Cool Int! Mobile Application for Android

by

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
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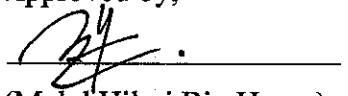


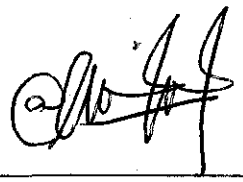
(Mohd Hilmi Bin Hasan)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
January 2006

SAMPLE OF CERTIFICATION OF ORIGINALITY

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



NUR ADAWIYAH BINTI RUSLI

Abstract

Cool Int! is a mobile application developed for Android mobile targeting kids between 4 :o 6 years old. Nowadays, kids at this age usually playing with their parents mobile and it would ıelp their mental development in learning mathematics if they are playing educational games ınstead of purely entertainment games. This study is done by analyzing real situation, conduct ;ome survey, and get some views based on journals. The development process uses combination ɔf software such as Adobe Photoshop, DroidDraw, Android SDK Tools, Eclipse and Java ɔrogramming language. The application is mainly to entertain kids in educated way by ıntroducing basic numbering, to test calculation capability of the kids, and all the challenges are livided according to difficulty level. Kids can only move to the higher level once they completed :alculating within the time given. It is designed interactively with colorful interfaces and ɔackground music. The main contribution of this project is it would entertain kids and at the ;ame time contribute to positive guidance which helps kids in their learning process with ıteractive ways, whereby it is proven attracting kids more than formal learning.

CHAPTER 1
INTRODUCTION

1.1 Background

Smartphone is a mobile phone that offers more advanced computing ability and connectivity than a contemporary feature phone [1]. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language [2]. In Malaysia, the trend of using Android has increase with more and more Smartphone users are using Android application such as Games, Books and References, Entertainment, Health and Fitness, Social Network, and also Google features such as Gmail and Google Maps.

Android software is available on their online store, Android Market, allows users to browse and download apps published by third-party developers, hosted on Android Market. As of November 2011 there were about 300,000 games, applications and widgets available on the Android Market, with an estimated more than seven billion total downloads [3].

This research focuses generally on the Android users, specifically parents' community. Kids learn technology at an amazingly fast rate nowadays. They are constantly texting, surfing the internet, playing video games, and calling using their parent's phone and latest trend is parent buying tablet PC for their kids to play. By

understanding the kids and their needs, an interesting learning can be made for them. They enjoy learning more when it is fun.

Interactive games appeal to kids because these games are visual, auditory, dynamic, and colorful [5]. They increase learning because kids will focus their attention and are much less likely to be distracted while playing them. Also, interactive games require active participation rather than passive listening and give kids immediate feedback. A good interactive computer game is a very effective teaching tool. Cool Int! is designed guided by learning theory proposed in Montessori method of education whereby it sets according to kids preferences, level of difficulties, and they can record their high scores for own reference.

1.2 Problem Statement

In this century where technology changes every second, the person that depends a lot on technology advancement is youngsters and working people. However, kids are also among the group that being impacted by this situation. There are various types of programs and applications developed to attract kids but not all of those are beneficial for kids' mind. It would be better for kids to play game that can assist in their mental development.

With the smart phone trend that is getting popular in Malaysia, kids are getting use to play with their parent's phone. They got no important purpose to use financial guide or organizer, therefore they usually using the games application. Most of the game applications are in terms of solely giving fun, so it would be very beneficial if

educational games are developed for them to have fun and also at the same time educating.

1.3 Objectives

The objectives of this project are:

- To develop a mobile application for kids 4-6 years old
- To create an interesting environment for learning process

1.4 Scope of Study

This research covers the learning theory for kids' age between 4 to 6 years old based on Montessori Method. It also to ensure that the interfaces develop is suitable for the kids' level. Furthermore, the application difficulties levels are according to kids' adeptness.

CHAPTER 2
LITERATURE REVIEW

2.1 Android Technology

Android is an open-source software stack for mobile devices that includes an operating system, middleware and key applications. Android's mobile operating system is based upon a modified version of the Linux kernel. Google and other members of the Open Handset Alliance collaborated on Android's development and release [7].

In a few years, it's expected to find Android inside millions of cell phones and other mobile devices, making Android a major platform for application developers. Android application to be used is Android 2.2 platform. It is widely use compared to version 2.3

An Android application consists the following parts [8]:

- Activity - Preview the presentation layer of an Android application, for example a screen which the user sees. An Android application can have several activities and it can be switched between them during runtime of the application.
- Views - The User interface of an Activity is build with widgets classes which inherent from "android.view.View". The layout of the views is managed by "android.view.ViewGroups".
- Services - perform background tasks without providing a user interface. They can notify the user via the notification framework in Android.

- Content Provider - provides data to applications, via a content provider, the application can share data with other applications. Android contains a SQLite DB which can serve as data provider.

Android uses a special virtual machine, for example the Dalvik Virtual Machine which is 2-5 times faster because of the Dalvik JIT compiler [9]. Dalvik uses special bytecode (Lars Vogel, 2009) [10] [11]. Therefore you cannot run standard Java bytecode on Android. Android provides a tool, dx, which allows converting Java Class files into "dex" (Dalvik Executable) files [12]. It is a trace-based JIT, compiling only hot code traces rather than method-at-a-time strategy typically found on server-class JITs. It attempts to minimize heap usage, and it requires no persistent storage [13]. The goal is to give a quick performance boost using very little heap and battery. The ADT performs automatically the conversion from class to dex files and creates the apk during deployment.

Android supports 2-D and 3-D graphics using the OpenGL libraries and supports data storage in a SQLite database. For the mobile storage, user can choose to store application on the SD card, or users can move the application from the SD card to internal storage.

Every Android applications runs in its own process and under its own user_id which is generated automatically by the Android system during deployment. Therefore the application is isolated from other running applications and a misbehaving application cannot easily harm other Android applications.

User experience, the advantages of Android:

"I chose Android for multiple reasons. First, it is built on the Linux kernel, an OS that I trust more than any other. Second, I like the syncing with Google.

When I have to replace the phone or I get a new one, I don't have to worry about my apps, calendar, or contacts. I just log into my Google account from the phone and my calendar and contacts are back. Then I go into the Android Market and all of the apps I had are listed and I just download them again.

It's convenient, it's powerful, and it's an open system."

(Mike Saxton, Science Fiction Author)

2.2 Learning and Learning Theory

Learning is the insatiable curiosity that drives the adolescent kids to absorb everything they can see or hear or read about gasoline engines in order to improve the efficiency and speed of his 'cruiser' [14].

Montessori practice is always up-to-date and dynamic because observation and the meeting of needs are continual and specific for each child. When physical, mental, and emotional needs are met children glow with excitement and a drive to play and work with enthusiasm, to learn, and to create. They exhibit a desire to teach, help, and care for others and for their environment. [15].

Therefore, based on Montessori education, a method of schooling that focuses on personal development rather than exams produces more mature, creative and socially adapt children [16]. For example, this includes a two-month-old baby learning to explore the environment with hands or eyes or a five-year-old learning how to do simple math problems.

