The Islamic University of Gaza
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LCD show via Resperry Pi on Android

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Final Graduation Project Report

Submitted in Partial Fulfillment of the Requirements

For

The Bachelor of Science Degree

(December, 2014)

DEDICATION

We dedicate this work

To our Parents…

To our supervisor Prof. Dr.-Eng. Hatem M. Hamad …

To our University…

To our country, PALESTINE …

ACKNOWLEDGEMENT

First of all, we would like to thank Allah for HIS firm hands in guiding us in the course of completing this Graduation project. Alhamdulillah.

Throughout the process of preparing and completing this project, we have received many assistance and guidance from various parties. Without these individuals who are willing to share their experiences and time to give us a helping hand, Thus, in this section, we would like to express our heartfelt gratitude to all of these individuals who had supported us.

Firstly, we are honored to be supervised by Prof. Dr.-Eng. Hatem M. Hamad and we would like to thank him for his direction, assistance, and guidance. In particular, Prof. Hatem recommendations and suggestions have been invaluable for choosing the idea and for the completion of our project. Plus, with his constructive comments and suggestion, we could clearly see where our mistakes are and improve ourselves further throughout the processes in developing (LCD show via Resperry Pi on Android).

Next, would like to thanks all those who have directly or indirectly helped and cooperated in accomplishing this Project.

At last, we would like to thank our families, especially our parents, for their encouragement, patience and assistance over the years. We are forever indebted to our parents, who have always kept us in their prayers.

ABSTRACT

This project intiated as one of the solutions for major problem faced by some segments of society, such as advertising agencies, universities and other people use LCD only for viewing ,there no need for these segments to have computer to view a video or powerpoint slides on LCD, our project solve this issue by creating a system composed from hardware device and software application depends on android platform.

The idea of the system is to upload files from a smartphone over WIFI to the hardware kit which is called Raspberry pi kit which will receive these data and control it to display on LCD or any monitor.

In our project , we used JAVA programming language to make android application and other hardware programming language for Raspberry Pi kit and finally some network methodologies to make a connection between application and hardware.

Our project provides some features like :

- Upload files from smart phone to raspberry pi kit.
- Open files previously uploaded from our web site to raspberry pi.
- Open and edit files on raspberry pi
- Full control with files on raspberry pi
- Specifying data on raspberry pi to folders and directories.
- Returning JSON script with the raspberry pi details (Folders, Files, etc.)
- User authentication.
- User authorization
- Snapshot of raspberry pi screen on smartphone.
- More than one way to upload your files, either directly using private network (adhoc) or using public network (server)
- Asynchronous operations on smartphone
- Responsive design.
- User experience design

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GLOSSARY

Term	Definition
LCD	liquid-crystal display
JSON	JavaScript Object Notation
AVD	Android Virtual Device
SDK	software Development Kit
XML	Extensible Markup Language
HTTP	Hypertext Transfer Protocol
PC	Personal computer
SDLC	System Development Life Cycle

Chapter 1

INTRODUCTION

In this chapter, the background of the project, problems faced and the objectives are described. Then, the contribution in which this project is expected to produce is briefly elaborated. The scopes, tools and technology of the project are also explained in details under this chapter. Finally, a chapter summary is provided as a guideline for readers on what contents are available in each chapter of the report.

1.1 Project background

Islamic University of Gaza has 400 PC approximately used only for showing lectures to students, and in IUG security rules, these PC's aren't used for anything except showing lectures and files, teachers cannot make anything else, this means 400 screen, 400 mouse, 400 keyboard, 400 UBS, and others without use, these PC's are costly unnecessarily.

On the other hand, these devices require maintenance and monitoring by a computer technician, and also this is unnecessary cost.

According to the previous problem, we want to solve it, by working on our proposed solution, which is a complete system to view files on LCD using smart phones, this system consists of two parts which are the hardware microcontroller and the smart phone application, in the next subsections we will explain these components.

And because the most of smart phones has an Android operating system, which is the mostly used in smart phones according to the LCD show via Resperry Pi &WIFI on smartphones ,Android operating system has been used. In the next sections, we have a project description and some problems which we faced in this project and the main objective of the project.

The target audience aimed for this project are users who used LCD's and has own data plan or Wi-Fi to show their files like teachers and students and others.

By the end of project , the the above-mentioned system consists of two parts which are the hardware microcontroller and the smart phone application are to be completely developed, tested and presented.

1.2 Project description

LCD show via WIFI on smartphones will be help user. to view files on LCD using smart phones without using PC or Laptop, this system consists of three parts, the first part is android application, the second is hardware kit which is Raspberry pi kit, and finally the medium which is WIFI connection We will study the nature of these components in this project

1.3 Objectives

The following are the objectives which are top br achieved from the development of our project (LCD show via WIFI on Android)

a) Reduce of consuming PC devices and screens.
b) Reduce of consuming power human.
c) Didn’t need more of electrical power so reduce of consum it.
d) Easy controlling.

1.4 Similar Previous Systems

Multimedia presentations with Raspberry Pi

Pi Presents has a lot more features than we actually need and project now in the progress of developing an AJAX based Web-Interface that allows for easy creation of shows consisting of slides and videos as well as publishing them to the associated Raspberry Pi.

1.5 Report outline

In Chapter 1, the background of the project, problems faced and the objectives are described. Then, the contribution in which this project is expected to produce is briefly elaborated. The scopes, tools and technology of the project are also explained in details under this chapter. Finally, a chapter summary is provided as a guideline for readers on what contents are available in each chapter of the report.

In the next chapter reviews on topics of Andoid, SDLC methods, Agile Methodology and the usage of JSON. The reviews include the topic's background, functionalities, pros and cons.

In the third chapter, user functionalities are discussed in the first section. In the second section we discuss nonfunctional requirement of the system.

Chapter 4 sketches of each and every screens of the android application will be shown and explained thoroughly. This chapter can be served as guidelines for future developers of the application besides acting as a storyboard

Chapter 5, use cases and activity diagrams for the whole system will be illustrated.

Chapter 6, mainly consist of two part servers talk about php pages and contact with mobile application ,database ,fully focuses on the database design of project

Chapter 7 includes descriptions on what software and language are used for the development of android application and Rassbperry pi . Critical factors that will affect the launching of the application will also be stated out as guidelines and error prevention. Next, special background features will also be explained with the aid of partial programming codes as references

The next chapter The aim of this chapter is to make clear user-system interaction and system implementation aspects. Therefore, more details about system's modules are provided. The main functions of the system are shown and discussed.

Conclusion and future work are provided in chapter 9.

Chapter 2

LITERATURE REVIEW

This chapter reviews on topics of Andoid, SDLC methods, Agile Methodology and the usage of JSON. The reviews include the topic's background, functionalities

2.1 Android

Android platform can be generally defined as a software bunch for mobiles which include an operating system, middleware and key applications. Google which acquire Android Inc. in 2003 has been constantly researching and updating the versions of Android to fix bugs faced by previous versions besides adding in more functionalities and specifications. The latest version of Android which can be found in the market is Android 4.4, KitKat which was released last quarter-2013. Among the improved functionalities implemented on this latest version are improved touchscreen so that it responds faster and more accurately than ever before. This means that you can listen to music while browsing the web, or race down the highway with the latest hit game, all without a hitch. (android.com 2013) Android platform can be divided into five primary layers namely:-

a) Applications - Set of core application that comes with Android distribution such as Calendar, Map Browser, Web Browser and Contacts application

b) Application Framework - Facilitate reuse of components in Android. With this framework, developers could build applications to execute on Android Kernel.

c) Libraries – Includes System C Library.

Media Codecs, SQLite and web browser engine, LibWebCore

d) Android Runtime - Consist of a set of Core libraries that provides most Java functionalities and Dalvik virtual machine which act as a translator between application side and operating system

e) Linux Kernel - For core system services

With all these layers integrated, Android platform is said to be successful in offering many features to the end user, which covers the area of application development,internet, media and connectivity. (Maji, Kangli, Sultana & Bagchi 2010)

The following diagram shows a clearer picture of the Android layers:

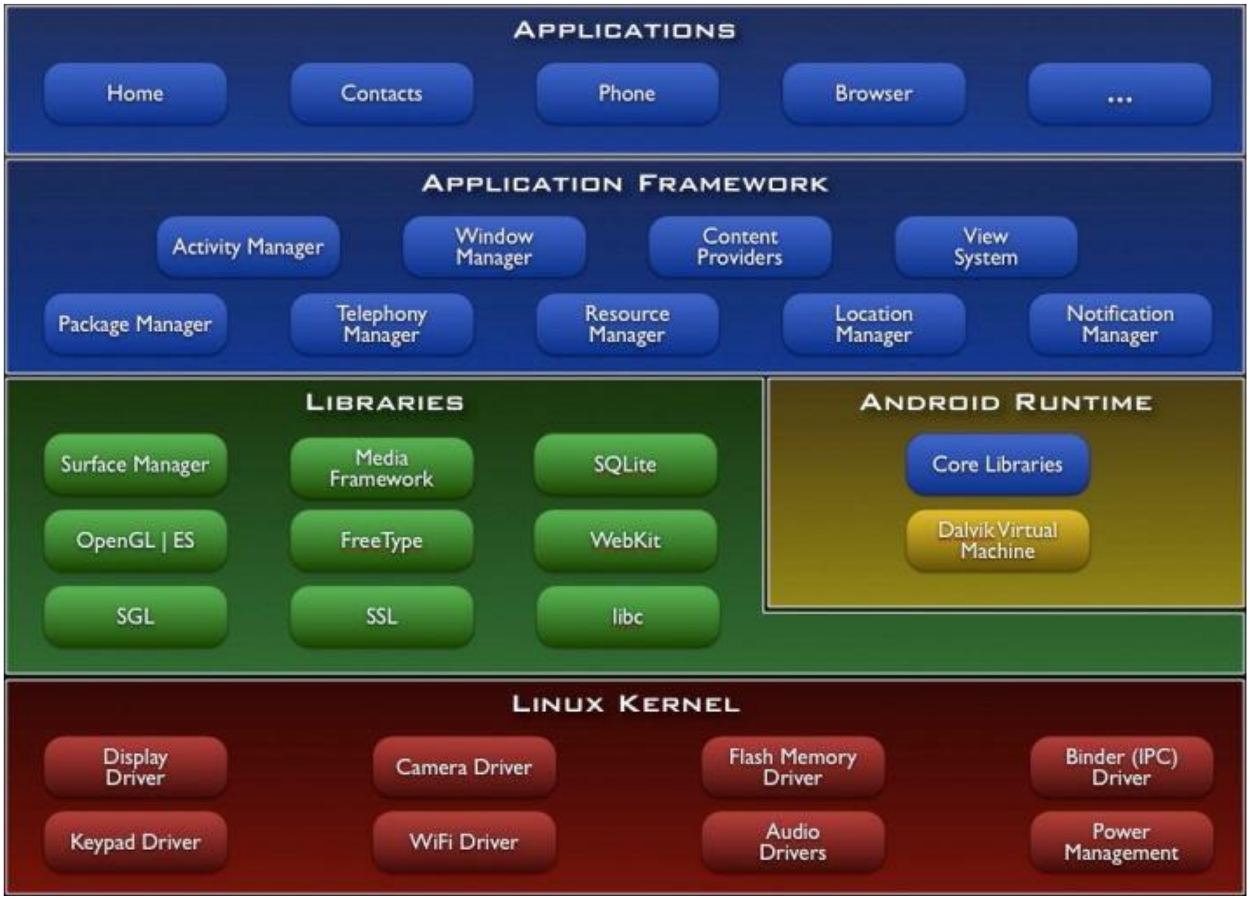


Figure 2.1.1–Android Architecture Frameworks (Developer.android.com 2012)

There are many strengths of Android which are worth to be applauded for. For instance, developers may most likely prefer creating apps for Android devices since Android offers an open development platform, allowing them to use third-party tools to create the particular app. With the implementation of open source platform, anyone with the right skills and knowledge can create an app specially tailored for Android devices without tight restrictions or approvals. Besides, this strength of Android also enhances flexibility since it allows developers to update their apps anytime to accommodate a range of different devices and play around with many features and functions of their app during the development process. (Priya Viswanathan n.d.)

Developing an Android app may also be easy especially for Java programmers since all applications under Android mainly use Java, a commonly used programming language in current days. Hassell (2010) also commented that since Android implements the open source platform, available code samples and supports from fellow developers can be easily accessed thus, attracting more new potential developers to learn and create apps either with basic or complex functionalities.Meanwhile, an excellent testing environment is also provided by Android that encourages developers to test and debug apps properly before presenting them to the Android Market. Android Inc. has also make developers' life easier by providing downloadable System Development Kit (SDK) in its website which comes with the API libraries and developer tools necessary to build, test and debug apps. (Developer.android.com 2012) .

In contrast with its major competitor's application market, Apple's App Store which rejects application submissions that are deemed too simple or are similar to existing apps, Android Marketplace doesn't censor its apps. In other words, apps developed by any developers will have equal chances to enter and to be published in the market but of course, the best one will only succeed. Meanwhile, since Android is an open platform, manufacturers have the flexibility to pair the OS with any hardware they wish, thus providing end users a higher number of device selections in terms of specifications, design, screen and other physical appearances. (Escallier 2010).

However, Android does have its cons too. Though open source platform is part of Android major strengths, this technique has also raised security and quality control concerns to app developers. Since anyone can develop and present new apps in the market without much restrictions and approvals, end users may purchase low-quality apps numerous times thus wasting their resources. With the open source concept, developers may also face piracy threats and loss of potential profits since anyone could easily access to the same learning resources and produce similar app. Meanwhile, hackers could also easily mimic popular apps and trick end users into using the fake app which may contain malicious elements. (Dempsey 2012).

Since Android is being licensed to multiple phone manufacturers such as Samsung, Huawei and HTC, apps developers also face problem in successfully presenting their apps across all Android devices since each manufacturer has its own configurations and specifications (especially processing power) being implemented on its respective smart phones. In other words, there may be an incident in which some devices installed with certain versions of Android will not be able to run applications that work fine either on the same device or another device of different Android version. With such problem, fixing bugs and updating apps will also cause headache to developers as they have to make sure that the app could be supported by all Android devices as soon as an update is performed. (Rodriguez 2012).

2.2 System Development Methodologies – Agile Methods

Association of Modern Technologies Professionals (2012) defines System Development Life Cycle (SDLC) as a conceptual model used in project management that describes the stage involved in developing an information system, starting from initial feasible studies. As time passes, SDLC is no longer only incorporated in Waterfall Methodology (the traditional way of SDLC) but is also applied in other various methodologies including Rapid Application Development, Object-Oriented Analysis & Design and Agile Methodology in which each methodology has its own pros and cons and accommodates certain situation of a system development.

Meanwhile, Wiras Adi (2008) stated that SDLC is a process of gradual refinement in which each development phase continues and refines what is done in the previous phase. The commonly known development phases are namely Planning (understanding why system has to be built and its requirements are determined), Analysis (identifying and analysing problems besides predicting problems which may arise in the future), Design (determines how exactly system operates in its environment), Implementation (stage where system is built, tested and installed) and lastly, Maintenance.

Agile Methodology has existed since in the 90s solving most frustrations met when the waterfall approach of the SDLC is being commenced. As mentioned, it is one of the approaches to project management but what differ it from the rest is that it helps team respond to unpredictable situations while building a software or application through incremental and iterative work cadences. Plus, agile methods also emphasizes on collaboration among customers and development teams especially when requirements and solution are to be determined. (Haughey D. 2009; Gatherspace.com n.d.).

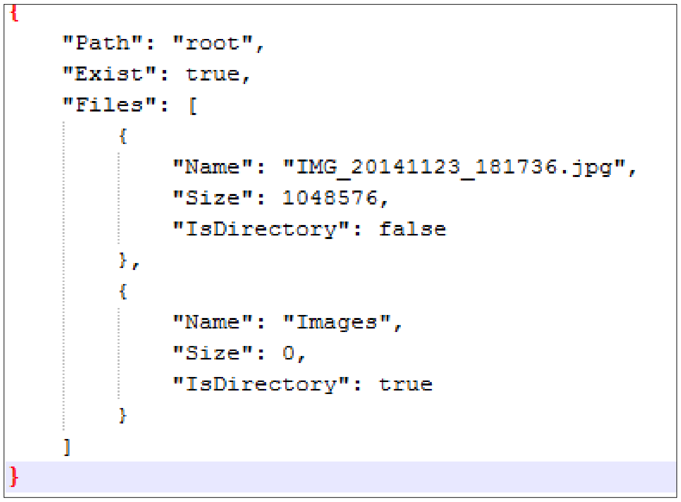
Besides having the benefit of being incremental and iterative unlike the traditional approach which does not allow developers to return from the current phase back to the previous phase, agile methods also promote real-time communication over documents. Thus, better understanding of the requirements and retrieval of customer reviews and feedbacks can be performed swiftly. Plus, since customers are majorly involved and testing is performed in a continuous manner, chances of reworking certain phases of the project will be minimized. (Haughey D. 2009).

2.3 The Usage of JavaScript Object Notation (JSON)

JSON is the abbreviation for Javascript Object Notation which is famously used by programmers and application developers for its organized, logical and easy to access mechanism to store information. Plus, with the implementation of JSON in the background of the system, a set of collected data could be projected out in a human-readable format besides being able to be manipulated easily. (Lengstorf, J.,2009).

JSON is also deemed as a vital tool for nowadays development involving retrieveand storage of data as it supports the loading of data in a quick and asynchronous manner without delaying any page rendering especially in mobile applications and websites. JSON can be implemented in various programming standards such as JAVA and PHP, thus, providing flexibility and acting as a glue between a single server to multiple clients at once. (Lengstorf, J., 2009).

The following figure shows an example on how a set of information of an individual is stored in JSON format:-

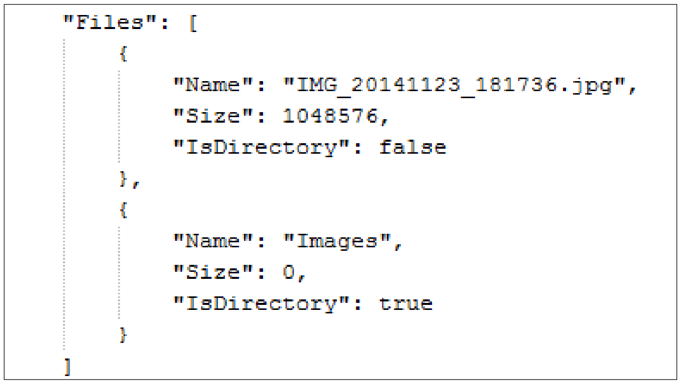


```
{
    "Path": "root",
    "Exist": true,
    "Files": [
        {
            "Name": "IMG_20141123_181736.jpg",
            "Size": 1048576,
            "IsDirectory": false
        },
        {
            "Name": "Images",
            "Size": 0,
            "IsDirectory": true
        }
    ]
}
```

Figure 2.3.1–Example on How Information is Stored in JSON Format (Lengstorf, J.2009)

Based on the diagram above, the data of an object (age, hometown and gender) named Jason is being stored. Between the curly brackets after the object name is initiated, any number of properties can be declared using the standards “propertyname”:“ property-value”. Each property of the object is separated by a comma. This function is especially useful whenever there is a need in a mobile application to read and display data of a single object queried from a PHP file using SQL syntax. In other words, if a SELECT statement manages to read data of an object from the database, all the data (columns of a record) will be stored as seen in the above format, sent to the mobile application background upon calling a few methods and thus, processed according to the application need. The update, insert, and deletion of data of a single object will also use the above format as information storage means. (Tamada, R., 2012).

Multiple data of different objects can also be stored within a single array of JSON format as illustrated in the below diagram:-



```
"Files": [
    {
        "Name": "IMG_20141123_181736.jpg",
        "Size": 1048576,
        "IsDirectory": false
    },
    {
        "Name": "Images",
        "Size": 0,
        "IsDirectory": true
    }
]
```

Figure 2.3.2–Example on How Information is Stored in an Array of JSON Format (Lengstorf J., 2009)

In the figure above, the variable “family” stores two objects by enclosing them with square brackets thus, forming an array. This is especially useful when a mobile application requires reading information of more than one object from the database server. If a SELECT statement manages to read data of multiple objects from the database, all the data (columns of the records) will be stored as seen in the above format, sent to the mobile application background upon calling a few methods and thus, processed according to the application need. The update, insert, and deletion of data of multiple objects will also use the above format as information storage means. (Tamada, R., 2012).

