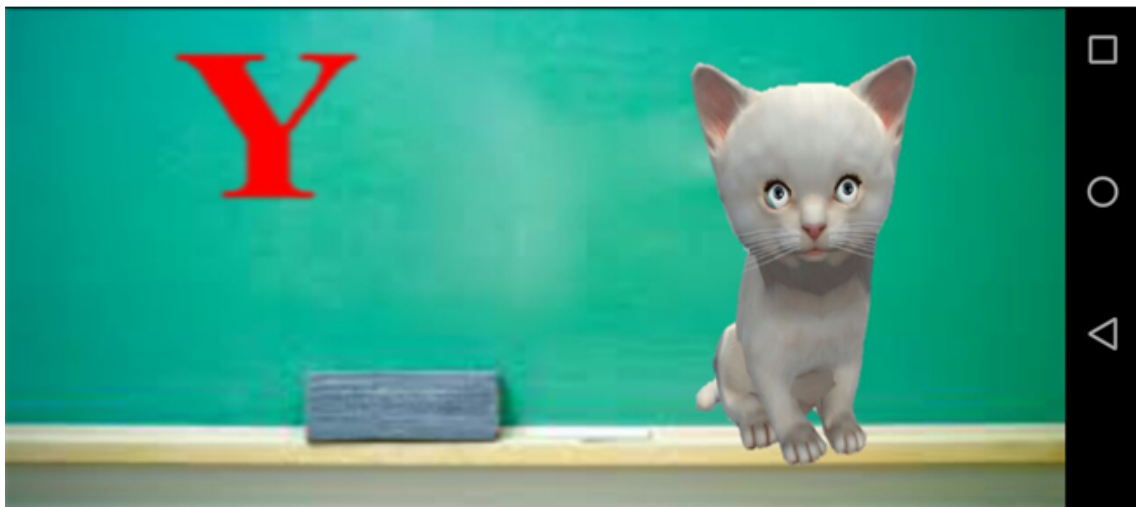


Figure B.5: Quiz Manual

B.2.6 Bubbles Game

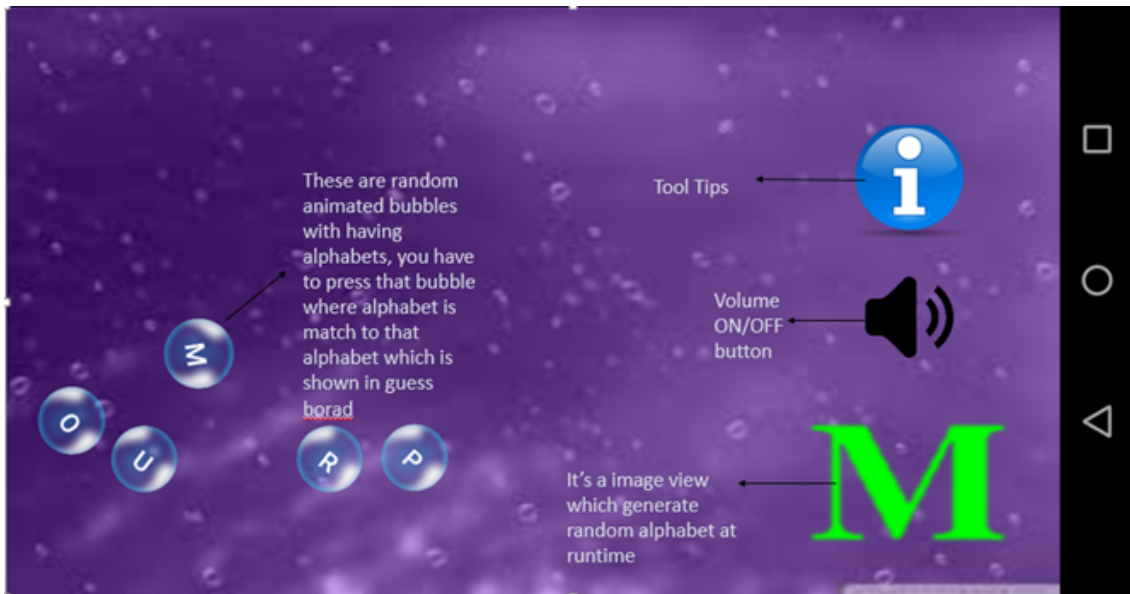


Figure B.6: Bubble Manual

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