In terms of learning, according to James Hartley (1998) four key principles come to the fore [17]:

- Activity is important. Learning is better when the learner is active rather than passive.
- Repetition, generalization and discrimination are important notions. Frequent practice and practice in varied contexts is necessary for learning to take place.
- Reinforcement is the cardinal motivator. Positive reinforces like rewards and successes are preferable to negative events like punishments and failures.
- Learning is helped when objectives are clear. Those who look to behaviorism in teaching will generally frame their activities by behavioral objectives.

Referring to those principles, when rote memorization is necessary, interactive games offer a tool that makes the memorization more effective. In addition, interactive games are more fun, but it really seems as if they are more fun because they promote more kids autonomy. The children control the ebb and flow of information rather than having a teacher do it. Moreover, interactive games make a good incentive for promoting children accountability in that they can be rewarded or rank their scores when they have fulfilled part of the task requirements.

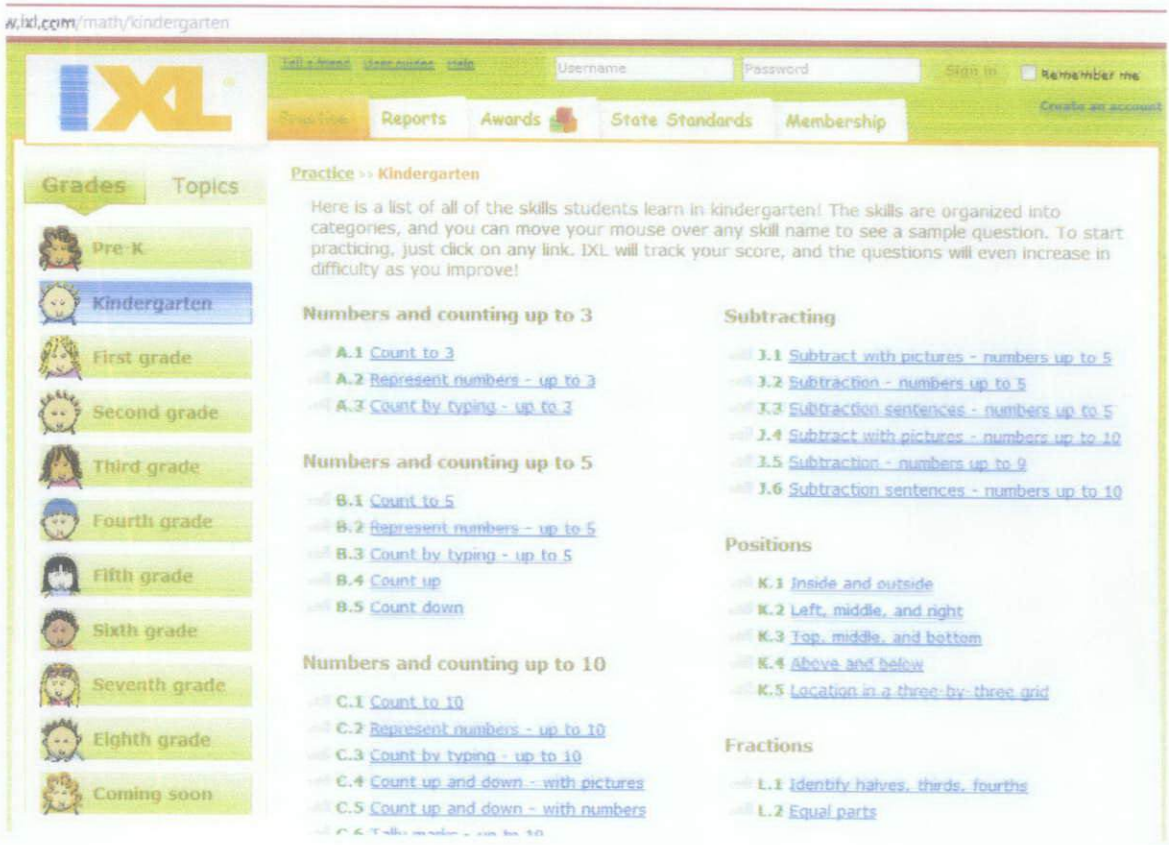
A common phenomenon is that new game ideas grow up with distinctive technology or novel equipments used in learning, and it also brings a challenge to educational games, how we could integrate games in lectures, exercises, day life with recent technologies, such as 3G to enrich the teaching or training environment and achieve better learning life. [18]

2.3 Related Works

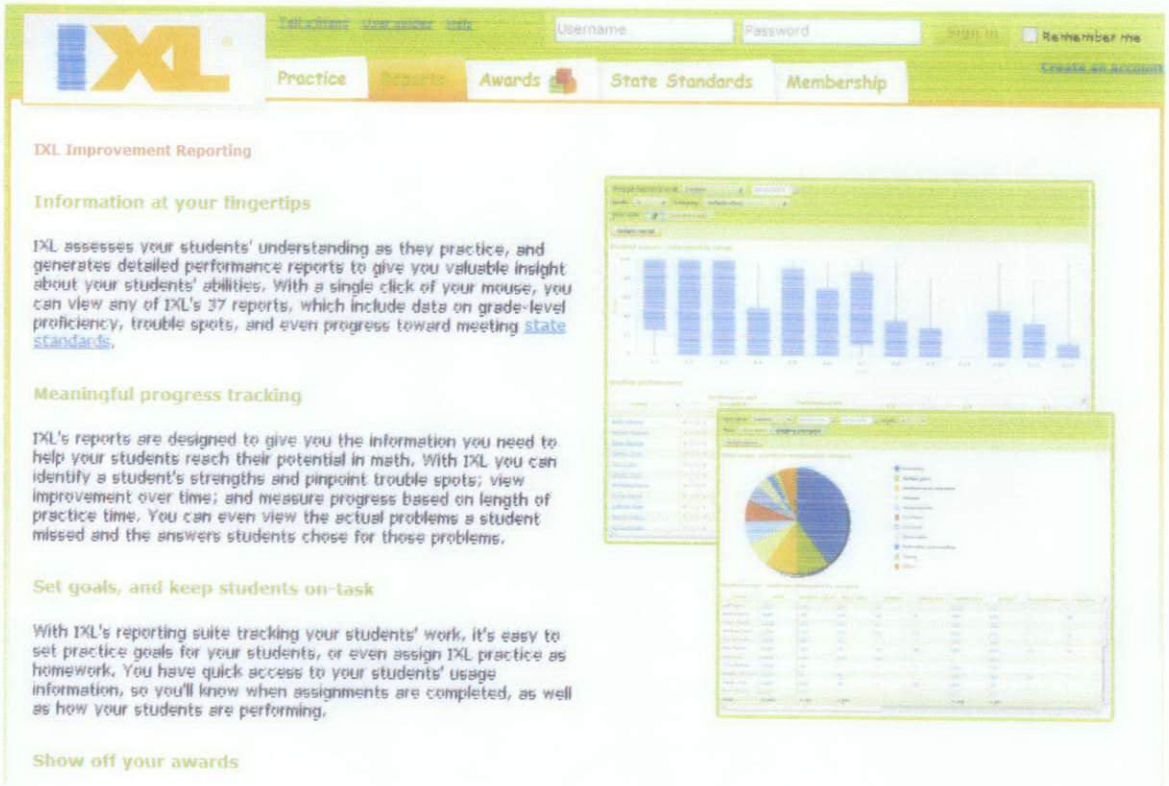
Since AndroidMarket currently does not open some games for PC viewing, this project is then referred to a web-based project from ixl.com, a virtual mathematics class that being used over 150 countries all around the world.

ixl.com provides a structured and systematic ways for the users. Covering from Pre-K until Eighth Grade, ixl.com has differentiated the difficulties level based on the age group. For every exercise and challenge, ixl.com provides a detail report on the kids' progress. There are also awards for total questions answered, total practice done, and how many skills mastered.