JSON does have its limitations when it comes to the support of data types.

Data types that JSON supports are only limited to strings, numbers, Booleans and nulls. For Date types, developers are only given the choices to either transform them into string uses Unix timestamp as integer. (Nitschinger, M., 2010).

2.4 What is Rasspberry pi

The Raspberry Pi is a minicomputer Supports few operating systems, the default OS for it is Rasbian which is a debian distribution of Linux operating system – same as the Ubuntu OS – the following programing languages and IDEs are tested on raspberry pi: C# (Mono runtime) , Code Blocks IDE , Erlang , Forth , Forth, GalaxC , Go (new language) , Java (needs some configirations to access HW), JavaScript (Node.js interpreter) ,Pascal , PHP, Python, Regina Rexx, Scratch , TcI/Tk And much more programming languages However, developer support website of Raspberry Pi recommends either Python or C/C++ programming languages, and gives more tutorials and samples for both of these languages next to Assembly language for ARMv6 architecture.

Therefore, for new learning students it is better to use the supported languages by the company since samples and tutorials are already available.

❖ **Rassperry Pi Components:**

- 700Mhz ARM v6 Broadcomm CPU+GPU
- 512 MB RAM (256MB on Model A)
- Boots off SD card for filesystem
- USB, Audio out, LAN (Model B only)
- HDMI + Composite videoout
- GPIO pins
- Powered off 5V, ~700ma
- (500ma on Model A)

❖ **Where does the Raspberry Pi come from?**

The Raspberry Pi is the work of the Raspberry Pi Foundation, a charitable organisation founded in 2009. It's supported by the University of Cambridge COMPUTER Laboratory and tech firm Broadcomm, whose system-on-a-chip powers the device. Speaking to our sister magazine Edge, legendary games developer and Raspberry Pi Foundation head David

Braben explained the foundation's mission: "[In Raspberry Pi] you've got quite a powerful, very cheap device that anyone can carry around, take to school, and hopefully do interesting things with that make it seem less like it's purely a school thing."

❖ Why do we need the Raspberry Pi?

In today's schools, IT EDUCATION means IT literacy, not computer science - that is, teaching kids how to use applications rather than how to make them.According to The Royal Society, "we appear to have succeeded in making many people comfortable with using the technology that we find around us, but this seems to have been at the expense of failing to provide a deeper understanding of the rigorous academic subject of COMPUTER science." The Pi hopes to help promote that understanding.

❖ Raspberry Pi price

There are two versions of the Raspberry Pi hardware: the $25 Model A and the $35 model B - that's around £16 and £22 respectively. Neither one, it's safe to say, will break the bank - but you do need to provide your own keyboard and TV.

❖ Raspberry Pi specifications

The Raspberry Pi processor is a 700MHz Broadcomm system on a chip with a Videocore 4 GPU. That provides OpenGL ES 2.0, hardware-accelerated OpenVG and 1080p HD video. There's 256MB of on-board RAM and sockets for HDMI, USB 2.0, RCA video, USB 2.0 and 3.5mm audio jacks, and power comes via a MicroUSB connector.

The model B adds a second USB 2.0 port and a 10/100 BaseT Ethernet connection. There's no Wi-Fi in either version, but you can easily hook up a USB Wi-Fi adapter. It doesn't come with a case, either, and there's no hard disk or SSD - it's designed to use SD cards for booting and storage.

❖ Raspberry Pi operating system

The Raspberry Pi software is Linux - Fedora, to be precise - and it supports programming languages including Python, BBC Basic, C and Perl. You don't have to run Fedora if you don't want to, although the PC'S architecture - it's based around version 6 of the ARM architecture, which may not be supported by some more recent distributions - will slightly limit the available options..

❖ Raspberry Pi launch date

The Raspberry Pi UK launch has already taken place for the Model B, with stocksselling out in a heartbeat, and more stock is expected in the next few weeks. What we've seen so far is a soft launch, however, with Raspberry Pi devices being bought by interested individuals rather than bought in bulk for schools.

The official EDUCATIONAL launch will take place later this year. The plan is to use existing customers as voluntary guinea pigs so that when the Pi hits schools, its "software will be more mature and free of obvious bugs, and easier for children and educators to use."

Chapter 3

REQUIREMENT AND SPECIFICATION:

3.1 Functional requirements:

- Our project provides some services like:
- Uploading files on the mobile.
- Sending files to the hardware.
- Full controlling of the sent file.
- Showing file to the LCD.

3.2 Nonfunctional requirements:

Efficiency: our system sends data to the hardware with high bandwidth using WIFI.

Usability: our system provides high usability through the smart phone application.

Security: through the login process, we prevent any hack to the system.

Performance: the system provides high performance through using raspberry pi kit.

Flexibility

- This System will be easy to learn and easy to use, also will be provide help page for all new users.
- Meaningful notification messages are displayed when some error happens.

Robustness

- No wrong information will be entered.

Accuracy

- The system will not permit to the users enter any invalid data.
- User and shop location must be accurate as possible.

Adaptability

- Our project Support adding new shopping list without effect on old one.
- Our project Support user to feedback each offer (ex: like, comment) individually.

Aesthetics

- The finished software has a nice view and appropriate to the nature of its work as a management program.
- All text will be clear and well readable.

Compatibility

- The system will be compatible with all mobile capable to run android program.

Frequency/Severity of Failure

- There will not be any unhandled exceptions from incorrect user input.

Human Factors

- GUI is user-friendly and attractive.
- Menus have a consistent format.

Chapter 4

INTERFACE DESIGN

In this chapter, sketches of each and every screens of the android application will be shown and explained thoroughly. This chapter can be served as guidelines for future developers of the application besides acting as a storyboard

4.1 Home Screen

Upon finshing from the setting screen ,user will be navigate into the home screen of the application as illustrated the figure below :-

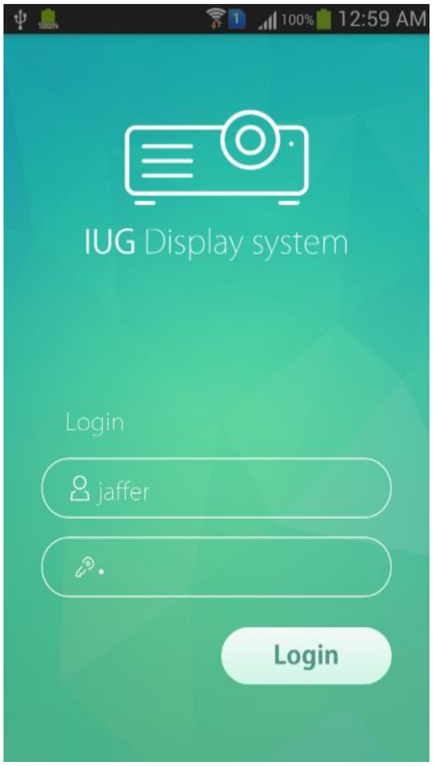


Figure 4.1-home screen of application

This screen will be lunched as the main screen after the first time run.

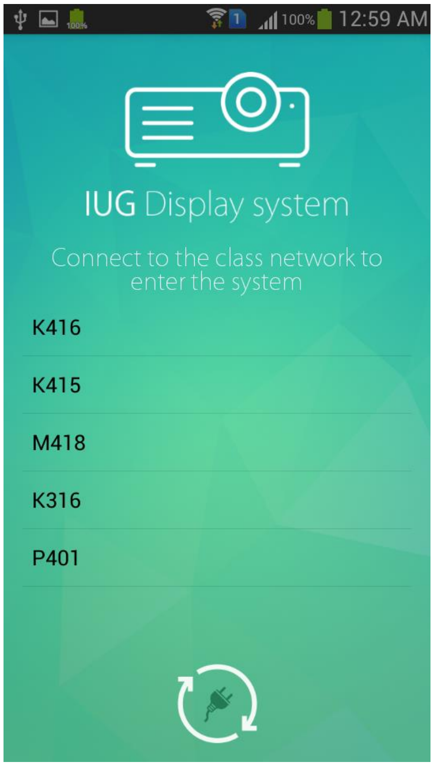
The characteristics of the home screen are :-

- The screen is contained two text field and login button.
- Fisrt text field for input user name that allow the user to insert the correct username.

- Seconed text field for password that allow the user to insert the correct password.
- The login button firstly checks the user name and password if there are correct or not befor passeing to Database then check them if are found in Database then logged to the next activity which is connection screen.

4.2 Connection screen

After logged into home screen correctly we show the seconed activity which specfies the class connection



IUG Display system

Connect to the class network to enter the system

K416

K415

M418

K316

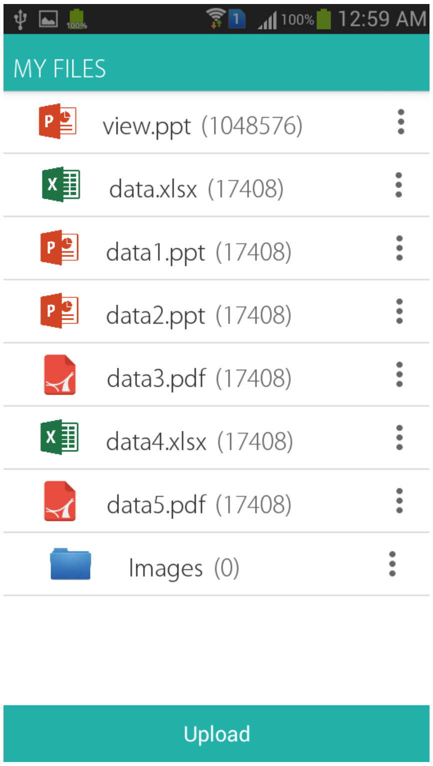
P401

Figure 4.2-connection screen of application

The characteristics of the connection screen are :-

The connect button view the available networks and connect to specific Ressperry pi network.

4.3 Main Screen



100% 12:59 AM

MY FILES

view.ppt (1048576)

data.xlsx (17408)

data1.ppt (17408)

data2.ppt (17408)

data3.pdf (17408)

data4.xlsx (17408)

data5.pdf (17408)

Images (0)

Upload

(Figure 4.3: Main screen)

In this screen, and after fetching the connection with the raspberry pi, the user will be able to do the following characteristics:

1- Knowing the name of the class which the user within.

2- Listing all files which the user uploaded it into the raspberry pi with the file name, size and thumbnail image for each file.

3- Options button which contains a list of options (which will illustrated in the next section).

4- Finally, upload button to allow the user to upload a new file into the raspberry pi.

4.4 Options screen

In this screen we have a list of four perations on file uploaded.

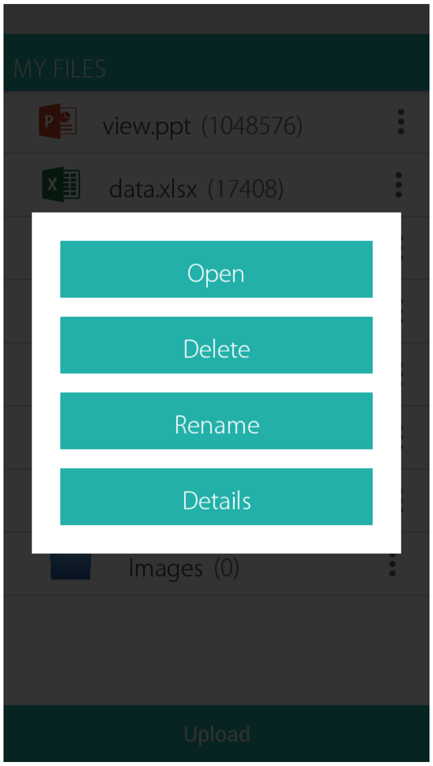


Figure 4.4-Options screen of application

The screen will be lunched after clicking on Options Button

The characteristics of the Options screen are :-

- The screen is contained four button which it have a main oprations on files uploaded
- First button can open existing file.
- Seconned button can delete existing file.
- Third button can rename existing file.
- Fourth button can view to useres the detailes about existing file.

4.5 File screen

In this screen, and after the user clicks to any file from the Main screen files list (Figure 4.3), the user will be transferred to this activity, which allow to user to be able to do the following characteristics:

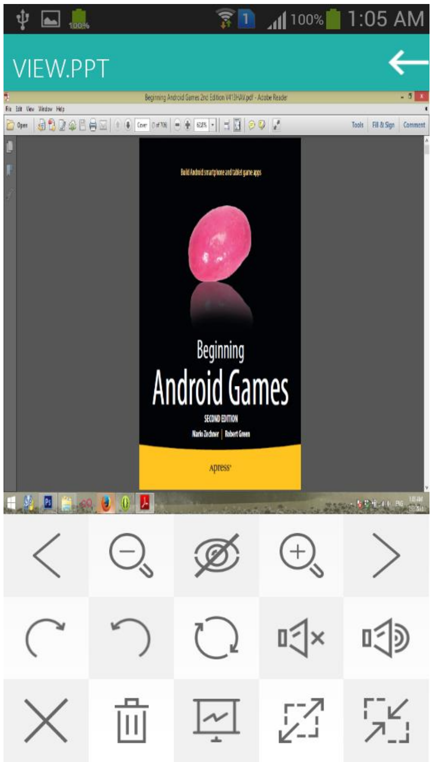


Figure 4.5-Options screen of application

- ❖ Firstly, this activity displays the file name which indicates to the currently opened file (the name will be the ID of the current class).
- ❖ Close button to allow user to close the current file and back automatically to the Main screen.
- ❖ Synchronized frame to make a synchronous view with the opened file on the raspberry pi.
- ❖ A group of control buttons to allow user to control with the opened file:
  - ➢ Right button :
  - ➢ Zoom in button:
  - ➢ Hide button:

- Zoom out button:
- Left button:
- Sound on button:
- Sound off button:
- Refresh button:
- Rotate left:
- Rotate right:
- Minimize button:
- Maximize button:
- Full screen button:
- Remove button:
- Exit button:

Finally, back button to close the opened file and returns the current user to the main screen.

Chapter 5
SYSTEM DESIGN

In this chapter, use cases and activity diagrams for the whole system will be illustrated.