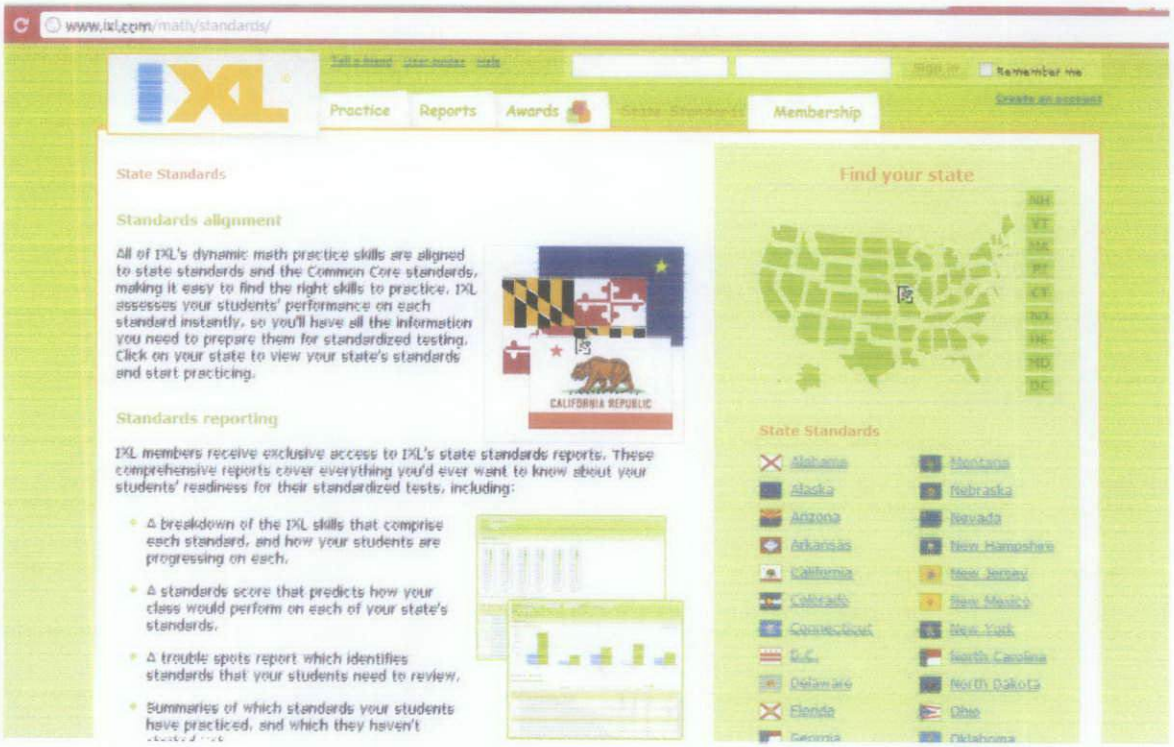
The main page of ixl.com website where they introduces that ixl.com is a virtual mathematics lesson for kids up till eighth grade that follows international mathematics standard which has been accepted in more than 150 countries all over the world. There are also testimonials from the users previewed at the home page for experience sharing and highlight the advantage of this virtual school from the user point of view.



User can choose to do exercises based on the grades or the specific topics available. For example, kids 4-6 years is assumed to be in Kindergarten level and the exercises available number introduction by counting numbers and also simple mathematical operation involving addition, subtraction, position and fraction. The number involve in each exercises are basic integers from 0 to 9.



For parents' remarks, this virtual class also provides Reports tab, which analyze the kids performance when completing the exercises. Graphs and charts are generated for visual representation and makes it easier for parents to keep track their kids' task. With this analysis, parents can identify in which area their kids are doing well and which specific area their kids need to do improvement.



The unique feature of ixl.com is the international standard applied to the mathematics task and also method of reporting. With this standardize format, the interaction between kids and guardians from different country are easier. The maintenance of the website is also effortless because changing one portion of this website is sync with one standard. Parents also have access to state standards reporting, so that working toward standards goals can be both an in-school and at-home endeavor.

CHAPTER 3
METHODOLOGY

3.1 Research Methodology

The project adopts spiral model of system development life cycle and is segmented into four main phases which are Planning, Analysis, Evaluation, and Development. Phase 1 mainly involves research work. Phase 2, 3 and 4 make up the main development stage. A Gantt chart to keep track on the project development schedule is created.

The project's methodology is based on iterative development, prevalent in the development stage. This stage covers feasibility study, planning, analysis, design and implementation. Agile development is chosen to accommodate requirements changes and frequent adaptation to alternative designs and revised models. The developed modules from the iterations will be evaluated, inspected and further enhancements will be made, if needed. The agile methods could align the development of the proposed optimization technique with academic standards.

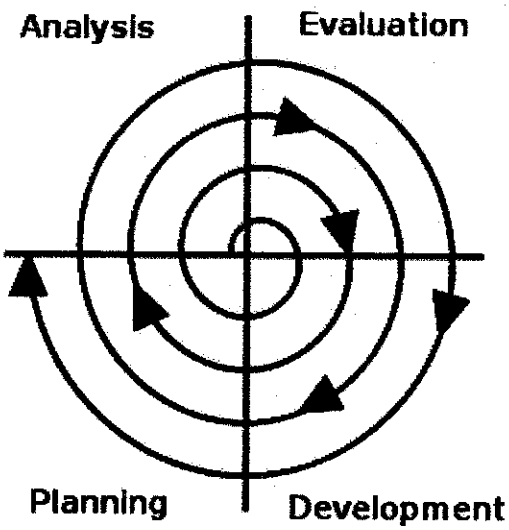


Image Source: http://en.wikipedia.org/wiki/File:Software_Development_Spiral.svg

Phase 1: Planning application (game) story flow and software to be used

In this phase, identifying the game concept and software to be use for developing is done during Final Year Project 1. The game will be divided into stages according to difficulty level. To develop this project, Adobe Illustrator, DroidDraw, Android SDK Tools, Eclipse are being used and coding is using Java programming language.

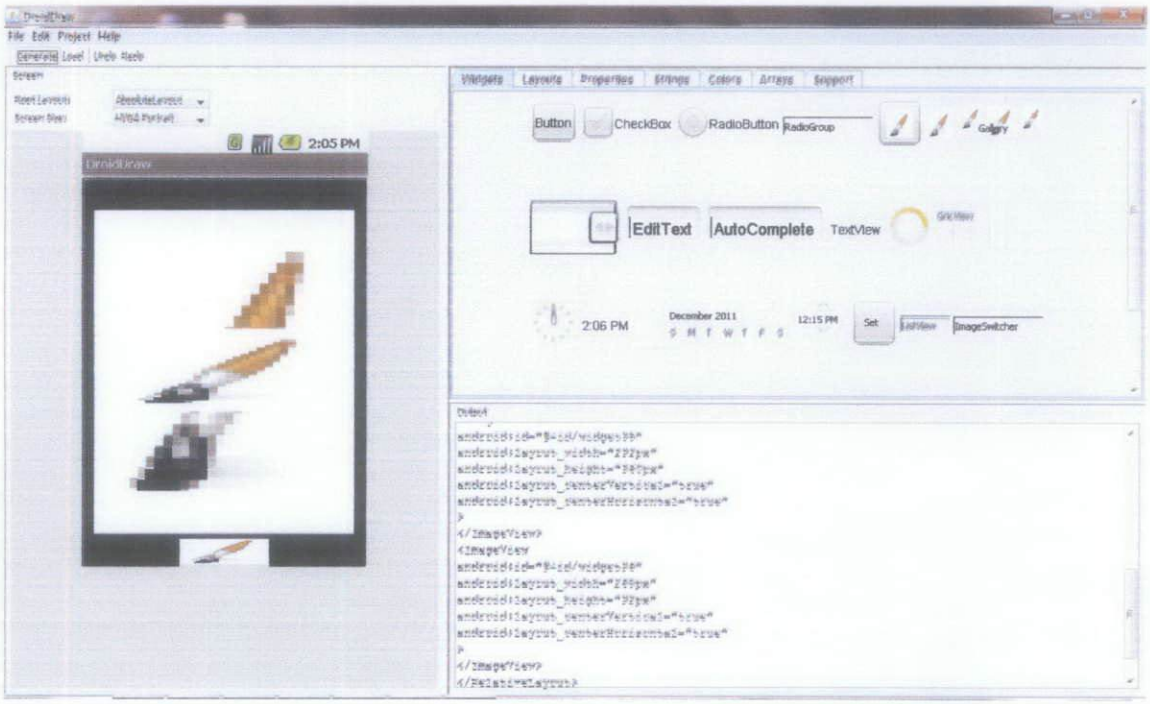
Generally, the story plot of this game is about a boy, Harry going to funfair at stop at each of the game stall there. In each game stall, Harry needs to solve mathematical challenge before he can proceed to the other game stall. Every time he manages to precede the quest, the level of difficulty becomes higher and the game is getting more challenging. It started with simple quest such as counting balloons, which the difficulty level is suite with 4-6 years old kids to understand.

Phase 2: Analysis on Basic Mathematics, Level of Difficulties, and Interfaces

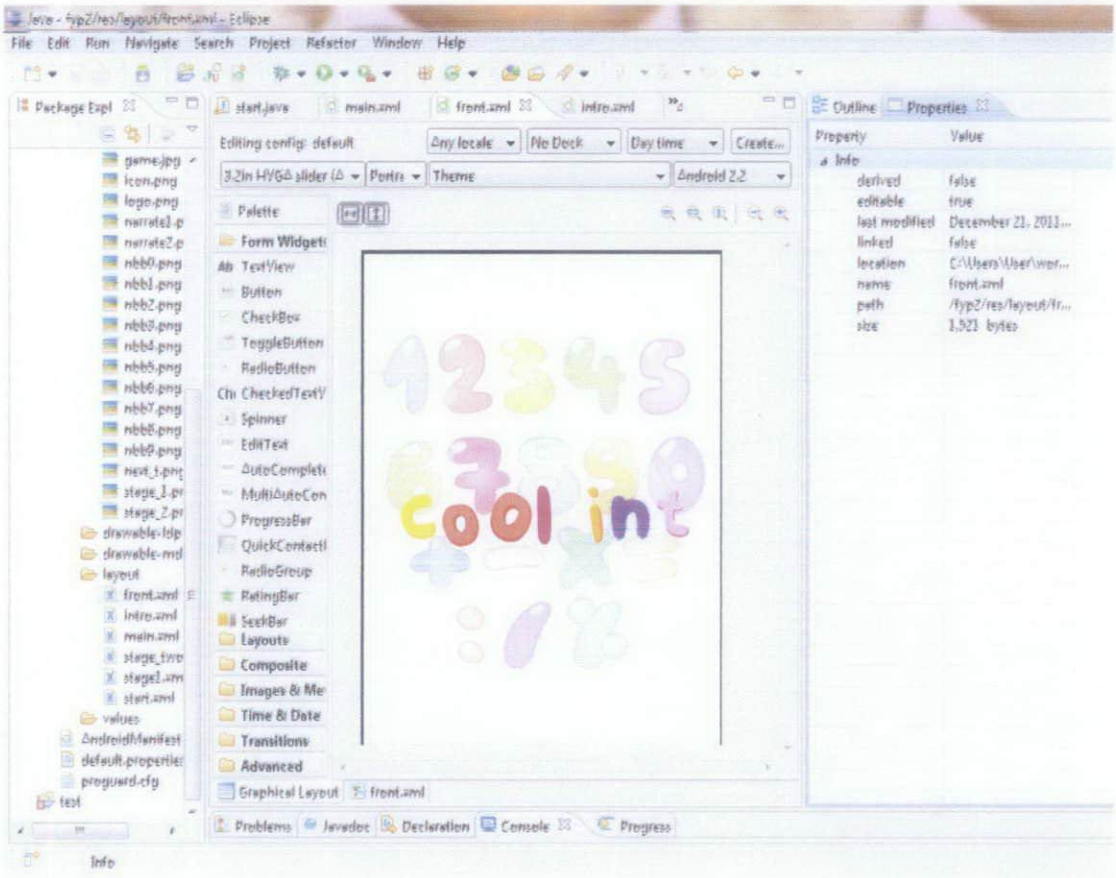
Kids age 4-6 years old is fall under Pre-School category. Based on observation and research, this group of kids should be introduce to basic numbering such as arranging digit and counting. As the kids understand the basic numbers, then addition and subtraction numbers will be introduce up till two digit numbers.