5.1 Use case of System

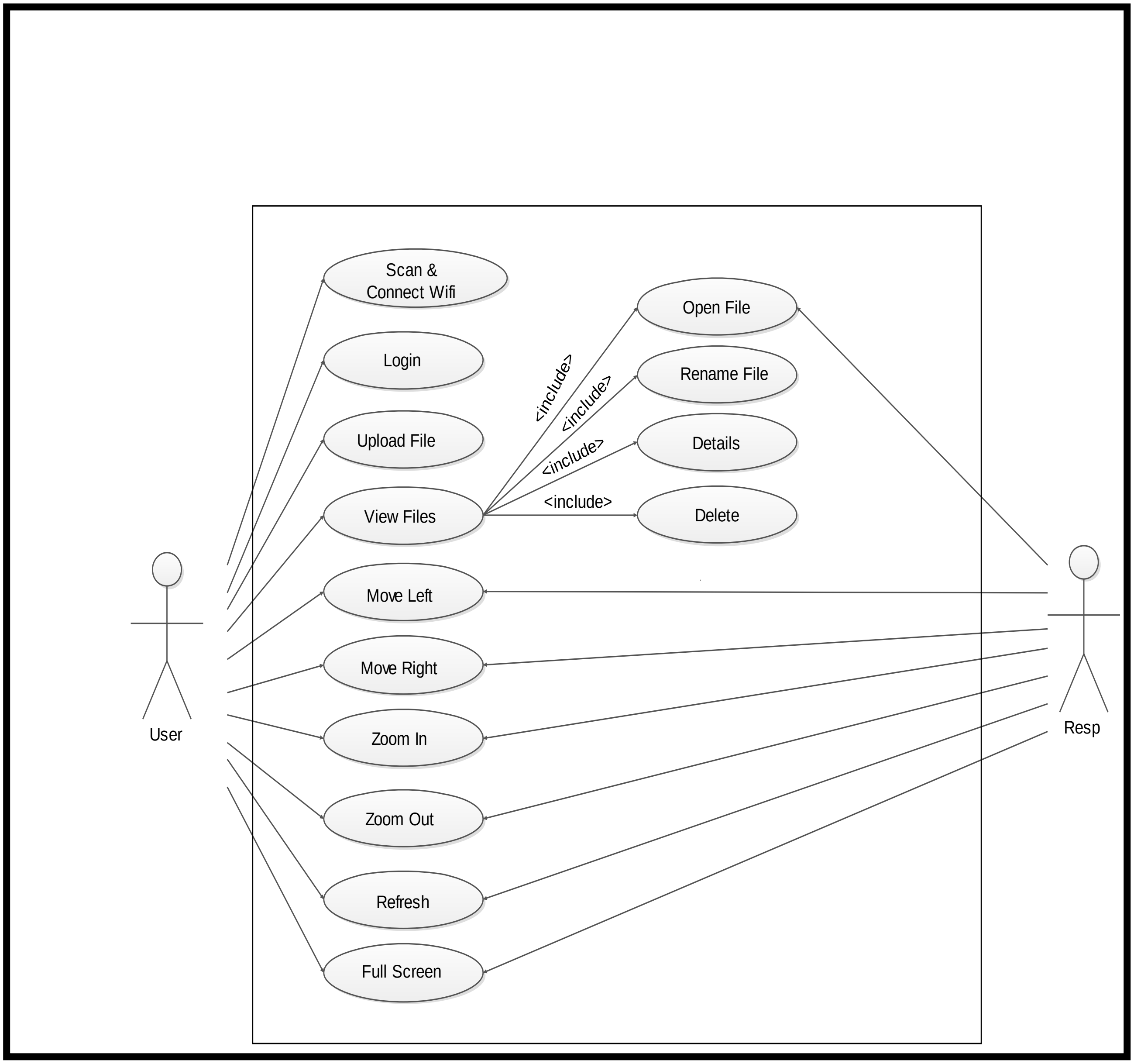


Figure 5.1.1– Use Case of system

5.2 Activity Diagrams of Project :

5.2.1 Login Cart Activity Diagram

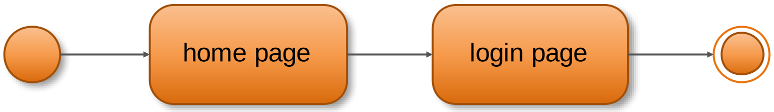


Figure 5.2.1.1– Login Cart Activity Diagram

5.2.2 Connect wifi Cart Activity Diagram

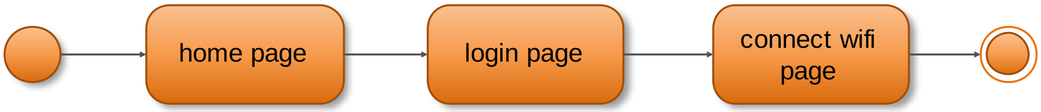


Figure 5.2.2.1- Connect wifi Cart Activity Diagram

5.2.3 Upload file Cart Activity Diagram

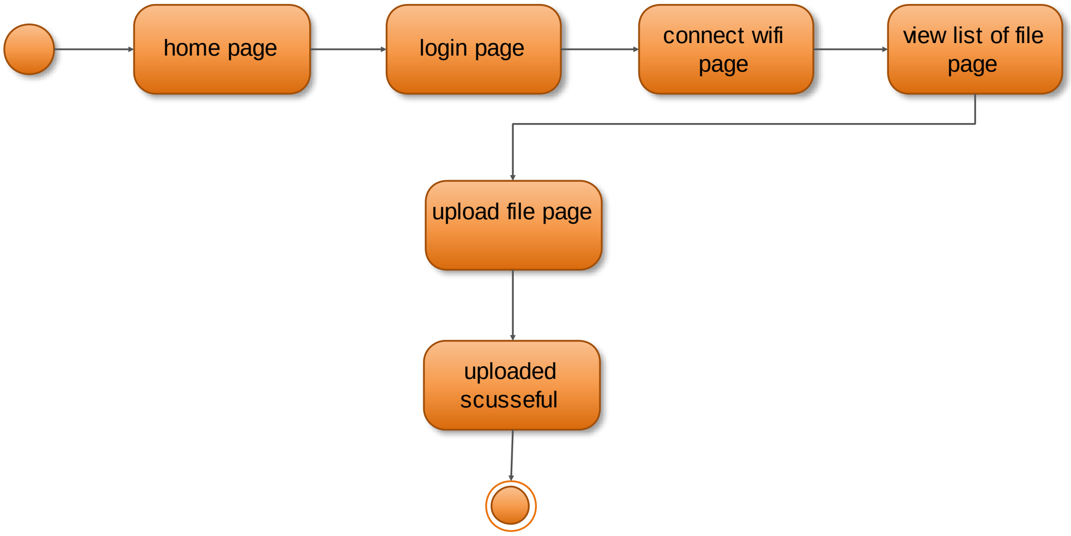


Figure 5.2.3.1-Upload file Cart Activity Diagram

5.2.4 View list of file Cart Activity Diagram

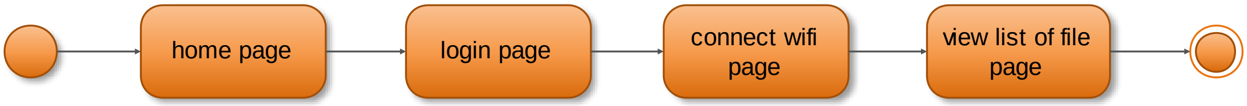


Figure 5.2.4.1 View list of file Cart Activity Diagram

5.2.5 View files Cart Activity Diagram

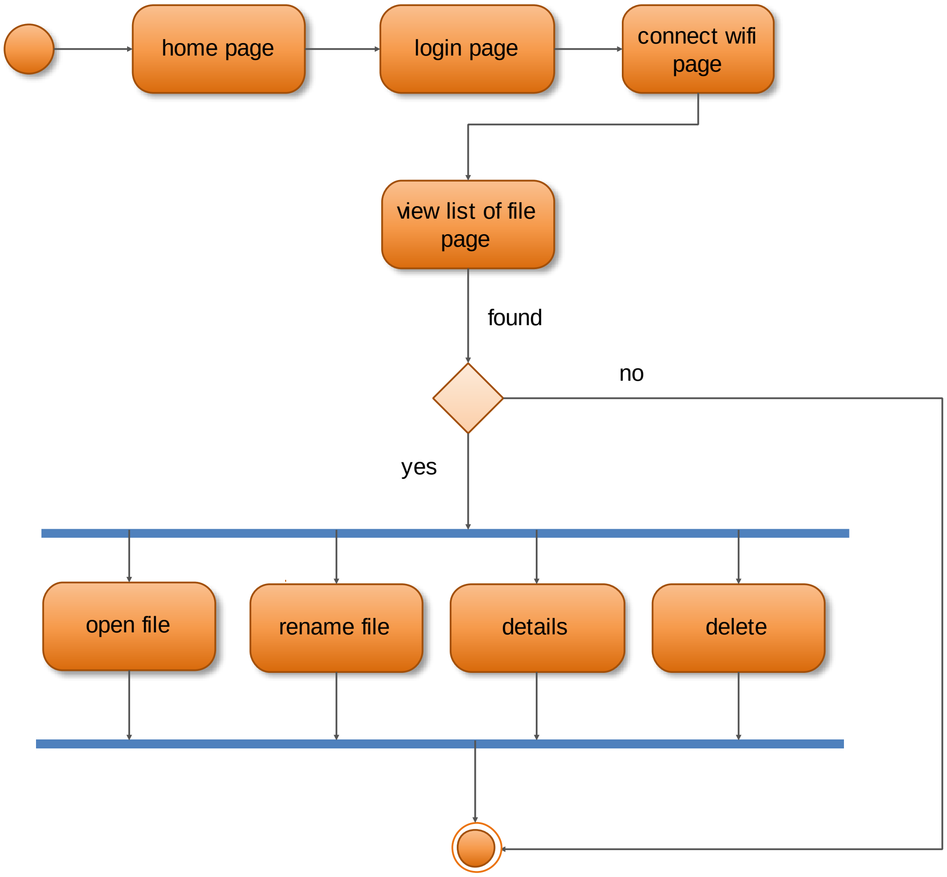


Figure 5.2.5.1 View files Cart Activity Diagram

5.2.6 Move left Cart Activity Diagram

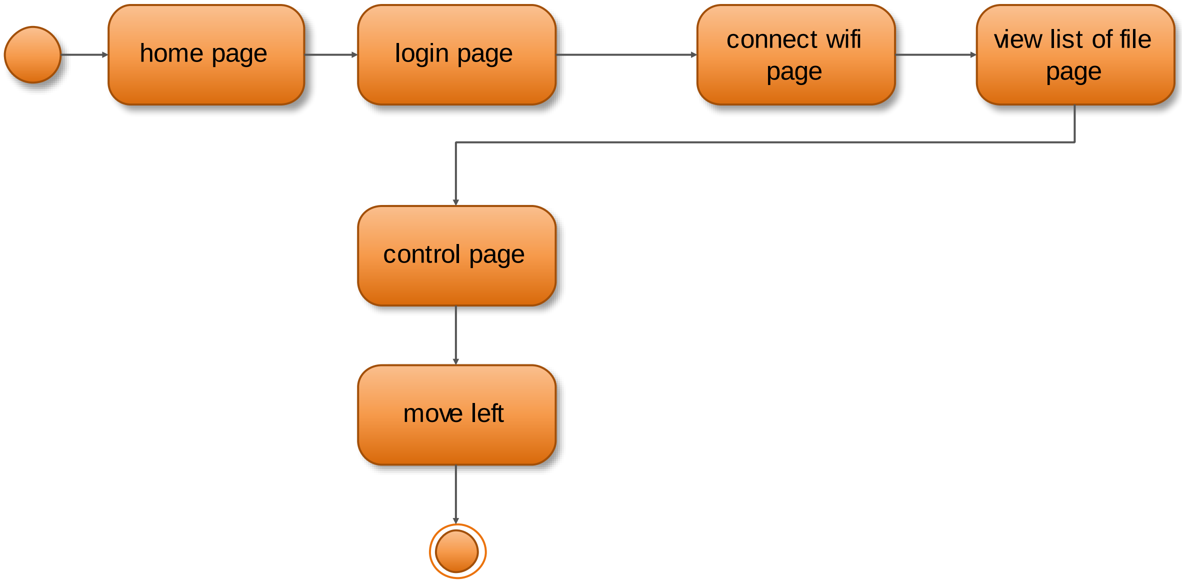


Figure 5.2.6.1 Move left Cart Activity Diagram

5.2.7 Move right Cart Activity Diagram

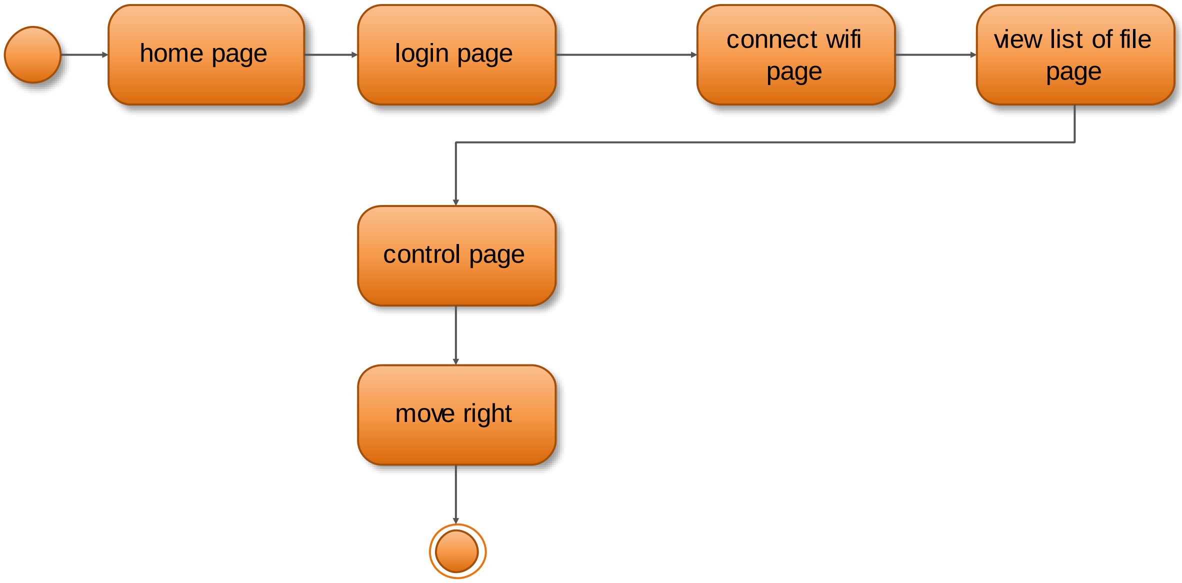


Figure 5.2.7.1 Move right Cart Activity Diagram

5.2.8 Zoom in Cart Activity Diagram

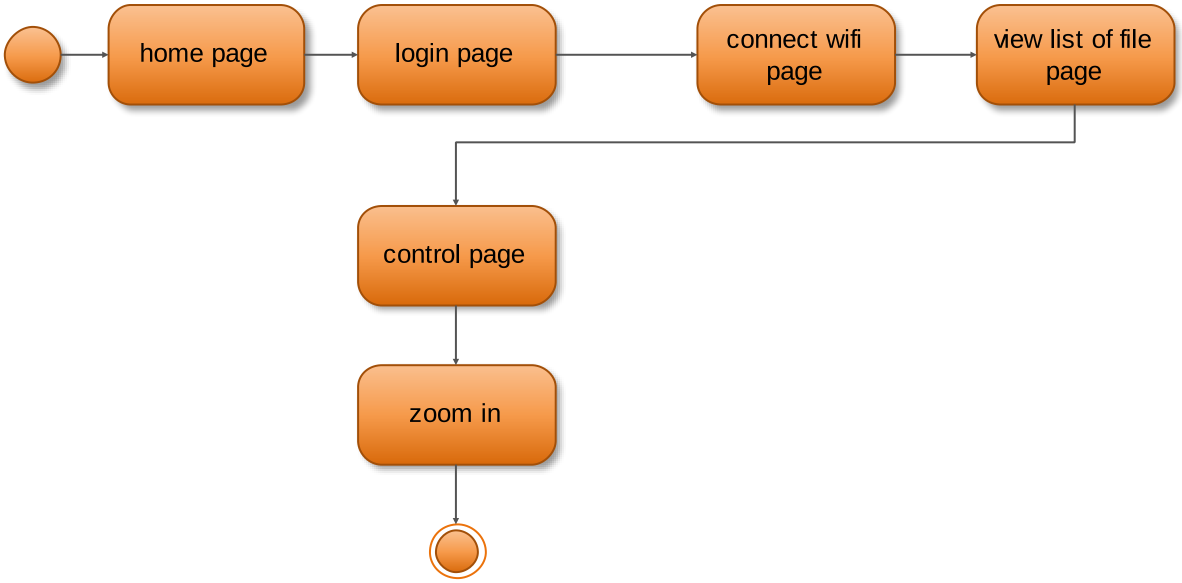


Figure 5.2.8.1 Zoom in Cart Activity Diagram

5.2.9 Zoom out Cart Activity Diagram

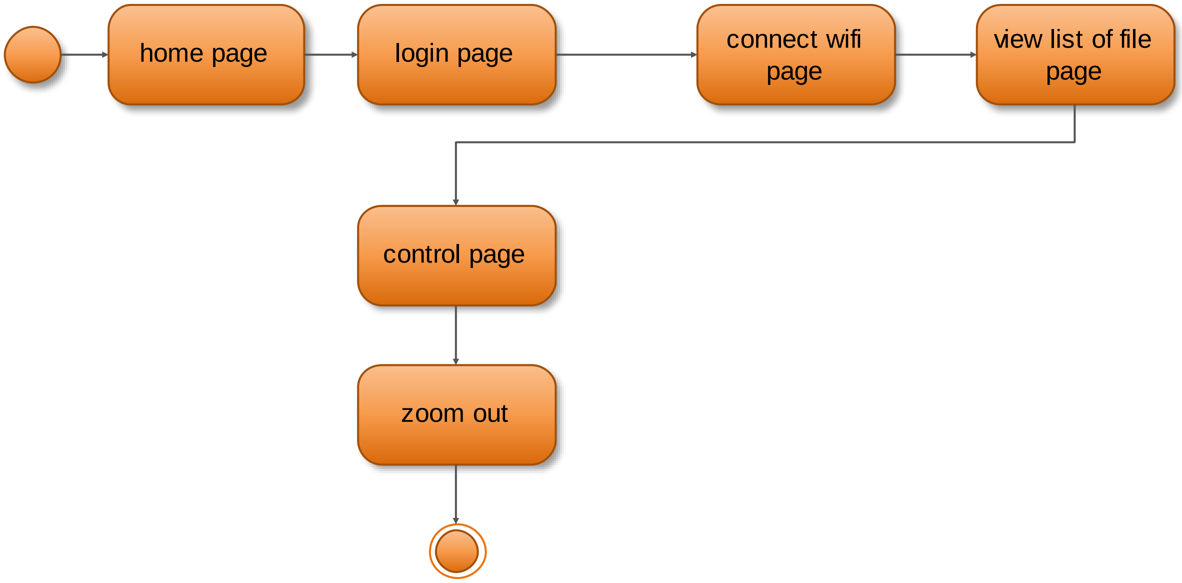


Figure 5.2.9.1 Zoom out Cart Activity Diagram

5.2.10 Refresh Cart Activity Diagram

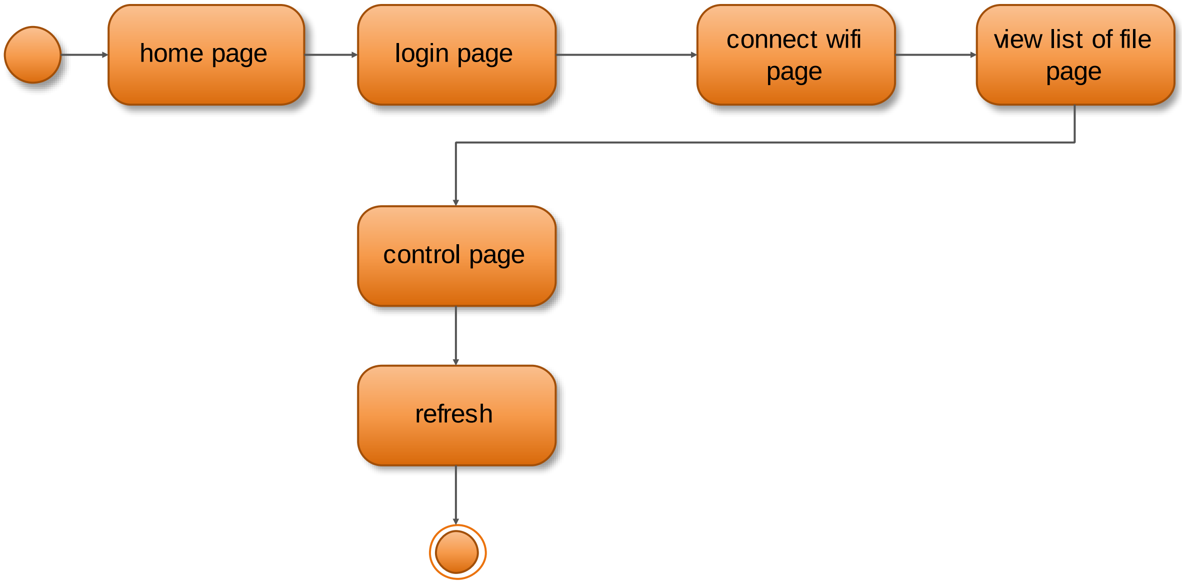


Figure 5.2.10.1 Refresh Cart Activity Diagram

5.2.11 Full screen Cart Activity Diagram

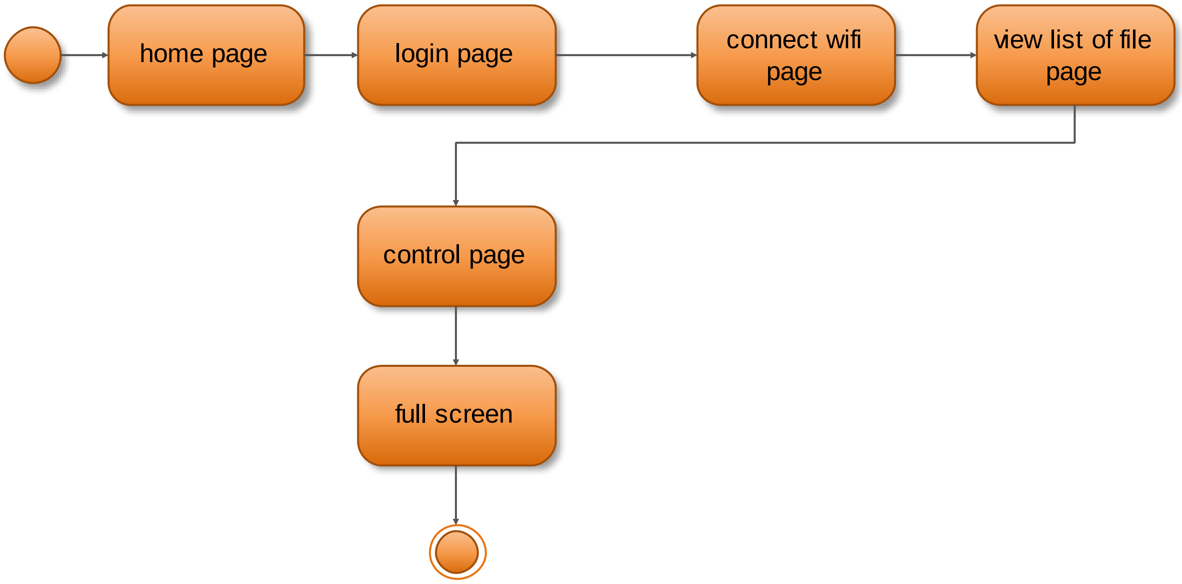


Figure 5.2.11.1 Full screen Cart Activity Diagram

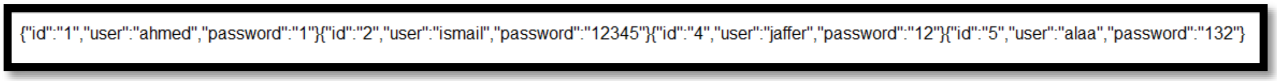
Chapter 6
SERVER AND DATA BASE

6.1 Server:

server is a php pages container , deal entirely with databases . Servers verifies the processof logging in , also used find out the ip that belongs to each classroom.

logging in methodology:

The mechanism of action for the validation of entry to be sent to the user name in addition to the Password Server through the mobile application for android http request and through which the research data on the health of the user name and Password rules if you find incorrect value is returned to the application through the Android json Array and http response following figure:

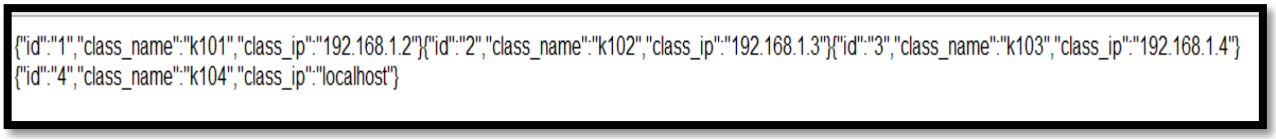


{"id":"1","user":"ahmed","password":"1"}{"id":"2","user":"ismail","password":"12345"}{"id":"4","user":"jaffer","password":"12"}{"id":"5","user":"alaa","password":"132"}

Figure 6.1.1 Login JSON format

The mechanism of action for knowing your IP Hall desired:

Is sent through the room name to http request of the mobile application is through the server send your ip Hall sent through json Array figure follows:

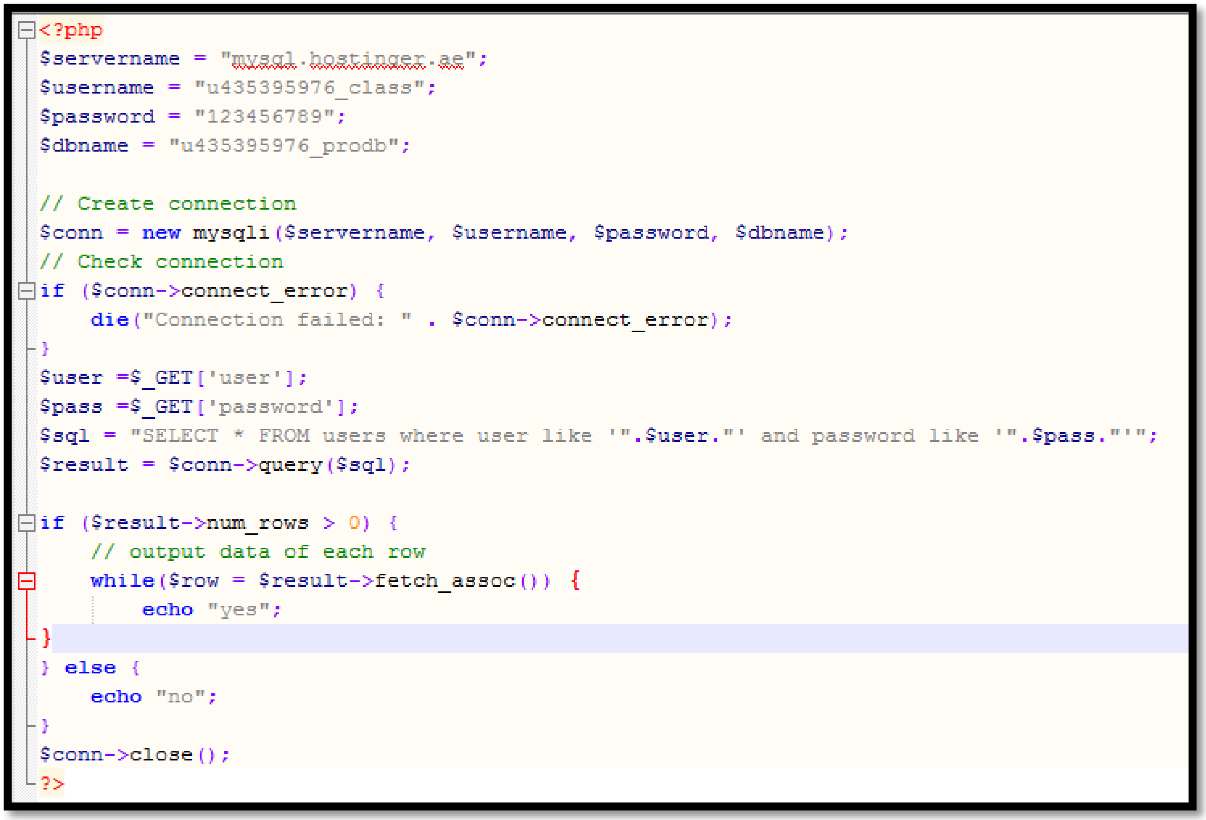


{"id":"1","class_name":"k101","class_ip":"192.168.1.2"}{"id":"2","class_name":"k102","class_ip":"192.168.1.3"}{"id":"3","class_name":"k103","class_ip":"192.168.1.4"}
{"id":"4","class_name":"k104","class_ip":"localhost"}

Figure 6.1.2 Classes JSON format

PHP code:

php pages consist of three pages:

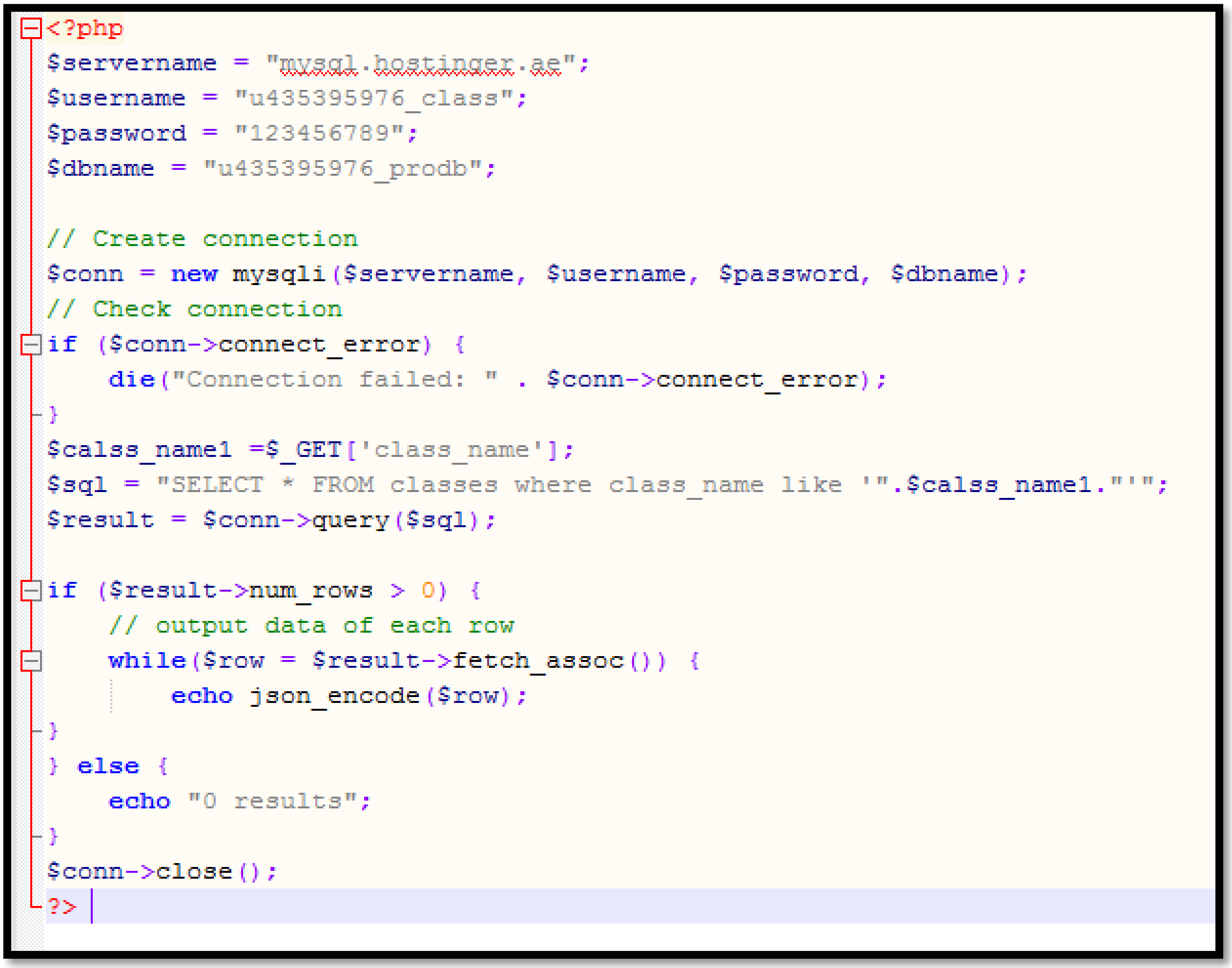


```
<?php
$servername = "mysql.hostinger.ae";
$username = "u435395976_class";
$password = "123456789";
$dbname = "u435395976_prodb";

// Create connection
$conn = new mysqli($servername, $username, $password, $dbname);
// Check connection
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}
$user =$_GET['user'];
$pass =$_GET['password'];
$sql = "SELECT * FROM users where user like '".$user."' and password like '".$pass."'";
$result = $conn->query($sql);

if ($result->num_rows > 0) {
    // output data of each row
    while($row = $result->fetch_assoc()) {
        echo "yes";
}
} else {
    echo "no";
}
$conn->close();
?>
```

Figure 6.1.3 PHP login code

check.php : This page user and password verification and return true or false.

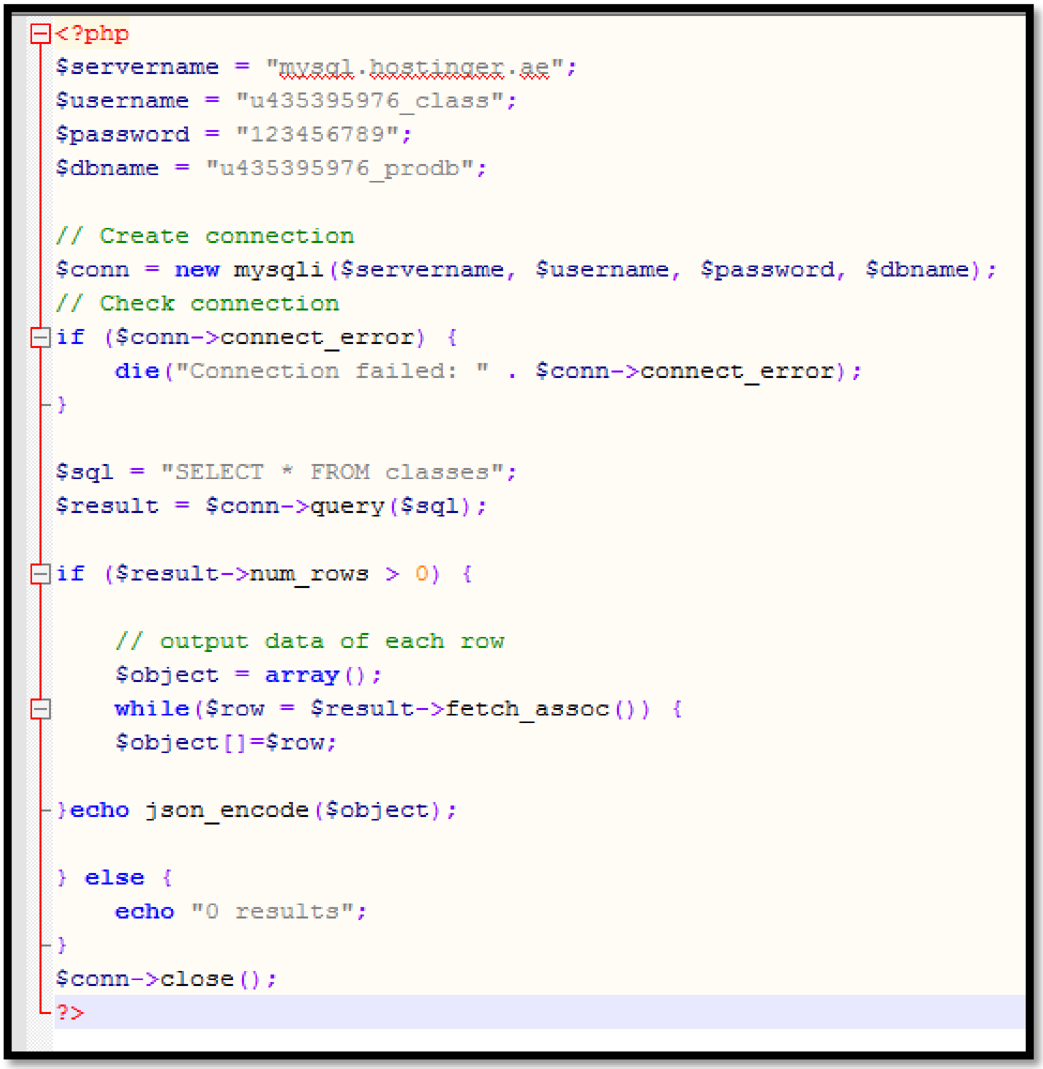
This page receives classroom name and return ip.



```
<?php
$servername = "mysql.hostinger.ae";
$username = "u435395976_class";
$password = "123456789";
$dbname = "u435395976_prodb";

// Create connection
$conn = new mysqli($servername, $username, $password, $dbname);
// Check connection
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}
$calss_name1 =$_GET['class_name'];
$sql = "SELECT * FROM classes where class_name like '".$calss_name1."'";
$result = $conn->query($sql);

if ($result->num_rows > 0) {
    // output data of each row
    while($row = $result->fetch_assoc()) {
        echo json_encode($row);
}
} else {
    echo "0 results";
}
$conn->close();
?>
```

Figure 6.1.4 PHP code to recive name and returm IP

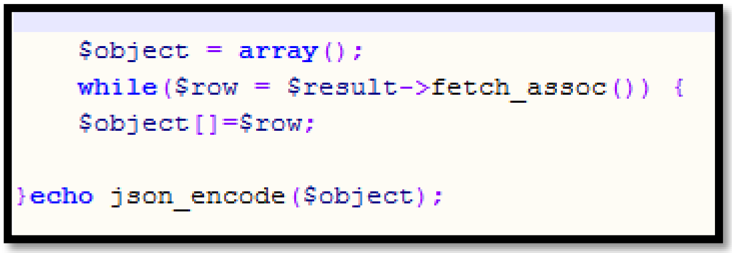
This page get all class name and ip



```php
<?php
$servername = "mysql.hostinger.ae";
$username = "u435395976_class";
$password = "123456789";
$dbname = "u435395976_prodb";

// Create connection
$conn = new mysqli($servername, $username, $password, $dbname);
// Check connection
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}

$sql = "SELECT * FROM classes";
$result = $conn->query($sql);

if ($result->num_rows > 0) {

    // output data of each row
    $object = array();
    while($row = $result->fetch_assoc()) {
    $object[]=$row;

}echo json_encode($object);

} else {
    echo "0 results";
}
$conn->close();
?>
```

Figure 6.1.5 PHP code to return all classes with its IP’s

PHP code to convert from Array to json Array:

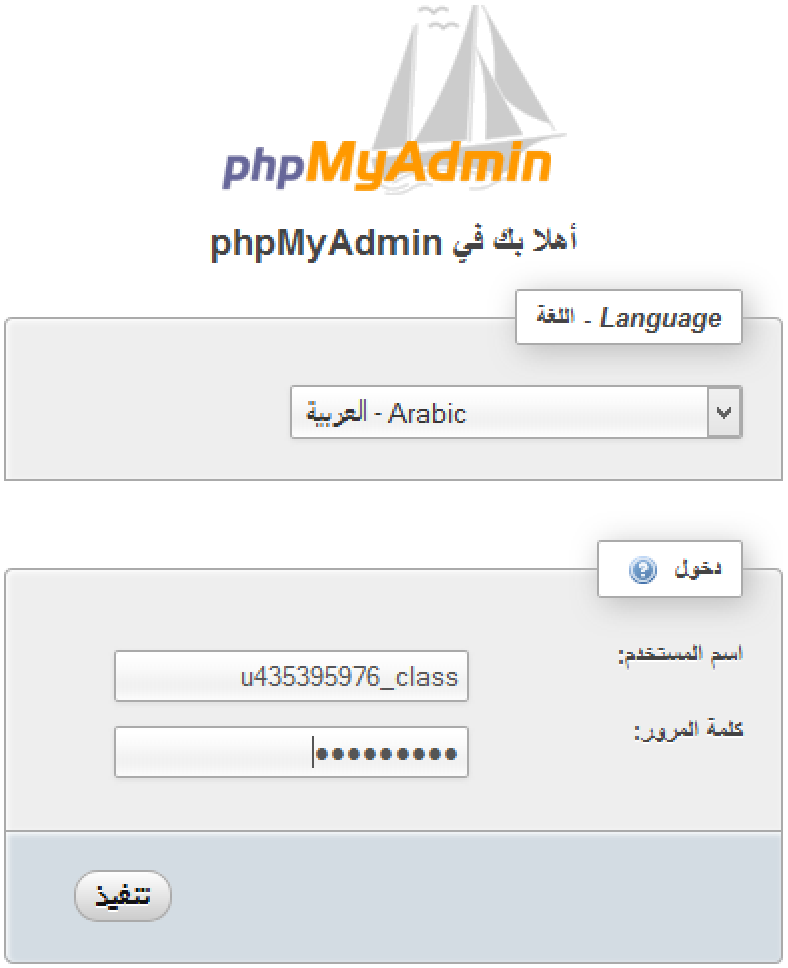


```php
    $object = array();
    while($row = $result->fetch_assoc()) {
    $object[]=$row;

}echo json_encode($object);
```

Figure 6.1.6 PHP code to convert from Array to json Array

6.2 Database:

I have been using Mysql to deal with the data and the creation of DataBase



أهلا بك في phpMyAdmin

اللغة - Language

العربية - Arabic

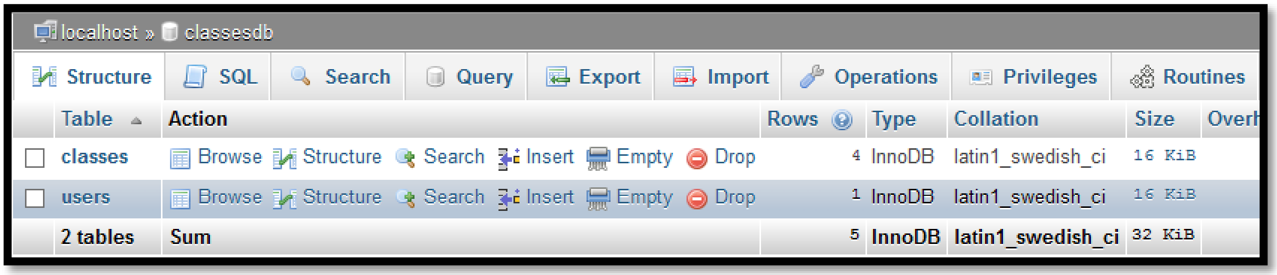
دخول

اسم المستخدم: u435395976_class

كلمة المرور: ●●●●●●●●●

Figure 6.2.1 Example of PHP Admin

database name classesDB consist of two table



localhost » classesdb

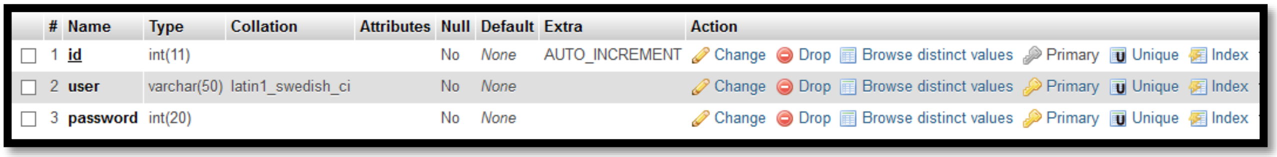
Structure | SQL | Search | Query | Export | Import | Operations | Privileges | Routines

	Table	Action	Rows	Type	Collation	Size	Overh
□	classes	Browse Structure Search Insert Empty Drop	4	InnoDB	latin1_swedish_ci	16 KiB	
□	users	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 KiB	
	2 tables	Sum	5	InnoDB	latin1_swedish_ci	32 KiB	

Figure 6.2.2 Database tables

Users:

It consists of three columns (id, user, password) user

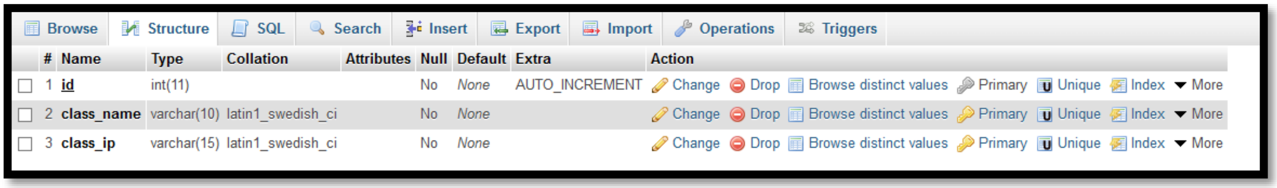


	#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
□	1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index
□	2	user	varchar(50)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index
□	3	password	int(20)			No	None		Change Drop Browse distinct values Primary Unique Index

Figure 6.2.3 Users table

Classes:

It consists of three columns (id, class_name, class_ip)

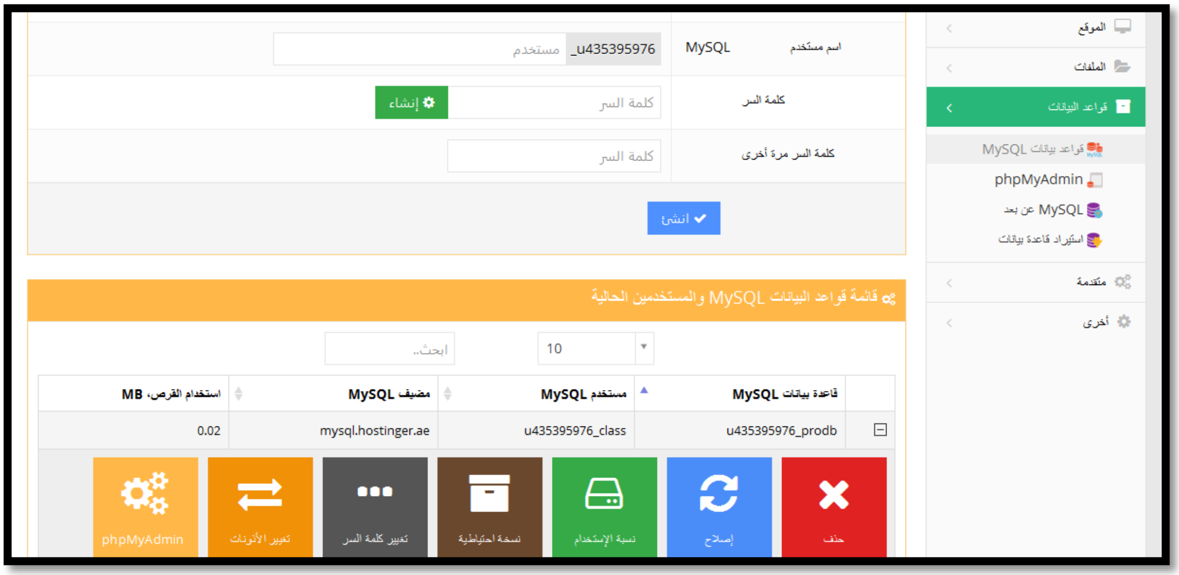


Browse | Structure | SQL | Search | Insert | Export | Import | Operations | Triggers

	#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
□	1	id	int(11)			No	None	AUTO_INCREMENT	Change Drop Browse distinct values Primary Unique Index More
□	2	class_name	varchar(10)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More
□	3	class_ip	varchar(15)	latin1_swedish_ci		No	None		Change Drop Browse distinct values Primary Unique Index More

Figure 6.2.4 Classes table

Was raised pages on free hosting in addition to databases.