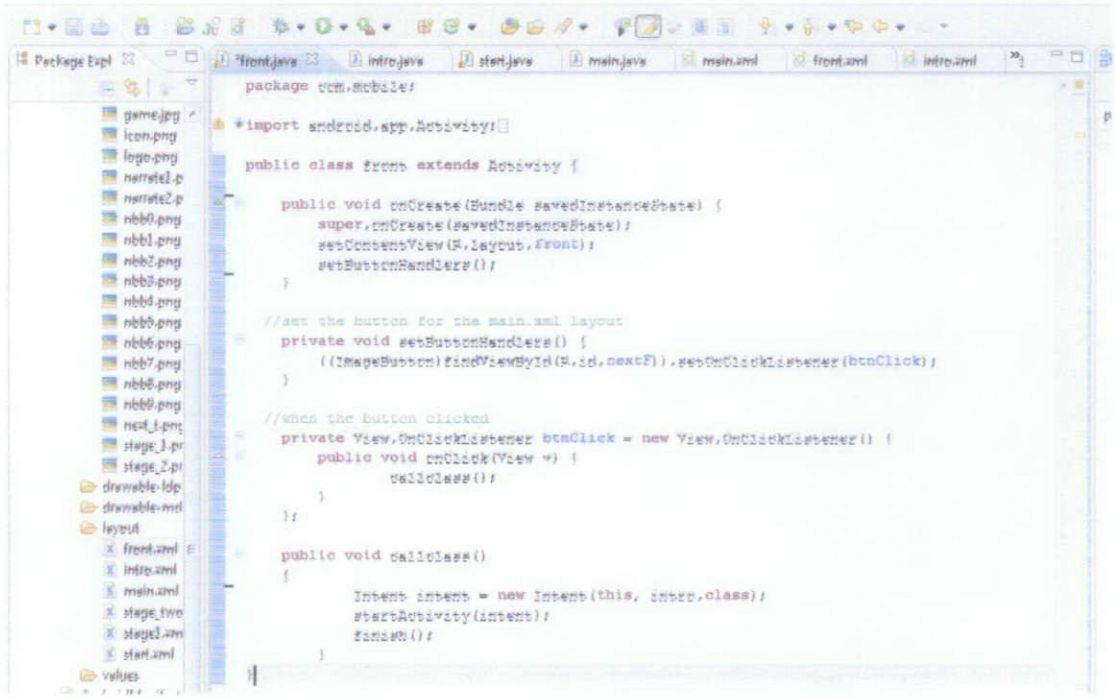
The difficulty level for the game is referred from various online mathematics exercises for kids. Level 1 will let kids play to arrange the numbers from 0 to 9 within 30 seconds. If kids are happen to get it done below the time acquired, the remaining time will be add up to their bonus score. In Level 2 kids will need to some number counting forward, and also backward. As the level goes up, the difficulties level are increasing and kids need higher score with higher brain ability to get there.

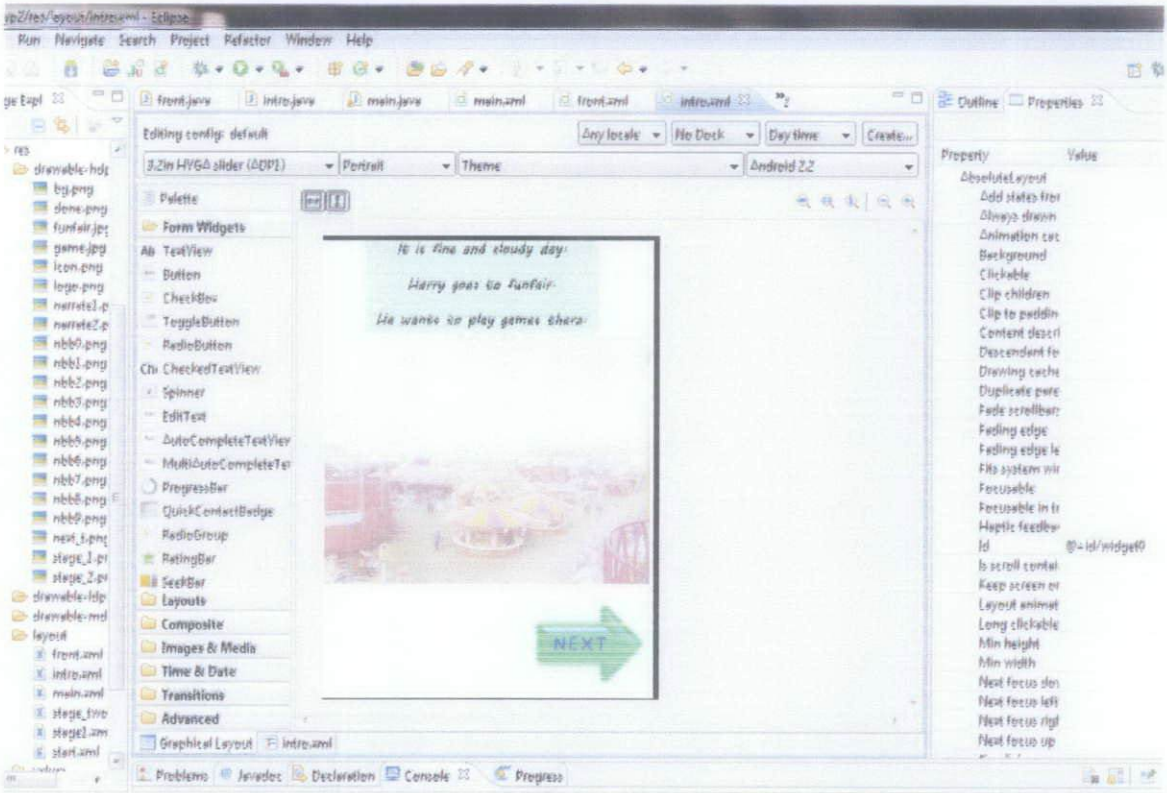
The interface for this application is designed using DroidDraw software. The arrangement of the icon is using relative layout because it is more flexible compare to absolute layout.

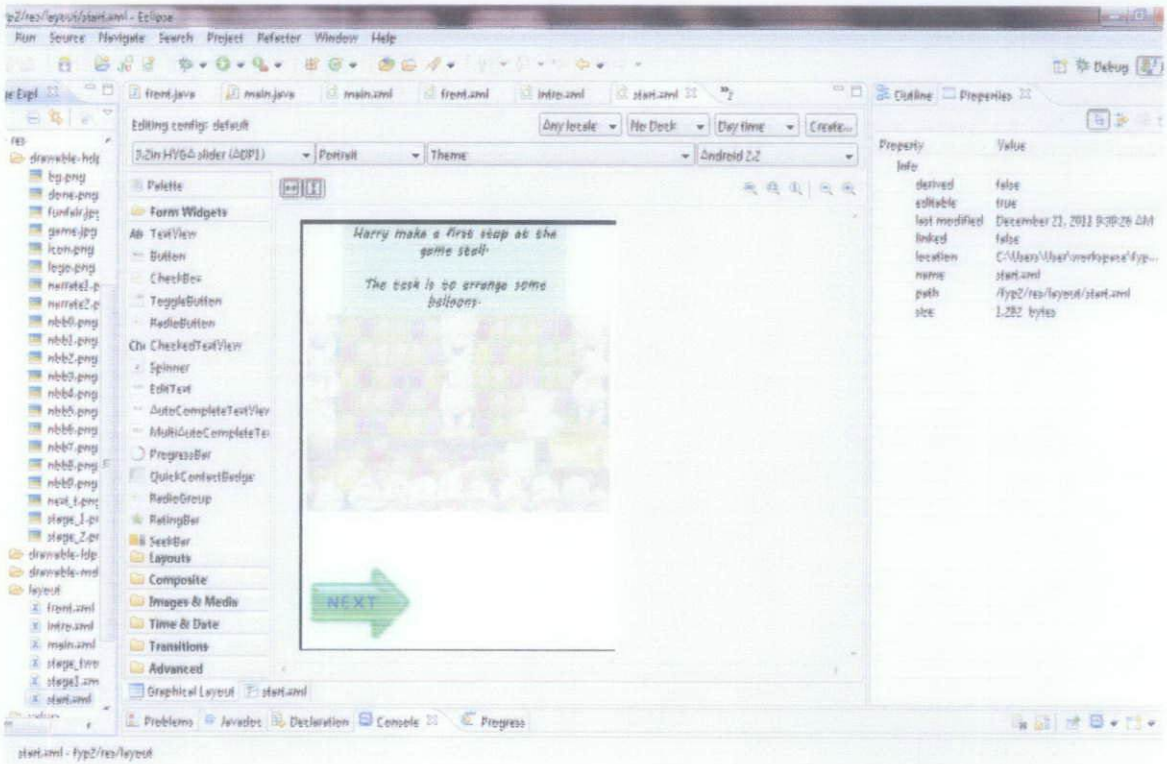


The command for every action is coded using Java programming language in Eclipse.