اسم مستخدم MySQL	u435395976_ مستخدم
كلمة السر	كلمة السر
كلمة السر مرة أخرى	كلمة السر

قائمة قواعد البيانات MySQL والمستخدمين الحالية

قاعدة بيانات MySQL	مستخدم MySQL	مضيف MySQL	استخدام القرص، MB
u435395976_prodb	u435395976_class	mysql.hostinger.ae	0.02

Figure 6.2.4 Free hosting server

Chapter 7
IMPLEMENTATİON AND DEPLOYMENT

This chapter includes descriptions on what software and language are used for the development of android application and Rassbperry pi . Critical factors that will affect the launching of the application will also be stated out as guidelines and error prevention. Next, special background features will also be explained with the aid of partial programming codes as references

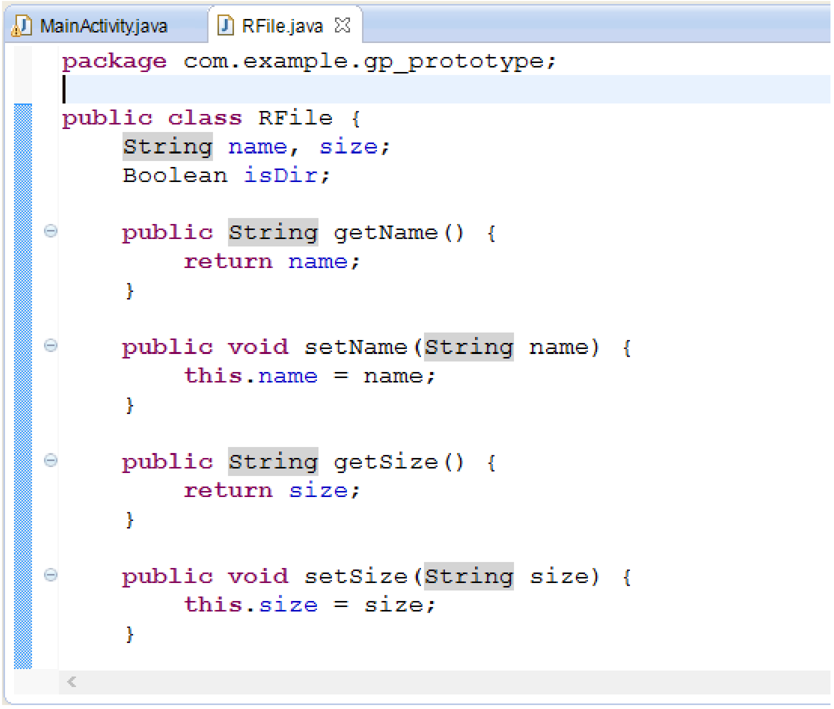
7.1 Language Used

7.1.1 Android

In the development of android application, the following programming languages are used:-

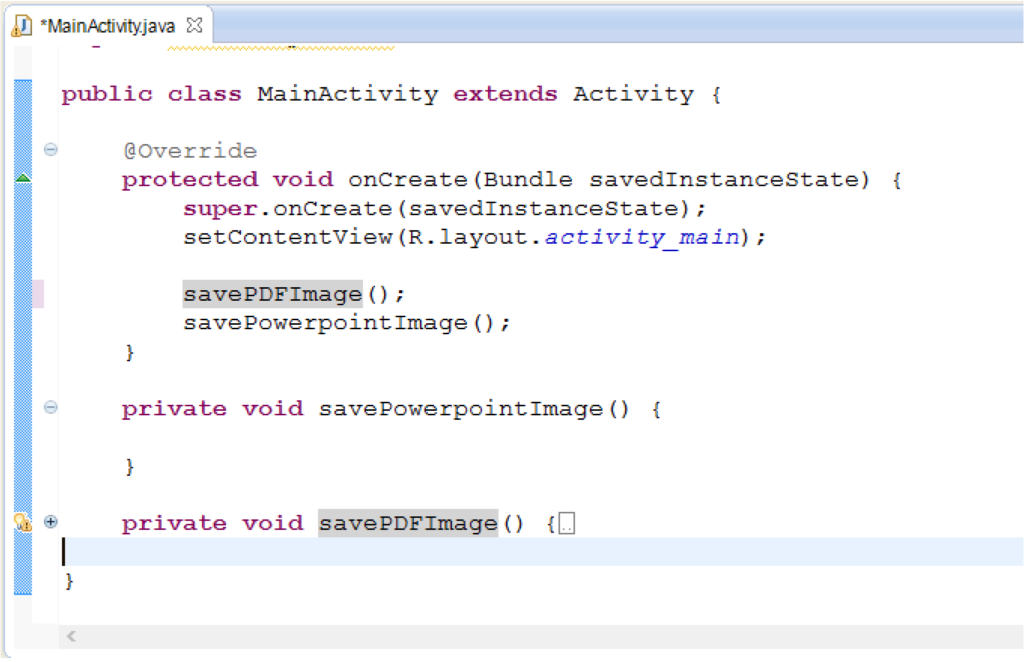
- **Java Programming Language**

As mentioned earlier in Chapter 2: Literature Review, development of Android applications require the foundation, knowledge and skills in using Java as this language is the main programming language supported by Android. Thus, Java concepts such as inheritance, usage of superclass and subclass and abstract and Java syntaxes are applied throughout the development of our application (using the Eclipse software). The following figures shows a part of the Java environment with basic examples of how main class is initiated and methods are written and called and show main activity of our android application :-



```java
package com.example.gp_prototype;

public class RFile {
    String name, size;
    Boolean isDir;

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getSize() {
        return size;
    }

    public void setSize(String size) {
        this.size = size;
    }
```

Figure 7.1.1.1 Java Programming Language

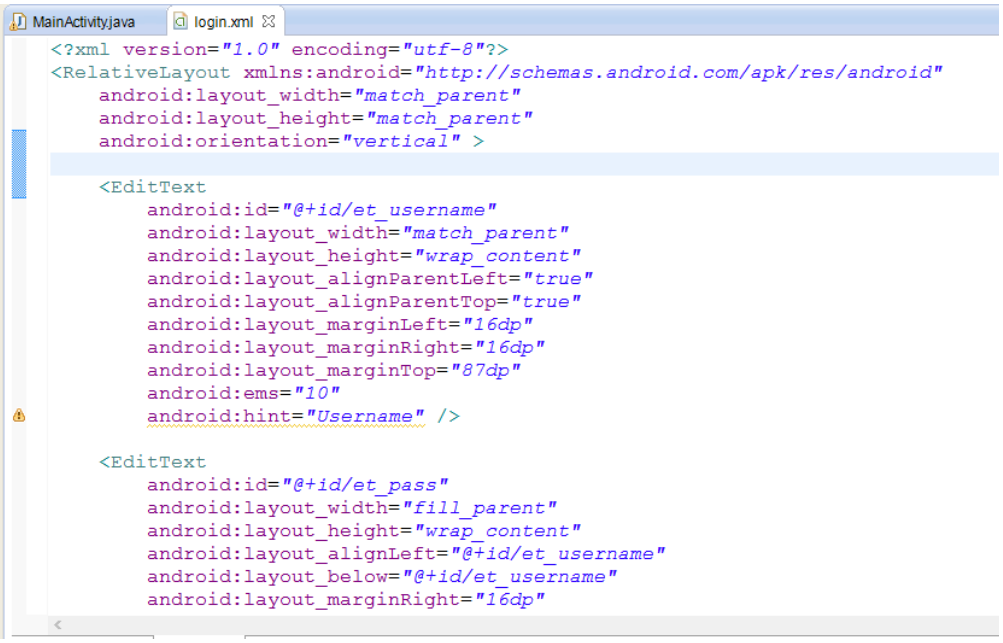


```java
public class MainActivity extends Activity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        savePDFImage();
        savePowerpointImage();
    }

    private void savePowerpointImage() {

    }

    private void savePDFImage() {□

}
```

Figure 7.1.1.2 Main Activity Java Programming Language

❖ Extensible Markup Language (XML)

XML is generally used to manipulate the layout for each screen involved in the Android application. The coding standards used shall comply with the type of Android layouts applied on each screen such as RelativeLayout, LinearLayout, AbsoluteLayout or Scrollable Layout (each with their own rules) and also Android specified terms and standards. The following figure shows an partial code example of how the manipulation of a screen layout is done using XML in Eclipse:-



```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >

    <EditText
        android:id="@+id/et_username"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_alignParentLeft="true"
        android:layout_alignParentTop="true"
        android:layout_marginLeft="16dp"
        android:layout_marginRight="16dp"
        android:layout_marginTop="87dp"
        android:ems="10"
        android:hint="Username" />

    <EditText
        android:id="@+id/et_pass"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/et_username"
        android:layout_below="@+id/et_username"
        android:layout_marginRight="16dp"
```

Figure 7.1.1.2 Extensible Markup Language (XML)

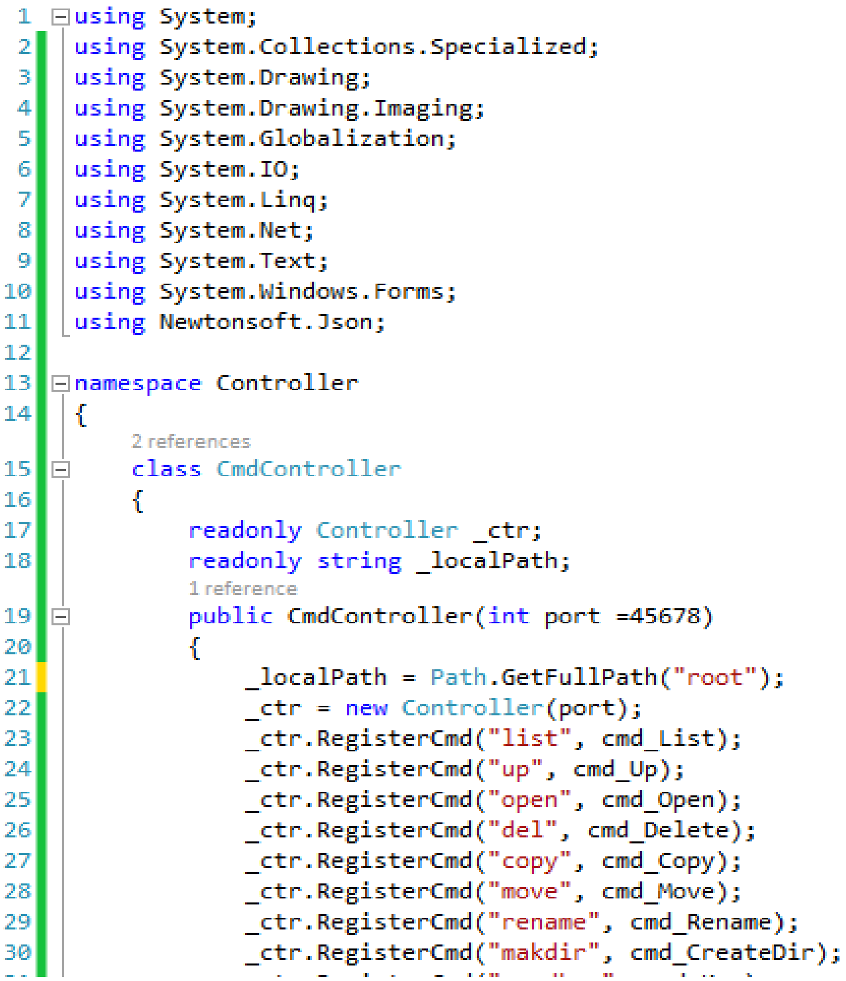
7.1.2 Rassperry pi

- ❖ The most important languages that run on Rassbpery pi:

  Java | C # | C | C ++ | Python

- ❖ In the project we used the C # mainly and C / C ++ for orders that deal directly with the system

The fact that the piece operates on systems running Mbenah Allinieks especially shown on the Debian distribution, it means it operates the majority of the programs that run them, especially programs that display the Office files



```
using System;
using System.Collections.Specialized;
using System.Drawing;
using System.Drawing.Imaging;
using System.Globalization;
using System.IO;
using System.Linq;
using System.Net;
using System.Text;
using System.Windows.Forms;
using Newtonsoft.Json;

namespace Controller
{
    2 references
    class CmdController
    {
        readonly Controller _ctr;
        readonly string _localPath;
        1 reference
        public CmdController(int port =45678)
        {
            _localPath = Path.GetFullPath("root");
            _ctr = new Controller(port);
            _ctr.RegisterCmd("list", cmd_List);
            _ctr.RegisterCmd("up", cmd_Up);
            _ctr.RegisterCmd("open", cmd_Open);
            _ctr.RegisterCmd("del", cmd_Delete);
            _ctr.RegisterCmd("copy", cmd_Copy);
            _ctr.RegisterCmd("move", cmd_Move);
            _ctr.RegisterCmd("rename", cmd_Rename);
            _ctr.RegisterCmd("makdir", cmd_CreateDir);
```

Figure 7.1.2.1 C sharp code

7.2 Software Used

Software used for the development, implementation and deployment of Android Application and Rasspbery pi is listed as follows:-

7.2.1 Android

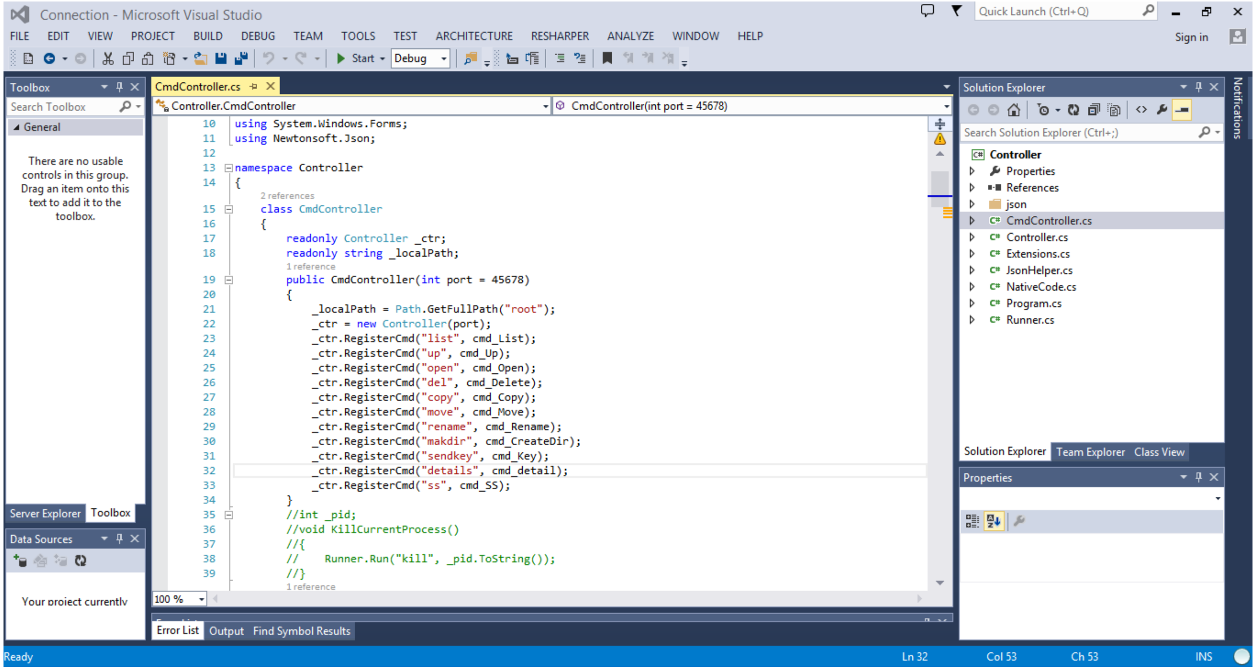
Eclipse SDK Version 4.2.1 – Main development platform. Make sure Android SDK is included when being installed for Android application development. Supports Java and XML.

7.2.2 *Rasspbery* pi

- **Visual Studio**

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows, as well as web sites, web applications and web services. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Storeand Microsoft Silverlight. It can produce both native code and managed code.

We used Visual studio to write and develop main code of the controller in C# that will run on the raspberry Pi to receive requests from client android device and execute commands.



```
using System.Windows.Forms;
using Newtonsoft.Json;

namespace Controller
{
    class CmdController
    {
        readonly Controller _ctr;
        readonly string _localPath;
        public CmdController(int port = 45678)
        {
            _localPath = Path.GetFullPath("root");
            _ctr = new Controller(port);
            _ctr.RegisterCmd("list", cmd_List);
            _ctr.RegisterCmd("up", cmd_Up);
            _ctr.RegisterCmd("open", cmd_Open);
            _ctr.RegisterCmd("del", cmd_Delete);
            _ctr.RegisterCmd("copy", cmd_Copy);
            _ctr.RegisterCmd("move", cmd_Move);
            _ctr.RegisterCmd("rename", cmd_Rename);
            _ctr.RegisterCmd("makdir", cmd_CreateDir);
            _ctr.RegisterCmd("sendkey", cmd_Key);
            _ctr.RegisterCmd("details", cmd_detail);
            _ctr.RegisterCmd("ss", cmd_SS);
        }
        //int _pid;
        //void KillCurrentProcess()
        //{
        //    Runner.Run("kill", _pid.ToString());
        //}
```

There are no usable controls in this group. Drag an item onto this text to add it to the toolbox.

Figure 7.2.2.1.1 Sample of code on Visual Studio

❖ Code Blocks

Is a free, open source cross-platform IDE which supports multiple compilers including GCC, Clang and Visual C++ It is developed in C++ using wxWidgets as the GUI toolkit. Using a plugin architecture, its capabilities and features are defined by the provided plugins. Currently, Code::Blocks is oriented towards C, C++, and Fortran. It has a custom build systemand optional Make support.

Code::Blocks is being developed for Windows, Linux, and Mac OS X and has been ported to FreeBSD, OpenBSD andSolaris.

We used CodeBlocks under rasbian on the raspberry pi to write, develop and test native C/C++ code.

❖ Installation of the system:

We found a mechanism to load the operating system on the segment without the need to associate them with the screen through the following:

1. Download the Operating system that we want to install a copy of the site from the following link http://www.raspberrypi.org/downloads/

We chose a copy of Rasbian a high Debian based for two reasons.

- Supports giving orders through cmdline file This was the first solution to the problem

- Are the most support system from the company. also supported by Mono the cross platform implementation of C # (.net frame work)

2. Download Win32 Disk Image program from the following link

http://win32diskimager.sourceforge.net/

It is a program used to back up a disk full of Partion Table and FileSystm and later retrieved. here we use it to restore the backup of pre-installed system image

3. Insert sd card into card reader

4. Open the program selecet the rasbian imag path and click write

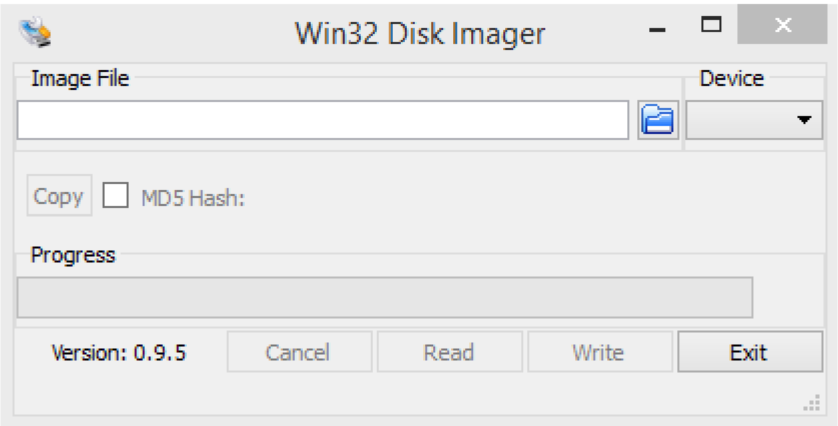


Figure 7.2.2.3.1 Installation of the system on Rasspbery pi

Rassbpery pi Running using Windows Interface: This solution to the stage of development not final presentation when view we use either vedio input or HDMI input.

Of the most commonly used methods was the process of creating SSH connection with the Rassbpery pi , but the problem was in the IP. The solution was to use the distribution rasbian it allows identifying IP before running the object , we illustrat the steps in the Appendix.

7.3 Libraries Used

7.3.1 Android

Android Libraries used for the development, implementation and deployment of our application are listed as follows:-

- **android-smart-image-view**

Is an open source library which is a drop-in replacement for Android's standard ImageView which additionally allows images to be loaded from URLs or the user's contact address book. Images are cached to memory and to disk for super fast loading.

We used this library to make a synchronous view between raspberry pi kit and smartphone, which is used to view the raspberry's screen on the smart phone.

Note: You can use FTP apache library to upload files from smartphone to raspberry pi if you used another library provides Linux header format on raspberry pi, but we didn't use it because the file's header format on raspberry pi accepts Windows format while we send Linux header format from smartphone.

7.3.2 Rasspbery pi

- **Mono implementation of .Net standard libraries**

For the C# program to run on any platform, it must use Mono platform, which uses modified version of the standard libraries of .Net platform.

- **Newtonsoft.Json: Open source .net implementation of Json Data Format:**

The comuniation between the controller on Raspberry Pi and clinet android devices, uses Json data format as strandard way to structure the parameter and response.

To accomplish this we needed comprehensive implementation of Json data format in C#, which is provided by this library.

- **X11 (X-Window System):**

The X Window System (X11, X, and sometimes informally X-Windows) is a windowing system forbitmap displays, common on UNIX-like computer operating systems.

To capture screenshots, and send control signals, we uses the System calls provided the X-Window kernel module.

- **XDoTool:**

A command line utility that can automate x11 GUI tasks such as focusing and moving windows, switching between desktops, and sending key presses and mouse clicks to windows programmatically.

The library is an open source project where its functionality can be used in another project.

We used this library to send key signals to the controlled applications.

7.4 Critical Factors & Vital Steps in Development

The following are the critical factors or important steps which should be acknowledged by developers during the development of Android Application and Rassbpery pi . Ignorance of these factors or steps will eventually cause the application to have errors or could not be launched accordingly**.**

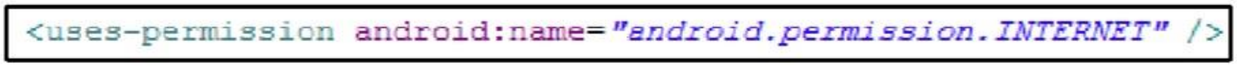
7.4.1 Android

- **Debugging Project Using Physical/Real Device**

  Instead of Android Virtual Device (AVD) provided in Eclipse which takes time to launch a project, developers may choose to debug project using own/real smartphone device for better efficiency and look-and-feel.

- **Permission for Application to Access Internet**

  requires Internet access for functions that requires retrieval and manipulation of data stored in the web server, viewing Google map and share on Facebook. By default, any Android application will never allow access to the Internet unless given permission to do so. To grant an application to use access the Internet, include this line of code right after the <manifest> tag in the project's manifest XML file (in this case, Manifest):

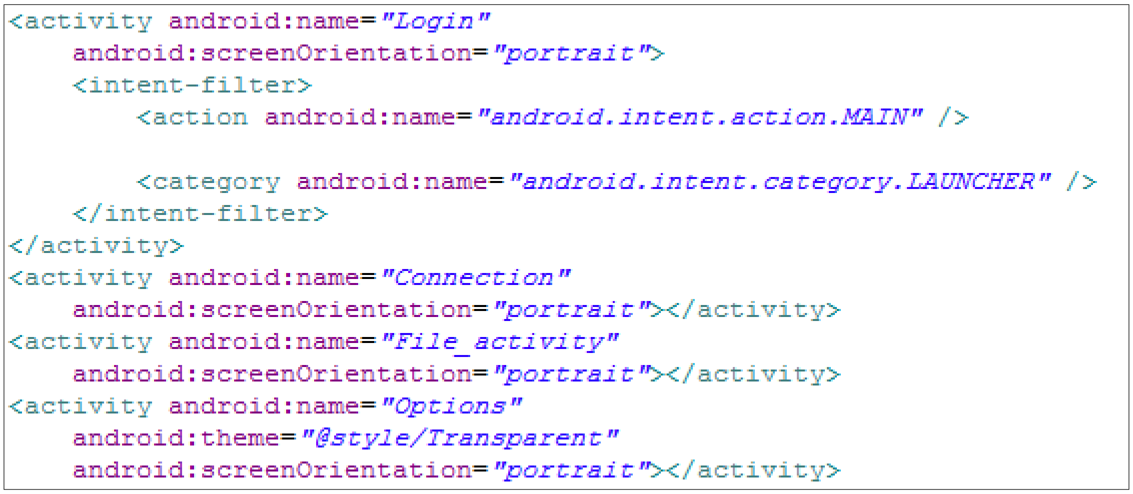


```
<uses-permission android:name="android.permission.INTERNET" />
```

- **Java Activities in Manifest**

In Eclipse IDE there are two ways to create your activity, either from New > Others > android activity or by creating a java class extends Activity.

And as we know each activity in your application must be registered in Manifest.xml file, the first way will register the activity implicitly, but the second way does not register it, you must register it manually to avoid exceptions as the following figure:

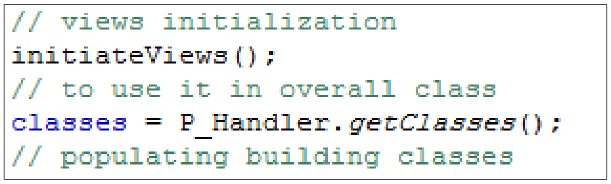


```
<activity android:name="Login"
    android:screenOrientation="portrait">
    <intent-filter>
        <action android:name="android.intent.action.MAIN" />

        <category android:name="android.intent.category.LAUNCHER" />
    </intent-filter>
</activity>
<activity android:name="Connection"
    android:screenOrientation="portrait"></activity>
<activity android:name="File_activity"
    android:screenOrientation="portrait"></activity>
<activity android:name="Options"
    android:theme="@style/Transparent"
    android:screenOrientation="portrait"></activity>
```

Figure 7.4.1.1 Java Activities in Manifest

- **Java methods ordering**

In our project, and according to the standard programming syntax, we made every process as a function, but there is an issue, you must use according to its ordering in the documentations, because the disordering of the functions may rise exceptions, for example, in the next figure we have two methods, the first is to initiates views from xml file, and the second is to getting data and populate it into list view, here if we populate data into list view before initialize it there is a **NullPointerException** raised, because there is no view to use it



```
// views initialization
initiateViews();
// to use it in overall class
classes = P_Handler.getClasses();
// populating building classes
```

Figure 7.4.1.2 Java methods ordering

7.4.2 Rasspbery pi

Establishing Wireless contact:

Rassbpery pi doesn’t come with embded wifi interface, but we can insert usb wirless driver the problem was that Rasbian OS puts every wirless interface into down mode, so to operate on it we must start it first, using the following command sudo ifup wlan0

In order to run the command on boot use the following cmd

1. Create a file for your startup script and write your script in the file:

```
$ sudo nano /etc/init.d/startupscript
```

2. Save and exit: Ctrl+X, Y, Enter

3. Make the script executable:

```
$ sudo chmod +x /etc/init.d/startupscript
```

4. Register script to be run at startup:

```
$ sudo update-rc.d startupscript defaults
```

7.5 Special Features

7.5.1 Android

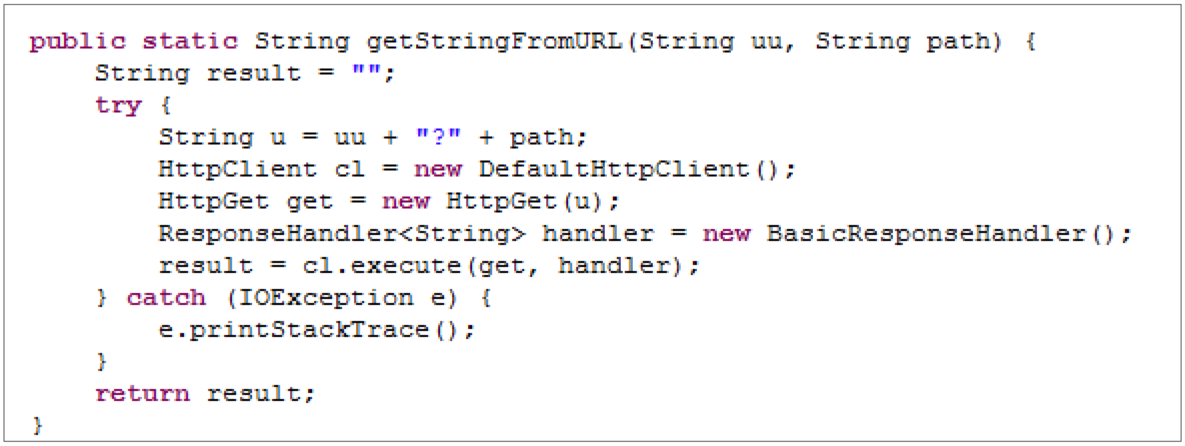
In the development of our project, the following features/techniques/methods are used in order for the program to run as expected:-

- **JSON**

JSON as mentioned in Chapter 2: Literature Review, is a method to access information in an organized, effective and efficient way. In the development of our project, JSON had been used in almost 80% of java classes, it is used as a way to retrieve directory’s/file’s data from raspberry pi, also as a way to retrieve the classes with its static IP from a web page.

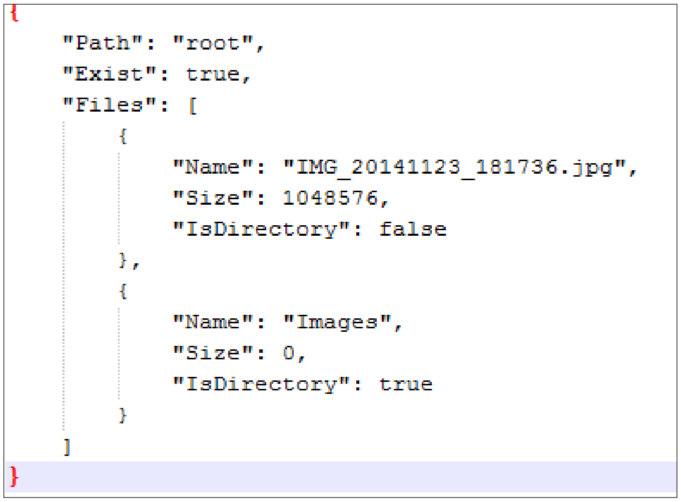
The following steps show how JSON is executed in an attempt to retrieve data from the web server and displayed via the smartphone application.

The first step is to make a HTTPRequest to the raspberry pi by request some URL from it (for example: **192.168.43.201:45678/r?cmd=list**), this request returns a JSON objet contains a list of files/directories as a response.



```
public static String getStringFromURL(String uu, String path) {
    String result = "";
    try {
        String u = uu + "?" + path;
        HttpClient cl = new DefaultHttpClient();
        HttpGet get = new HttpGet(u);
        ResponseHandler<String> handler = new BasicResponseHandler();
        result = cl.execute(get, handler);
    } catch (IOException e) {
        e.printStackTrace();
    }
    return result;
}
```

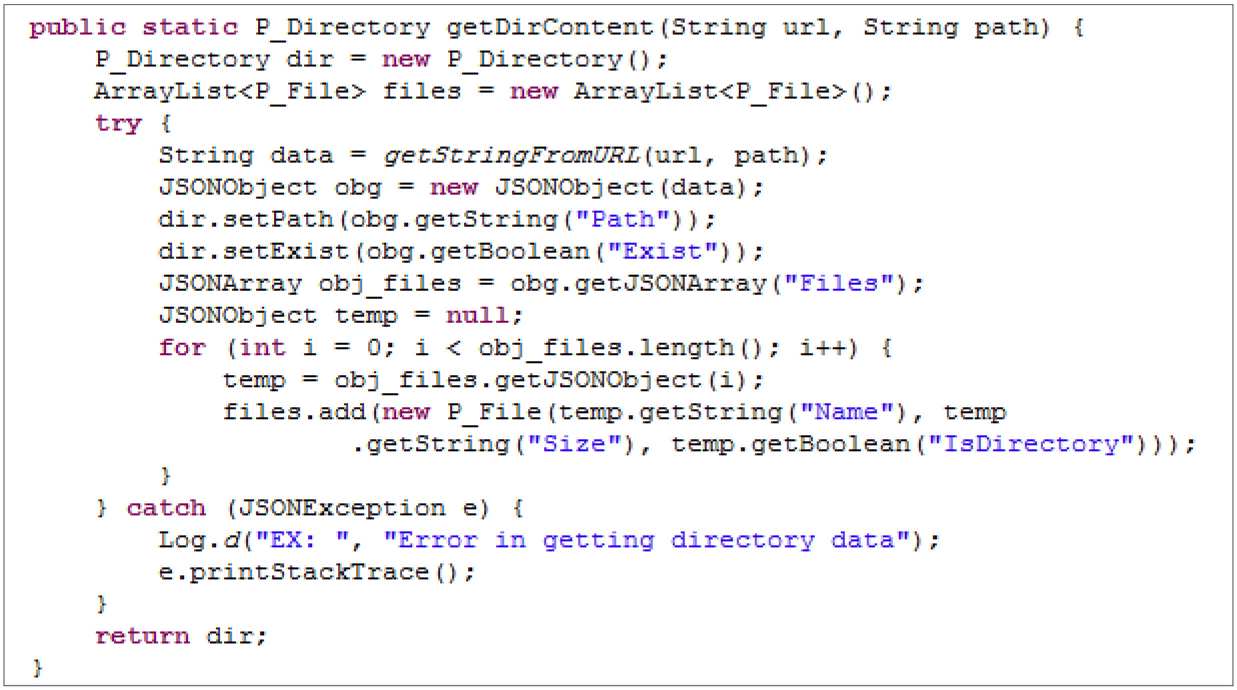
Figure 7.5.1.1.1 HTTPRequest to the raspberry pi by request some URL



```
{
    "Path": "root",
    "Exist": true,
    "Files": [
        {
            "Name": "IMG_20141123_181736.jpg",
            "Size": 1048576,
            "IsDirectory": false
        },
        {
            "Name": "Images",
            "Size": 0,
            "IsDirectory": true
        }
    ]
}
```

Figure 7.5.1.1.2 (Returned JSON object)

Then, after returning a response as a JSON object, we need a java code to convert the response to objects and arrays, which is a JSONObject and JSONArray as the following:



```java
public static P_Directory getDirContent(String url, String path) {
    P_Directory dir = new P_Directory();
    ArrayList<P_File> files = new ArrayList<P_File>();
    try {
        String data = getStringFromURL(url, path);
        JSONObject obg = new JSONObject(data);
        dir.setPath(obg.getString("Path"));
        dir.setExist(obg.getBoolean("Exist"));
        JSONArray obj_files = obg.getJSONArray("Files");
        JSONObject temp = null;
        for (int i = 0; i < obj_files.length(); i++) {
            temp = obj_files.getJSONObject(i);
            files.add(new P_File(temp.getString("Name"), temp
                    .getString("Size"), temp.getBoolean("IsDirectory")));
        }
    } catch (JSONException e) {
        Log.d("EX: ", "Error in getting directory data");
        e.printStackTrace();
    }
    return dir;
}
```

Figure 7.5.1.1.3 convert a URL response to java JSON objects

At the last figure, we convert a URL response to java JSON objects and arrays using the built in java methods like getString(), getBoolean(), and we stored it in java objects to populate it into android views.

7.5.2 Raspberry pi

Command Controller Main Code

The main code for the controller application is implementer in a class called CmdControler, it uses the http server class ‘Controller’ and registers the methods that will be activated on various commands sent by the client Android device:

Fields:
localPath: string
The location on the raspberry pi where the received files will be saved.
ctr: Controller
The http server that will receive the requests from the user

Constructor:

Initiates the ctr setting the port to 45678 default port for our controller, and register the handlers for the predefined commands, and set the localPath value.

Methods:

Start(): starts the http server.

Stop(): stops the http server.

Private Methods:

The private methods are the handlers for the controller.

- void cmd_Open(HttpListenerContext cx, NameValueCollection kvs)
- open the file whose path is kvs[“path”] with its proper application.
- void cmd_SS(HttpListenerContext cx, NameValueCollection kvs)
- When cmd= ss the http server routes the call to this function and its functionality is to capture the screen and send it as png image.
- void cmd_detail(HttpListenerContext cx, NameValueCollection kvs)
- Returns the file details whose path equals kvs[“path”], as json data.
- void cmd_Key(HttpListenerContext cx, NameValueCollection kvs)
- Send key signals to the controlled application, which its value equals kvs[“key”].
- void cmd_Up(HttpListenerContext cx, NameValueCollection kvs)
- This method handles file uploading from the android devices, and saves it relatively to the localPath.
- void cmd_CreateDir(HttpListenerContext cx, NameValueCollection kvs)
- Creates a directory with the relative path (kvs[“path”]) to the localPath value.
- void cmd_List(HttpListenerContext cx, NameValueCollection kvs)
- List the files and directories in the directory whose path is kvs[“path”] as json text.
- void cmd_Rename(HttpListenerContext cx, NameValueCollection kvs)
- renames the file or directory whose path is kvs[“path”] to kvs[“newname”]
- void cmd_Copy(HttpListenerContext cx, NameValueCollection kvs)
- copy the file or directory whose path is kvs[“path”] to kvs[“newpath”]
- void cmd_Move(HttpListenerContext cx, NameValueCollection kvs)
- move the file or directory whose path is kvs[“path”] to kvs[“newpath”]
- void cmd_Delete(HttpListenerContext cx, NameValueCollection kvs)
- delete the file or directory whose path is kvs[“path”].

Program Main Code

- The entry point of the program simply initiates the native code library NativeCode.init();
- And Creates new CmdController and start listnening CmdController cmd = new CmdController (); cmd.Start();
- And Start The Application Main Loop Application.Run(new ApplicationContext());

7.6 Screens and Files Involved

The following list shows the screens of our application which are implemented and deployed with Java classes and XML files involved for each of the screen. This subchapter serves as a guideline or directory to future developers whenever there is a need to make amendments to the screens or the functionalities behind the screen.