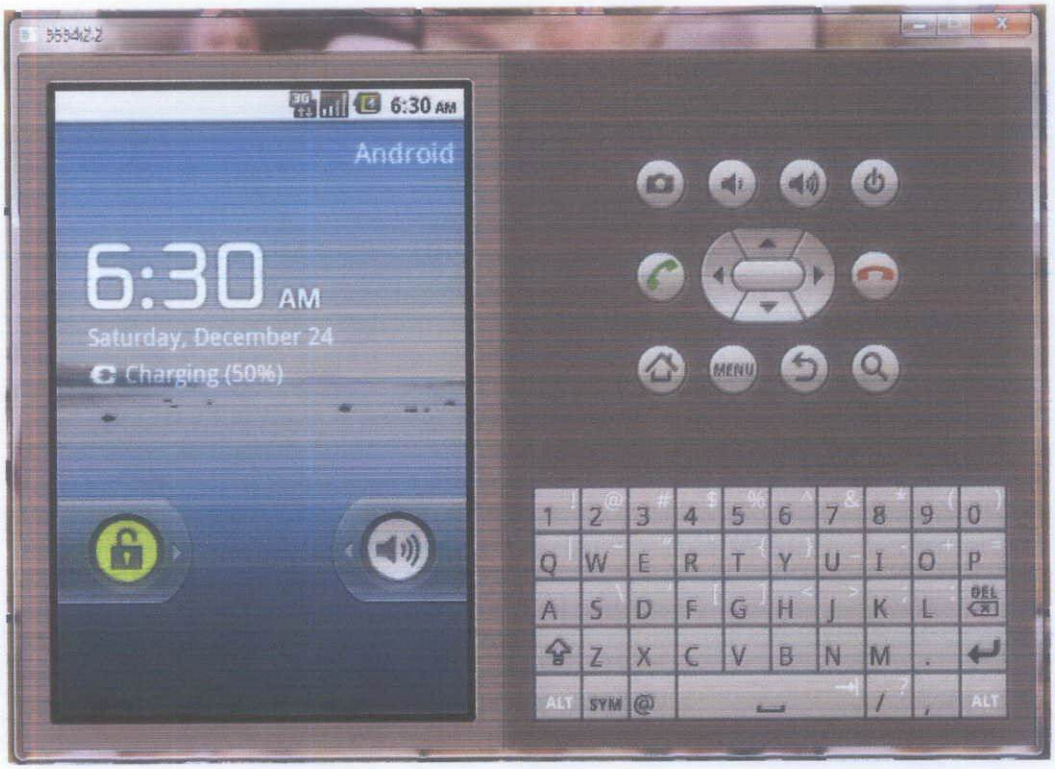


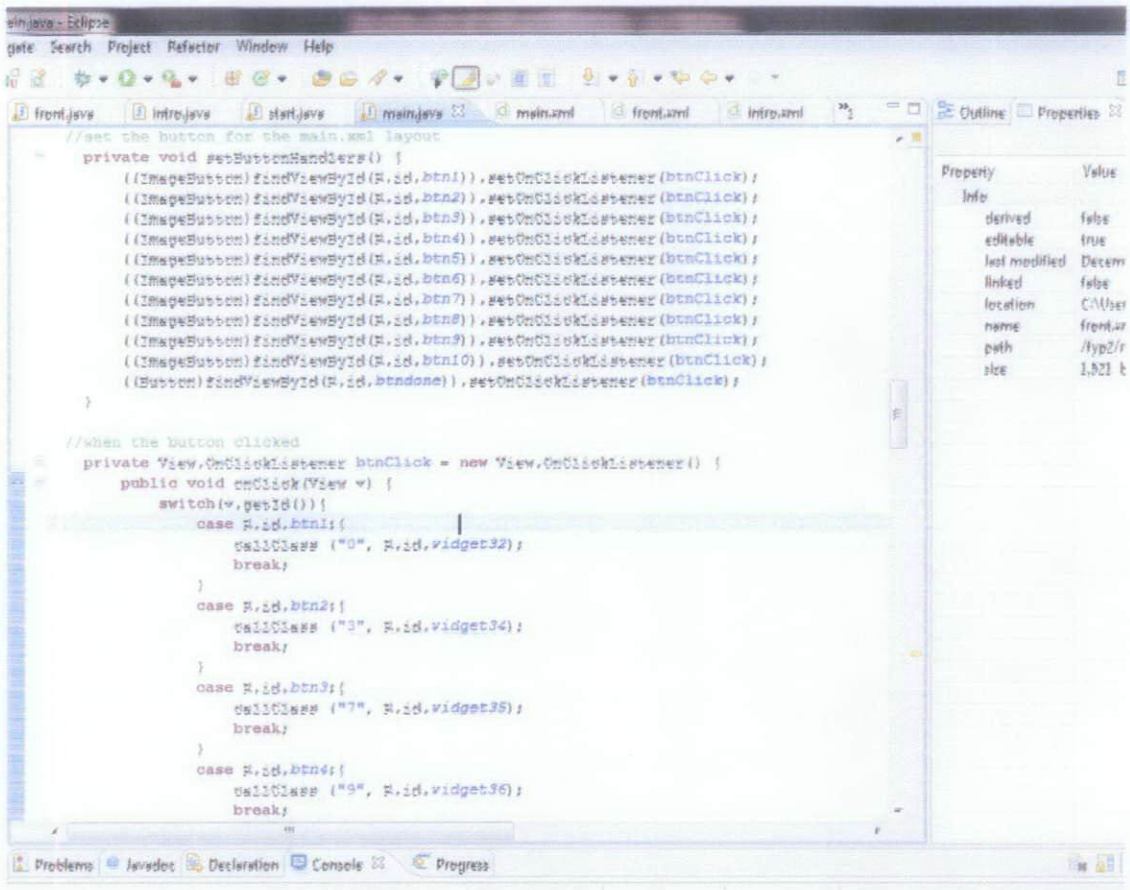



It is fine and cloudy day.
Harry goes to funfair.
He wants to play games there.
NEXT


Harry make a first step at the game stall.
The task is to arrange some balloons.
NEXT

The program coded is run using Android emulator. For this project, the version used is Android 2.2 (Froyo) API 8.