7.6.1 Login screen

Functionality: Display the logo of the application and login form to our system.
JAVA Files Involved:

- Login.java
- P_Handler.java

XML Files Involved:

- Login.xml

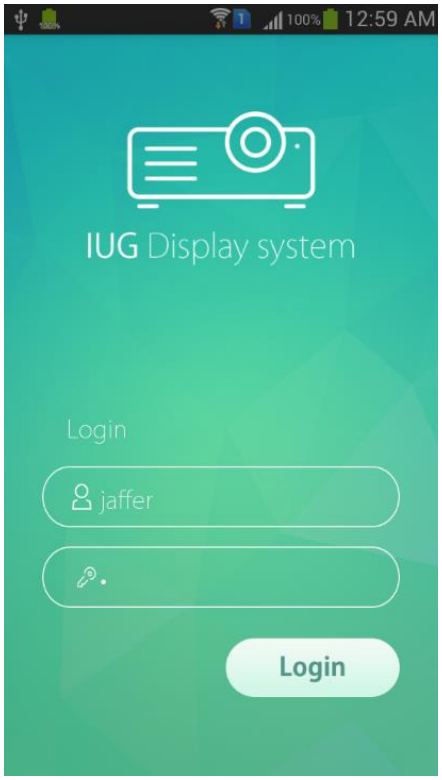


Figure 7.6.1.1 Login screen

7.6.2 Connection screen

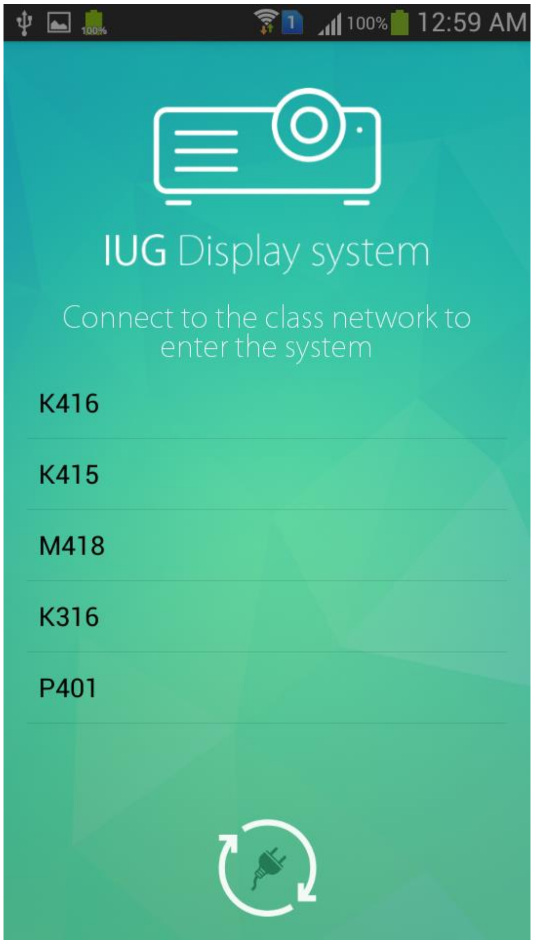
Functionality: Display the logo of the application and the available class rooms to connect with.

JAVA Files Involved:

- Connection.java
- P_Handler.java

XML Files Involved:

- connection.xml



IUG Display system

Connect to the class network to enter the system

Figure 7.6.2.1 Connection screen

7.6.3 Main Activity screen

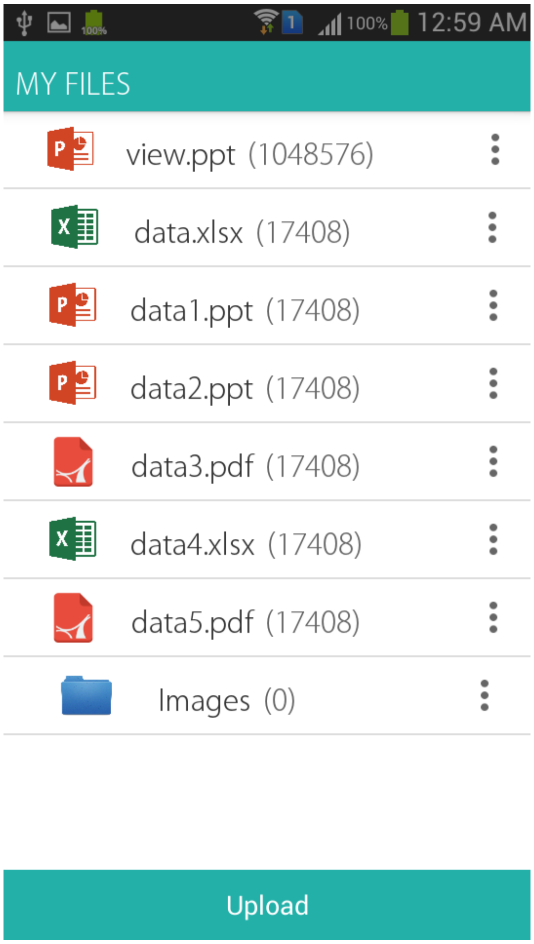
Functionality: Display list of files/folders uploaded to the raspberry pi and upload button to upload new files to raspberry pi.

JAVA Files Involved:

- ❖ MainActivity.java
- ❖ P_Handler.java

XML Files Involved:

- ❖ mainactivity.xml
- ❖ Actionbar.xml



view.ppt (1048576)
data.xlsx (17408)
data1.ppt (17408)
data2.ppt (17408)
data3.pdf (17408)
data4.xlsx (17408)
data5.pdf (17408)
Images (0)

Figure 7.6.3.1 Main Activity screen

7.6.4 Options Activity screen

Functionality: Display list of control buttons to the specified file (Open, Delete, Rename, Details).

JAVA Files Involved:

- Options.java
- P_Handler.java

XML Files Involved:

- options.xml

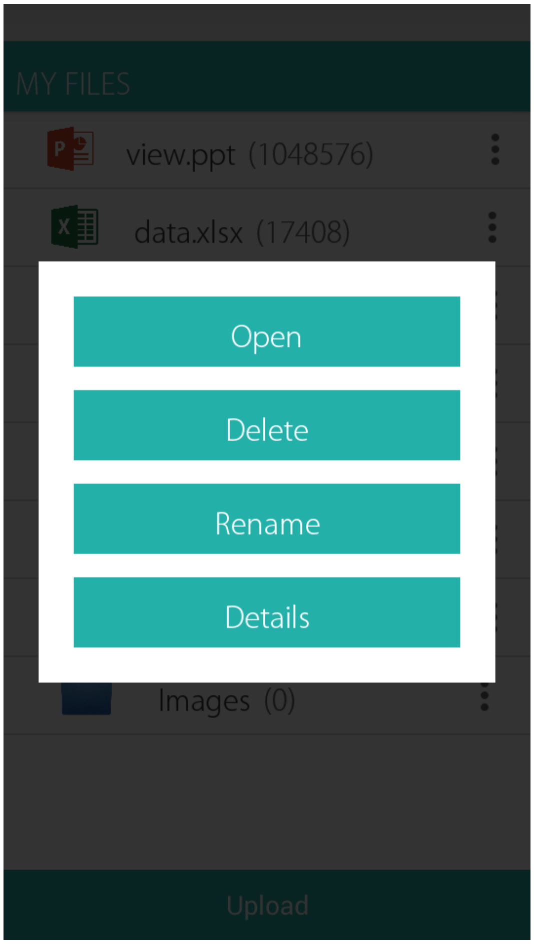


Figure 7.6.4.1 Options Activity screen

7.6.5 File Activity screen

Functionality: Open selected file and display control buttons to start control with file, also this screen displays back button on the top action bar.

JAVA Files Involved:

- File_Activity.java
- P_Handler.java

XML Files Involved:

- File_activity.xml
- File_item.xml
- Actionbar.xml

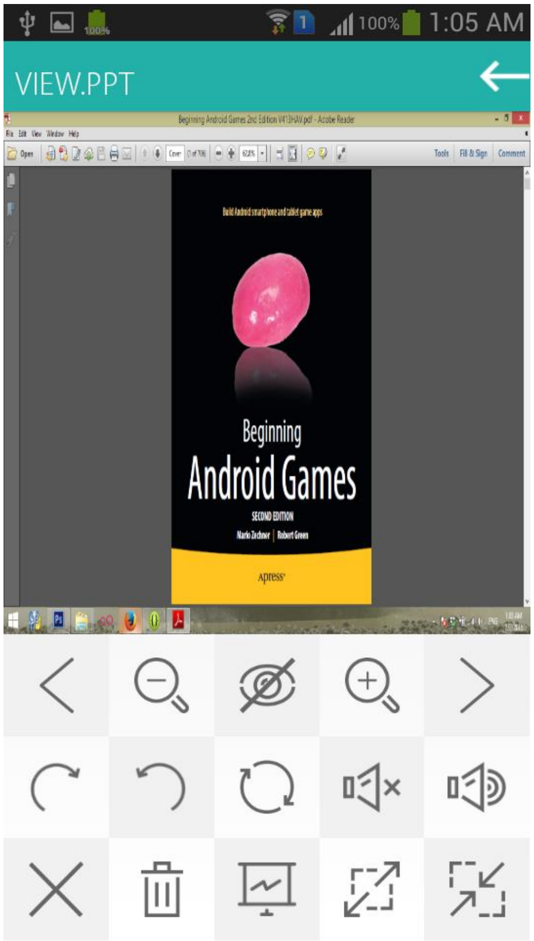


Figure 7.6.5.1 File Activity screen

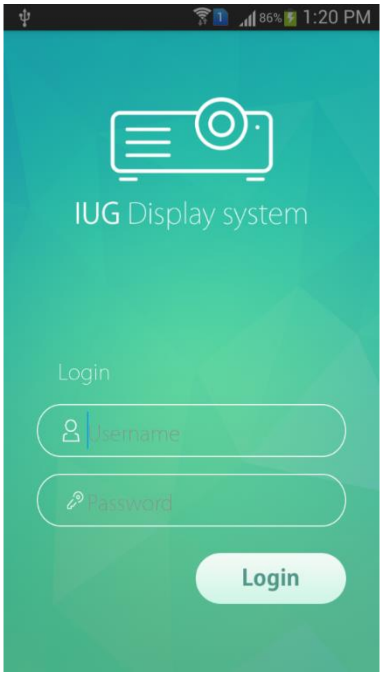
Chapter 8

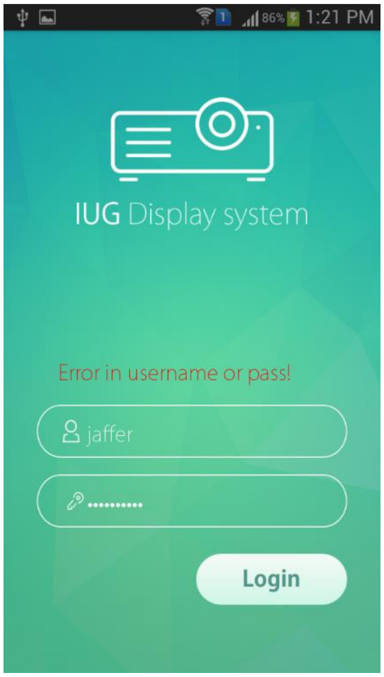
Testing

The aim of this chapter is to make clear user-system interaction and system implementation aspects. Therefore, more details about system's modules are provided. The main functions of the system are shown and discussed.

8.1 Login into the system

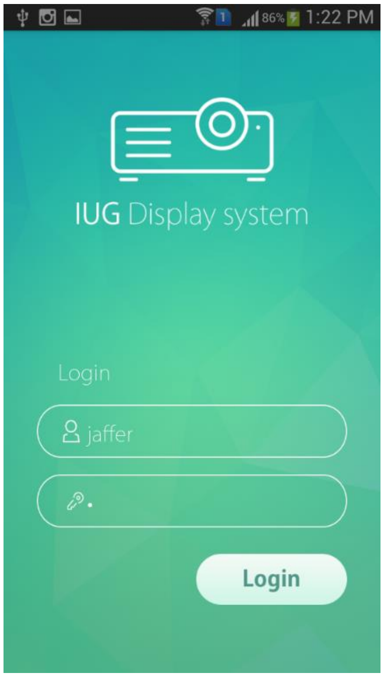
Firstly, at the beginning of using our application, the user login form will appear to login to the system, the user will enters his/her username and password and then clicks Login button, once the username and password correct, the user will redirect directly to start control with the system, else, the application will shows an error message according to the error, as the following:





Error in username or pass!

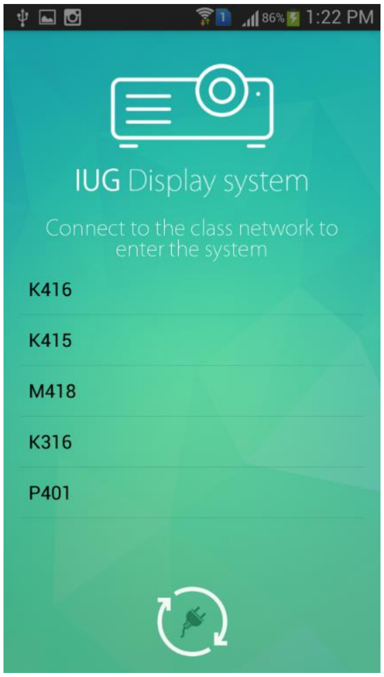
jaffer



jaffer

8.2 Connect to the class network

After the logging to the system, the system will show a list of classroom names to connect with one of them, after selecting a classroom the system will connect to the class's raspberry pi kit, as the following:



IUG Display system

Connect to the class network to enter the system

K416

K415

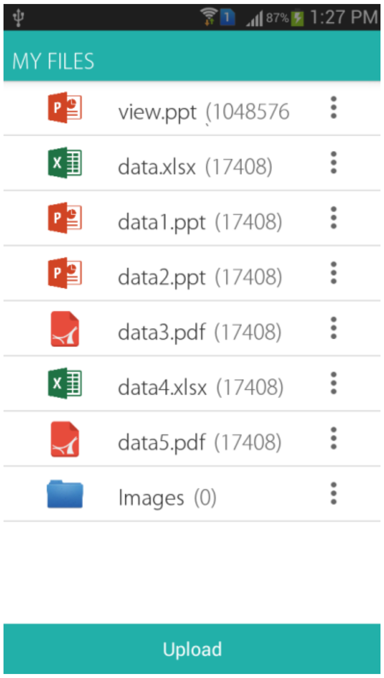
M418

K316

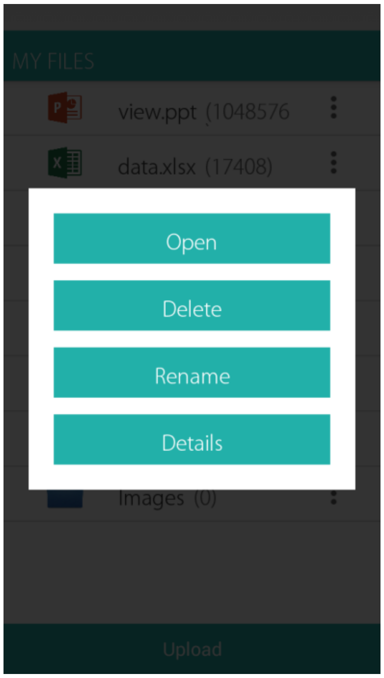
P401

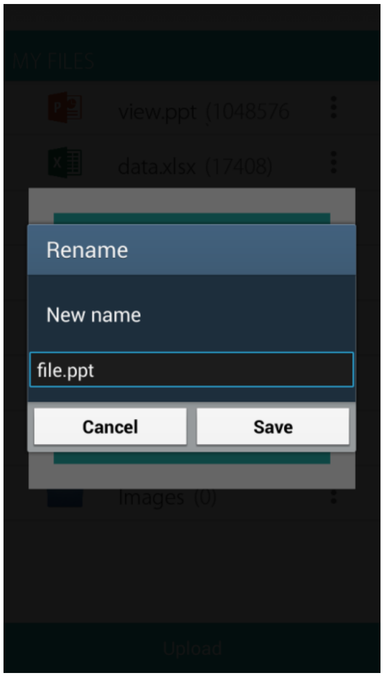
8.3 List and upload files

After the connecting to the system, the system will show the user's files and directories as a list, and the user will aple to open/delete/rename/show details of a file by clicking to the options button to the right of each file, and upload new file by clicking to the upload button on the bottom of the screen, as the following:



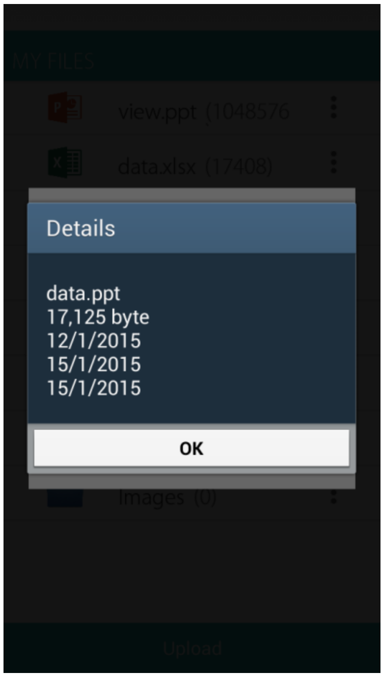
view.ppt (1048576
data.xlsx (17408)
data1.ppt (17408)
data2.ppt (17408)
data3.pdf (17408)
data4.xlsx (17408)
data5.pdf (17408)
Images (0)



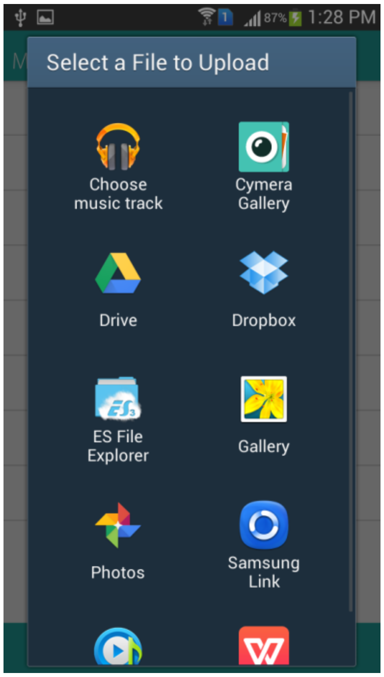


New name

file.ppt

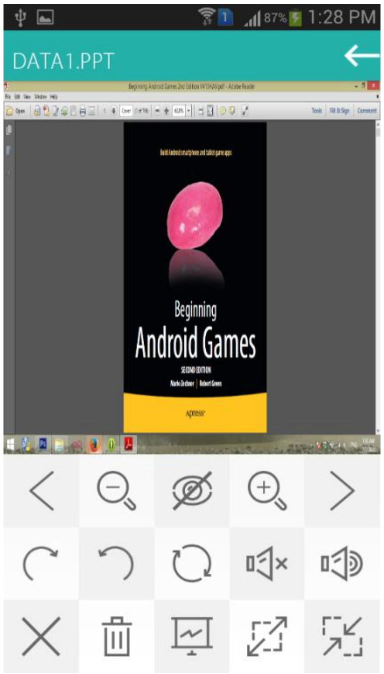


data.ppt
17,125 byte
12/1/2015
15/1/2015
15/1/2015



8.4 Start cotrolling with the file

After selecting a files and opening it, you can start control with a specified file by clicking to the contrl buttons on the bottom of the screen, and also you can show a raspberry’s screen on your smartphone, as the following:



Chapter 9
CONCLUSION

9.1. Summary

As we have stated previously the statement of problem , theh is aproblem in Islamic University of Gaza classes , it has 400 PC approximately used only for showing lectures to students adnd as we talk above in IUG security rulea , thehs devices does not make any thing except showing lectures , this means 400 screen , 400 mouse, 400 keyboard and others without used , these PC's are costly unnecessarily.

And as we work our project is a complete system to view files on LCD using smart phones.And as we talk the main important objective from this project is to reduce unnecessarily cost which we talk about it , another goal is to provide easy way to control with slides remotely instead of 7using traditional mouse and keyboard.

We have reached to the result as we have said previously it consist of final view of smart phone application using Rassbpery pi.

9.2 Future works :

- Give the possibility to the project that receives the files from server.
- Find a way to show files on some screens or tablets to clarify the show for teachers.
- Adding additional types of files to open it on LCD via Rassbpery pi.
- Development an IOS application in order to comply with the IPhone's samrtphones.
- Development and adding more controls on our project.

Appendix

ANALYZING THE REQUIREMENTS

A: Hardware requirements:-

We have heard good things about both Arduino and Raspberry Pi. But we can't decide – which the best mini-computer for our project.

What is the difference?