gate Search Project Refactor Window Help
front.java intro.java start.java main.java main.xml front.xml intro.xml
Outline Properties
//set the button for the main.xml layout
private void setButtonHandlers() {
((ImageButton)findViewById(R.id,btn1)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn2)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn3)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn4)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn5)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn6)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn7)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn8)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn9)),setOnClickListener(btnClick);
((ImageButton)findViewById(R.id,btn10)),setOnClickListener(btnClick);
((Button)findViewById(R.id,btndone)),setOnClickListener(btnClick);
//when the button clicked
private View.OnClickListener btnClick = new View.OnClickListener() {
public void onClick(View v) {
switch(v.getId()){
case R.id.btn1:{
callClass ("0", R.id.widget32);
break;
case R.id.btn2:{
callClass ("3", R.id.widget34);
break;
case R.id.btn3:{
callClass ("7", R.id.widget35);
break;
case R.id.btn4:{
callClass ("9", R.id.widget36);
break;
Problems Javadoc Declaration Console Progress


6:35 AM
mobile
stage 1
0 1 2 3 4 5 6 7 8 9
Done
MENU

Phase 3: Evaluation on the application created.

In this phase, throughout the development period continuous evaluation will be done to minimize error checking. This evaluation is consistently being done by developer alone. The evaluation will consist of interface design, algorithm, and difficulties level. The method uses to gather data is through observation during user acceptance test and provide some questions to the respondent. The testing session took about 40 minutes including the verbal questionnaire. All the information gathered during the user testing is recorded and analysis is done and several outcomes based on that are used for further improvement to the prototype.

The prototype has been tried out by a kid, Wan Hasya Maisarah Wan Faizal, 5 years old, and the responds from her and her parent, Puan Norma Abd Rahim was listed out below:

- The game is easy to understand. She would like to proceed with more challenges.
- The interface should be more colorful and interface design must be more random in terms of arrangement.
- Background sound was not suitable with the quest. There also should be sound effect for each clicking done by the kid.

A few adjustment has been made due to discussion and comment from the user, and the improved prototype will have more cheerful interfaces and some sort of journey story concept.

3.2 Project Activities and Key Milestone.

The development of this application mainly involves coding Java in Eclipse to make the interface created functional. Android SDK Manager will load the packages from https://dl-ssl.google.com/android/. The interface is drawn using relative layout, which allows developer to arrange the interface according to relation view.

Next, some bugs fixing will be done due to error in improving the interface and adding few more layout to complete the story telling concept of this mathematic quest.

CHAPTER 4
RESULT AND DISCUSSION

Findings of the study

4.1 Android Market

Throughout readings and general observation, Android phone is really popular throughout the world. According to mashable.com, Motorola CEO Sanjay Jha revealed to Reuters that the company's Android-powered mobile devices are selling faster that they can be manufactured. The same situation is faced by HTC and Nokia whereby the demand has outstrip the current supply. Therefore, the general conclusion based on the phenomenon stated that Android user is dominant.

4.2 Kids Learning and Adeptness.

Pre-School kids usually have known the basic numbering and decrement or increment counting. It would be fun for them to start the challenge with that because they can easily score and earned bonus marks

for the early stage. This will motivate kids to challenge themselves at the higher level of number manipulation when involving addition and subtraction. After all, they can save the score so that they themselves can monitor their own performance in mathematics.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Realizing that kids also part of gadget user, this project aimed to create beneficial yet interactive games for kids in mobile application. Although kids are minority user for Android application, however they are the generation which grows along with technology. They tend to use their parents gadget and will stick to it if they found it is interesting. Games are the most kids would play on mobile phone. Therefore, it is very important to introduce them that games also can be useful tools for mind development.

5.2 Recommendation

In general, this project has met its objectives, which are developing mobile application especially for kids 4-6 years old and giving them interesting environment for mathematics exercise. However, there are some recommendations are suggested for further improvement to this mobile application.

5.2.1 Using 3D graphics

This prototype is using 2D graphics as the interfaces for all layouts in the game. Since Android is supporting 3D graphics, it is an advantage for the developer to use 3D graphics because of the realism created in the model appears more interesting to kids. The effects of lighting, ray tracing and reflection of object give more impact to kids while solving the mathematics quest. However, maybe some hardware and software check need to be done before implementing 3D graphics to the application due to space requirement and response time because 3D graphics have three dimensional view with another one called vector graphics which requires the right display tools to get the right effects.

5.2.2 Background music and sound effects

Besides good quality of graphics, this mobile application also should come along with futuristic music as the background sound and the sound effects. Background music provides more emotion to the kids while playing the game and sound effects especially during every click gives more sense of excitement to the kids because they feel as if the device is interacting with them by giving respond in terms of sound.

5.2.3 High score and timer

In order to make user consistently playing the game, real time record for their achievement would be the best way to make them challenge their own self. Each time kids manage to score higher than their previous achievement, their record will be renewed and there will be ranking for top 10 scorers to this game. Countdown timer would be interesting to add because it will determine how fast a kid can solve each quest and on the other hand, this will create some positive force for kids to think fast and solve each stage within the time given.

5.2.4 Post-exercise report

For every exercise done by the kids, their result will be recorded and their performance will be analyzed for better understanding regarding their achievement. This report will be sent to parents on monthly basis regardless how many times they play the game. A chart and graph will be generated for visual presentation of the report. The report will highlight on specific area which the kid is good at and which area needs improvement. The compilation of every month performance later will be graded every 6 months. By using this method, parents can monitor their kids' ability by using mobile device which is proven to be more convenient.

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Appendices

Source code for prototype development in Java

```
//loading screen front.java

package com.mobile;

import android.app.Activity;
import android.app.AlertDialog;
import android.content.DialogInterface;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.ImageButton;
import android.widget.TextView;
import android.widget.ImageView;

public class front extends Activity {

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.front);
        setButtonHandlers();
    }

  //set the button for the front.xml layout
    private void setButtonHandlers() {

((ImageButton)findViewById(R.id.nextF)).setOnClickList
ener(btnClick);
    }

  //when the bucton clicked
    private View.OnClickListener btnClick = new
View.OnClickListener() {
     public void onClick(View v) {
               callclass();
     }
```

```
//instruction screen intro.java

package com.mobile;

import android.app.Activity;

public class intro extends Activity {

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.intro);
        setButtonHandlers();
    }

  //set the button for the intro.xml layout
    private void setButtonHandlers() {

((ImageButton)findViewById(R.id.nextF)).setOnClickList
ener(btnClick);
    }

  //when the button clicked
    private View.OnClickListener btnClick = new
View.OnClickListener() {
     public void onClick(View v) {
               callclass();
     }
    };

    public void callclass()
    {
          Intent intent = new Intent(this,
start.class);
          startActivity(intent);
          finish();
     }
}
```

```
//starting screen start.java

package com.mobile;

import android.app.Activity;

public class start extends Activity {

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.start);
        setButtonHandlers();
    }

  //set the button for the start.xml layout
    private void setButtonHandlers() {

((ImageButton)findViewById(R.id.nextF)).setOnClickList
ener(btnClick);
    }

  //when the button clicked
    private View.OnClickListener btnClick = new
View.OnClickListener() {
     public void onClick(View v) {
               callclass();
     }
    };

    public void callclass()
    {
         Intent intent = new Intent(this, main.class);
          startActivity(intent);
          finish();
     }
}
```

```
//stage one screen main.java

package com.mobile;

import android.app.Activity;
import android.app.AlertDialog;
import android.content.DialogInterface;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.ImageButton;
import android.widget.TextView;

public class main extends Activity {
     int count = 0;
     String val1;
     String val2;
     String val3;
     String val4;
     String val5;
     String val6;
     String val7;
     String val8;
     String val9;
     String val10;

    @Override
    public void onCreate(Bundle savedInstanceState) {
       super.onCreate(savedInstanceState);
       setContentView(R.layout.main);
       setButtonHandlers();
    }


  //get the value of the selected image from the other
class
    public void settext(String val)
    {
    EditText image1 = (EditText)findViewById(R.id.a1);
    EditText image2 = (EditText)findViewById(R.id.a2);
    EditText image3 = (EditText)findViewById(R.id.a3);
```

```
EditText image4 = (EditText)findViewById(R.id.a4);
EditText image5 = (EditText)findViewById(R.id.a5);
EditText image6 = (EditText)findViewById(R.id.a6);
EditText image7 = (EditText)findViewById(R.id.a7);
EditText image8 = (EditText)findViewById(R.id.a8);
EditText image9 = (EditText)findViewById(R.id.a9);
EditText image10= (EditText)findViewById(R.id.a10);

 if (count == 0){
      image1.setText(val);
      count++;
      val1 = val;
 }
 else if (count == 1){
      image2.setText(val);
      count++;
      val2 = val;
 }
 else if (count == 2){
      image3.setText(val);
      count++;
      val3 = val;
 }
 else if (count == 3){
      image4.setText(val);
      count++;
      val4 = val;
 }
 else if (count == 4){
      image5.setText(val);
      count++;
      val5 = val;
 }
 else if (count == 5){
      image6.setText(val);
      count++;
      val6 = val;
 }
 else if (count == 6){
      image7.setText(val);
      count++;
      val7 = val;
 }
 else if (count == 7){
```

```
            image8.setText(val);
            count++;
            val8 = val;
        }
        else if (count == 8){
            image9.setText(val);
            count++;
            val9 = val;
        }
        else {
            image10.setText(val);
            count++;
            val10 = val;
        }

}

   //set the button for the main.xml layout
private void setButtonHandlers() {

((ImageButton)findViewById(R.id.btn1)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn2)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn3)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn4)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn5)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn6)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn7)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn8)).setOnClickListe
ner(btnClick);
```

```
((ImageButton)findViewById(R.id.btn9)).setOnClickListe
ner(btnClick);

((ImageButton)findViewById(R.id.btn10)).setOnClickList
ener(btnClick);

((Button)findViewById(R.id.btndone)).setOnClickListene
r(btnClick);
}

  //when the button clicked
private View.OnClickListener btnClick = new
View.OnClickListener() {
     public void onClick(View v) {
          switch(v.getId()){
               case R.id.btn1:{
                    callClass ("0", R.id.widget32);
                     break;
               }
               case R.id.btn2:{
                    callClass ("3", R.id.widget34);
                     break;
               }
               case R.id.btn3:{
                    callClass ("7", R.id.widget35);
                     break;
               }
               case R.id.btn4:{
                    callClass ("9", R.id.widget36);
                     break;
               }
               case R.id.btn5:{
                    callClass ("5", R.id.widget37);
                     break;
               }
               case R.id.btn6:{
                    callClass ("2", R.id.widget38);
                     break;
               }
               case R.id.btn7:{
                    callClass ("8", R.id.widget39);
                     break;
               }
```

```
                case R.id.btn8:{
                     callClass ("4", R.id.widget40);
                      break;
                }
                case R.id.btn9:{
                     callClass ("1", R.id.widget41);
                      break;
                }
                case R.id.btn10:{
                     callClass ("6", R.id.widget41);
                      break;
                }
                case R.id.btndone:{
                     callClass ("Done!", R.id.btndone);
                      break;
                }
           }


     }
};

    public void callClass(String value, int id)
    {

     if (value == "7")
     {
          //assign value to text box
          settext(value);
     }
     else if (value == "4")
     {
          settext(value);
     }
     else if (value == "1")
     {
          settext(value);
     }
     else if (value == "0")
     {
          settext(value);
     }
     else if (value == "9")
```

```
        {
            settext(value);
        }
        else if (value == "3")
        {
            settext(value);
        }
        else if (value == "6")
        {
            settext(value);
        }
        else if (value == "8")
        {
            settext(value);
        }
        else if (value == "5")
        {
            settext(value);
        }
        else if (value == "2")
        {
            settext(value);
        }
        else if (value == "Done!")
        {
            //move to stage two
            checktext();
        }

    }

    public void checktext()
    {
     //check value of edit text(user selected value)
      if (val1 == "0" && val2 == "1" && val3 == "2" &&
val4 == "3" && val5 == "4" && val6 == "5" && val7 ==
"6" && val8 == "7" && val9 == "8" && val10 == "9")
        {
            TextView chck =
(TextView)findViewById(R.id.txtcheck);
            //chck.setText("Well Done!!");
            //buat alert box
            AlertDialog.Builder alert = new
AlertDialog.Builder(this);
```

```
          alert.setTitle("");
          alert.setMessage("Well Done! Are you ready
for the next challenge?")
          .setCancelable(true)
          .setPositiveButton("Yes", new
          DialogInterface.OnClickListener() {
               public void onClick(DialogInterface
dialog,
               int id) {
                    //call next page (other class)
                    callclass();
               }
          })
          .setNegativeButton("No", new
          DialogInterface.OnClickListener() {
               @Override
               public void onClick(DialogInterface
dialog, int id) {
               // pressed No.
               dialog.cancel();
               }
          });
          //compile
          alert.create();
          //display
          alert.show();

     }
     else
     {
          TextView chck =
(TextView)findViewById(R.id.txtcheck);
          chck.setText("Sorry, please try again :)");

EditText image1 = (EditText)findViewById(R.id.a1);
EditText image2 = (EditText)findViewById(R.id.a2);
EditText image3 = (EditText)findViewById(R.id.a3);
EditText image4 = (EditText)findViewById(R.id.a4);
EditText image5 = (EditText)findViewById(R.id.a5);
EditText image6 = (EditText)findViewById(R.id.a6);
EditText image7 = (EditText)findViewById(R.id.a7);
EditText image8 = (EditText)findViewById(R.id.a8);
EditText image9 = (EditText)findViewById(R.id.a9);
EditText image10 = (EditText)findViewById(R.id.a10);
```

```
image1.setText(null);
image2.setText(null);
image3.setText(null);
image4.setText(null);
image5.setText(null);
image6.setText(null);
image7.setText(null);
image8.setText(null);
image9.setText(null);
image10.setText(null);
count = 0;
}


    }

    public void callclass(){
     //call next page (other class)
         Intent intent = new Intent(this,
SecondActivity.class);
     startActivity(intent);
     finish();
    }

}
```