The Arduino and Raspberry Pi may look quite similar but they are in fact very different devices. The Arduino is in fact a micro-controller; not a mini-computer. A micro-controller is just a small part of what makes a computer, and only provides a subset of the functionality of the Raspberry Pi.
Although the Arduino can be programmed with small C-like applications, it cannot run a full scale "operating system" and certainly won't be replacing your media center anytime soon. The Raspberry Pi on the other hand, is a computer

Strengths & Weaknesses

So is the Arduino useless then? Hardly – an Arduino is perfect for electronics projects. It contains a set of input and output that can often be connected directly to components and sensors, The Arduino runs the Arduino firmware – a basic bit of core software which allows it to communicate with a computer over USB and gives access to all the features. You generally wouldn't replace this firmware, but it is possible.

The Raspberry Pi on the other is a complete, functional, mini-computer. It requires an operating system – the first thing you need to choose that will dramatically affect your experience – and has all the bits and pieces you might expect a full computer to have (just in a smaller scale). Storage is provided from a micro-SD card, while built-in Ethernet allows for networking (you can get networking on Arduino too, but it requires an add-on "shield").

At the heart of the Pi is a Broadcom Arm-v6 CPU; it has memory, and a graphics processor driving the HDMI output. You can plug in a keyboard and monitor, load up Linux, and the less technically savvy might have no clue how tiny the machine driving everything really is. The Pi is an incredibly powerful platform in a very small package – perfect for embedded systems, or projects requiring more interactivity and processing power.
The Raspberry is significantly more complex for simple electronics projects.
Arduino is the most popular platform for electronics projects.
On the other hand, the Raspberry Pi is a mini-computer, the Arduino isn't. To

understand that point a little more clearly, here’s a small selection of operating systems you can install on the Raspberry Pi:

- Raspian (based on Debian linux, and the “default”).
- Android (barely, but official support is coming).
- RiscOS.
- Plan 9.
- Xbox Media Center.

Conclusion:

After this comparison between Raspberry Pi & Arduino to we decide to choose Raspberry Pi and used it in our project because it features supports idea of our project and we study structure of it. And we collect information and data which have in our project.

B: Software requirements:-

Software requirements divides into two requirements:

B-1: Raspberry pi programming language:-

After looking up for the programming languages which used in Raspberry pi kit, we have many programming languages, but we have the best one which is C++ according to next comparison.

The Raspberry Pi minicomputer Supports few operating systems, the default OS for it is Rasbian which is a debian distribution of Linux operating system – same as the Ubuntu OS – the following programing languages and IDEs are tested on raspberry pi:

C# (Mono runtime) , Code Blocks IDE , Erlang , Forth , Forth, GalaxC , Go (new language) , Java (needs some configurations to access HW), JavaScript (Node.js interpreter) ,Pascal , PHP, Python, Regina Rexx, Scratch , TcI/Tk And much more programming languages.

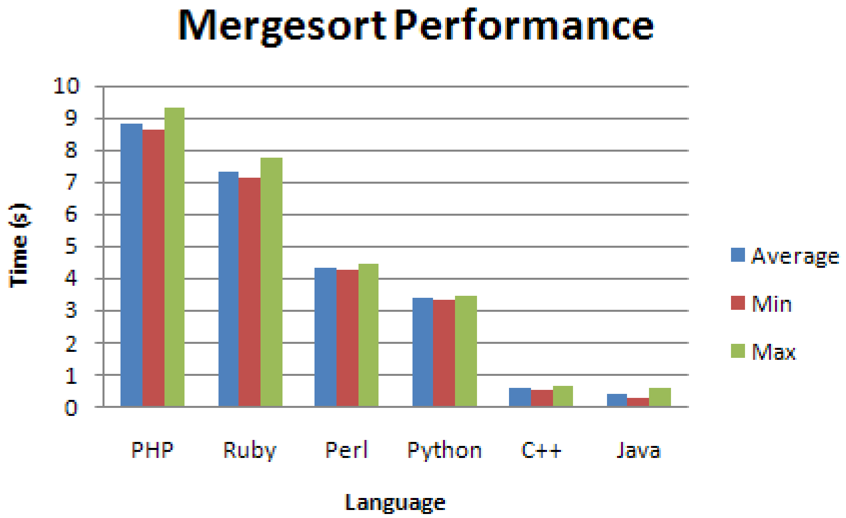
However, developer support website of Raspberry Pi recommends either Python or C/C++ programming languages, and gives more tutorials and samples for both of these languages next to Assembly language for ARMv6 architecture.

Therefore, for new learning students it is better to use the supported languages by the company since samples and tutorials are already available.

Therefore, we need to compare between C/C++ and python to choose between them, the main points for new student to know is:

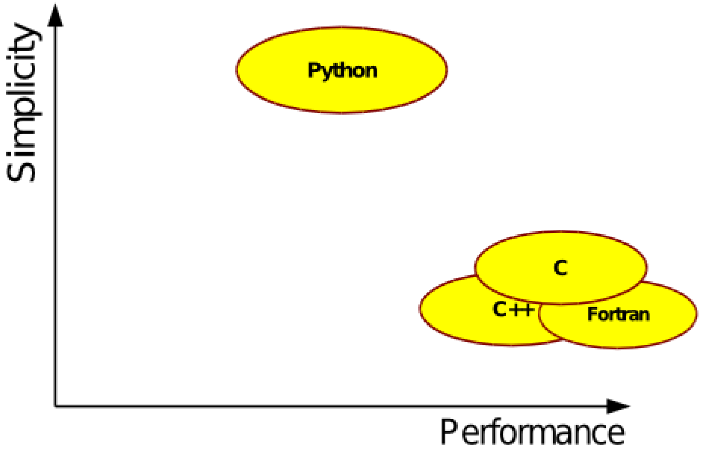
- **Performance**

  Since python is interpreted scripting language, we can notice the big gap of performance deference between python and the fully compiled and optimized for speed c/c++ languages.



- **Simplicity**

  Since python is higher level scripting language it is customized for simplicity and more user 'developer' friendly, since it is not strongly typed as c++, and supports Object oriented programming where C does not.



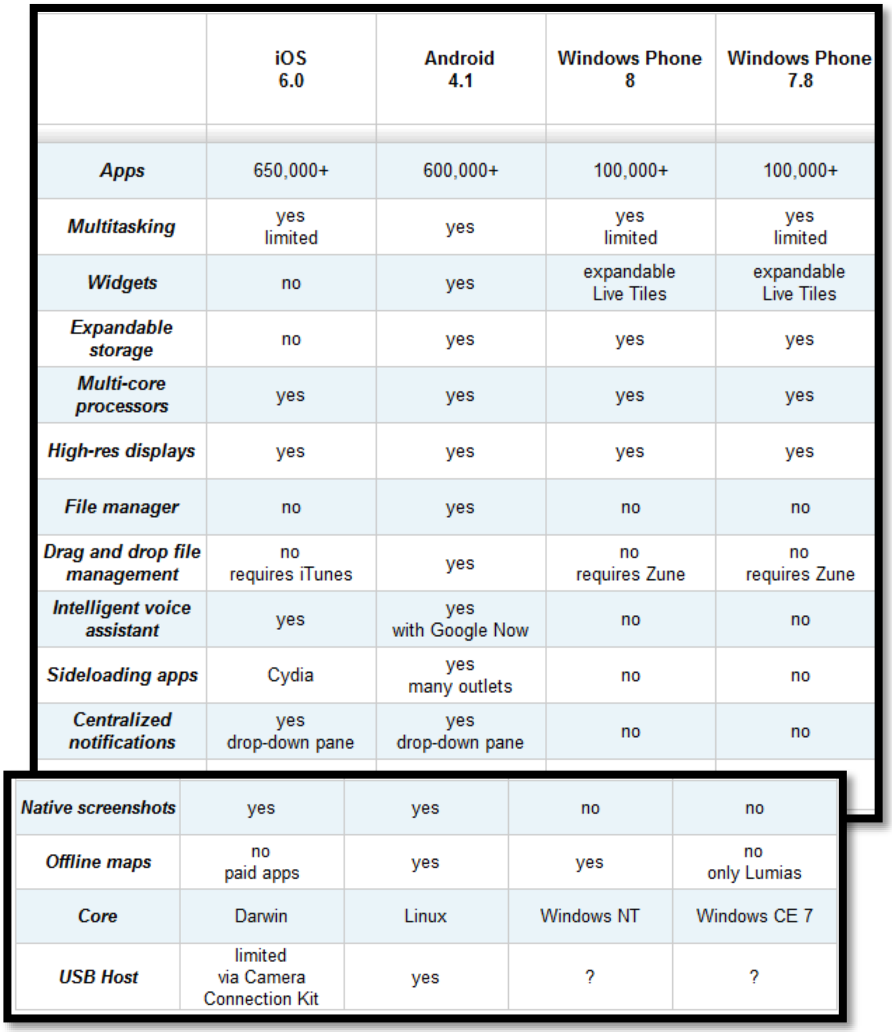
B-2: Smart phone programming language:-

After looking up for the programming languages which used in smart phones, we have many programming languages and many platforms to work on it, but we have the best one witch is java programming language based on android platform.

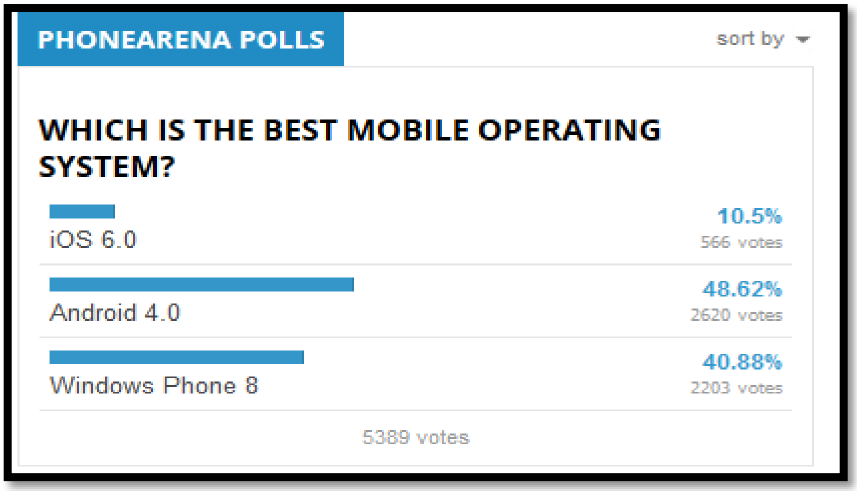
We are using the android platform for the following reasons:

- The biggest advantage of Android is that it is an open source, integrated software platform. Companies can release updates and revisions which users can download on their own.
- The Android SDK (Software Development Kit) allows you to create your own apps. SDK includes a comprehensive set of development tools like debugger, libraries, handset emulator, sample code, documentation and tutorials. So if you get hands on an SDK, you can develop applications on your own for Android.
- Android uses the standardized and open programming language Java. The emulator of the Android platform has a modern design and is easy to use.
- The installation of whole environment to develop Android applications is possible on every operating system.
- Android allows developers to design applications for users based on their preferences. This provides the ability for users to have unique experiences tailored specifically for them. This is possible as Android OS is customizable.
- There are numerous partners involved in Android which has led developers to create a standardized way of developing applications for users without botheration of the platform. This has also helped in defining documentation, procedures and application sharing.

- As Android is an open platform it always tend to be far less expensive than other than conventional products. This has notified users about the decrease in cost as compared to other handhelds operating systems like Windows Mobile, Apple iOS and so on.
- Android has encouraged innovation among the developers to innovate new applications from time to time for sustaining in competitive market.
- Android does not differentiate between the phone’s core applications and third-party applications. They can all be built to have equal access to a phone’s capabilities providing users with a broad spectrum of applications and services.
- Android has a low barrier to entry. There are less expensive licensing fees or development tools. It can be possible to develop applications without spending a dime.
- Android applications can be distributed in number of ways, unlike other mobile OS platform. Android Market is a third-party application store where you can browse and download apps published by third-party developers, hosted on Android Market. There are several other third-party application stores. You can also create your own distribution channels.
- There are more than 300,000 Apps available for Android in the market. This itself proves that popularity of Android is increasing among the people in the world.
- The Android platform is the best mobile platform for inter-application and inter-process architectures.



	iOS 6.0	Android 4.1	Windows Phone 8	Windows Phone 7.8
Apps	650,000+	600,000+	100,000+	100,000+
Multitasking	yes limited	yes	yes limited	yes limited
Widgets	no	yes	expandable Live Tiles	expandable Live Tiles
Expandable storage	no	yes	yes	yes
Multi-core processors	yes	yes	yes	yes
High-res displays	yes	yes	yes	yes
File manager	no	yes	no	no
Drag and drop file management	no requires iTunes	yes	no requires Zune	no requires Zune
Intelligent voice assistant	yes	yes with Google Now	no	no
Sideloading apps	Cydia	yes many outlets	no	no
Centralized notifications	yes drop-down pane	yes drop-down pane	no	no
Native screenshots	yes	yes	no	no
Offline maps	no paid apps	yes	yes	no only Lumias
Core	Darwin	Linux	Windows NT	Windows CE 7
USB Host	limited via Camera Connection Kit	yes	?	?



PHONEARENA POLLS

sort by

WHICH IS THE BEST MOBILE OPERATING SYSTEM?

iOS 6.0	10.5% 566 votes
Android 4.0	48.62% 2620 votes
Windows Phone 8	40.88% 2203 votes

5389 votes

Figure(1) : Difference between smart phones OS's

PLAN OF ACTIVITIES WITH DEADLINES

Event	Time needed
Study requirements (System req. and user Req.)	1 weeks
Study software	2 weeks
Study hardware	2 week

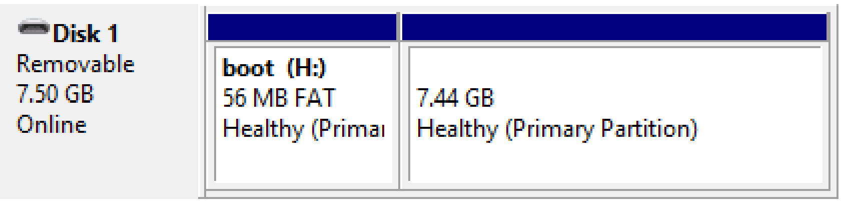
Note: According to the last plan, and by adding to the last weeks exams week, we have 6 weeks, which is remaining to the end of the semester.

Rassbpery pi Running using Windows Interface:

This solution to the stage of development not final presentation when view we use either vedio input or HDMI input.

Of the most commonly used methods was the process of creating SSH connection with the Rassbpery pi , but the problem was in the IP. The solution was to use the distribution rasbian it allows identifying IP before running the object , we illustrat the steps in the

1- After finishing the installation (restoring) the os , the SD card will be partitioned into 2 partitions:



Disk 1
Removable
7.50 GB
Online

boot (H:)
56 MB FAT
Healthy (Primai

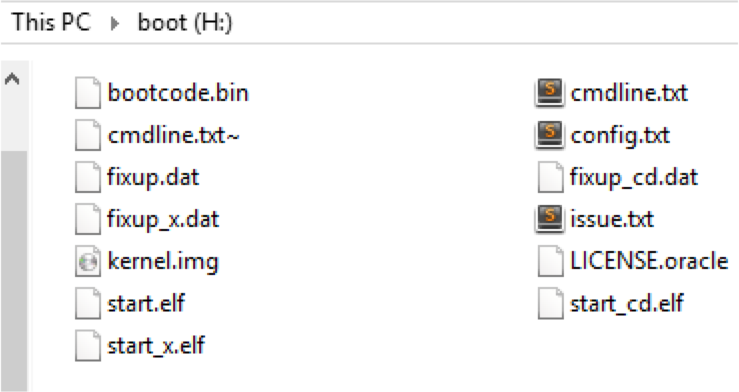
7.44 GB
Healthy (Primary Partition)

- boot partition :FAT32 portion contains boot command files

- Ext2 partition contains the OS files

2- In the root partition open the cmdline.txt file and append the following text
Ip=192.168.137.2
Where this ip Is used as static ip for the Ethernet interface, you can use any suitable ip for your network
This ip is in the network of sharing wifi internet connection to Ethernet on windows

```
dw
de
ip
```



This PC ▸ boot (H:)

bootcode.bin
cmdline.txt~
fixup.dat
fixup_x.dat
kernel.img
start.elf
start_x.elf
cmdline.txt
config.txt
fixup_cd.dat
issue.txt
LICENSE.oracle
start_cd.elf

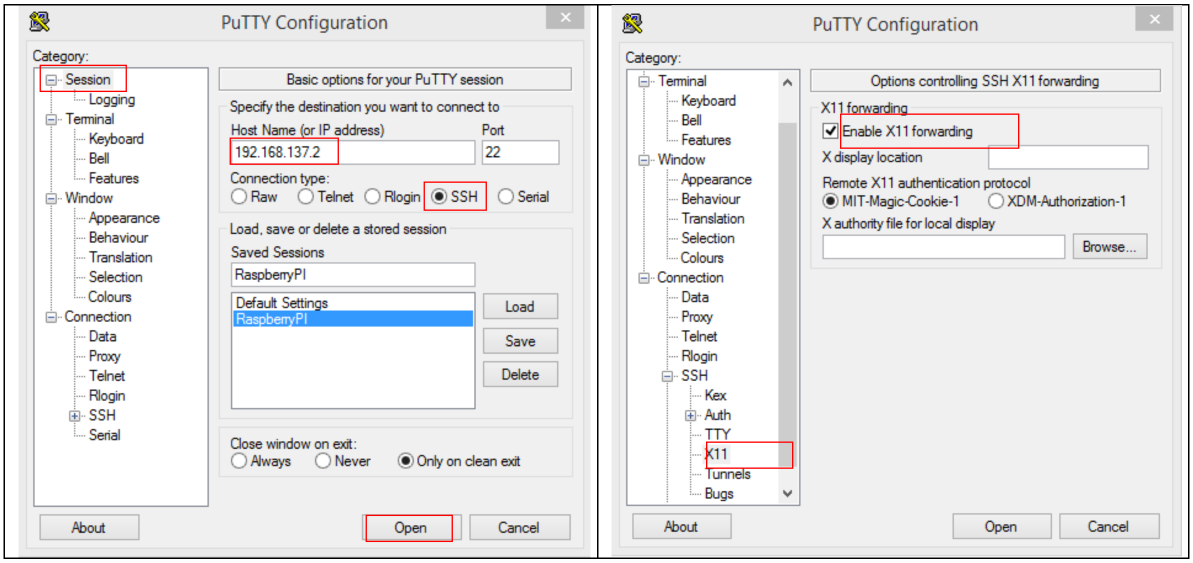
3- Download Putty (cross platform ssh and telnet client)
http://www.putty.org
used to create ssh connection with the Raspery PI

4- Download XMing Server (X Window System Server for Microsoft Windows)
Used to start XServer session with the raspery pi over the ssh connection to display the desktop of raspery pi.
http://sourceforge.net/projects/xming

5- Start X Server by running the XMing Server
Its window will receive the desktop display from the R PI after completing the next steps

6- Plug the sd card into Raspery pi and connect it to the network using Ethernet cable, and power it up, and wait until all the lights are on

7- Run Putty and configure it as following



Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): 192.168.137.2

Port: 22

Connection type: ○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial

Load, save or delete a stored session

Saved Sessions: RaspberryPI

Default Settings
RaspberryPI

Load | Save | Delete

Close window on exit: ○ Always ○ Never ● Only on clean exit

Options controlling SSH X11 forwarding

X11 forwarding

☑ Enable X11 forwarding

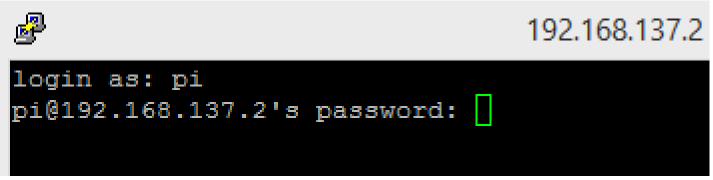
X display location:

Remote X11 authentication protocol: ● MIT-Magic-Cookie-1 ○ XDM-Authorization-1

X authority file for local display:

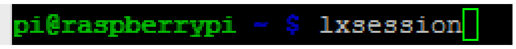
Browse...

8- Click Open and wait until the command line ask you to enter user name and password
Default credentials are:
Username : pi password: raspberry



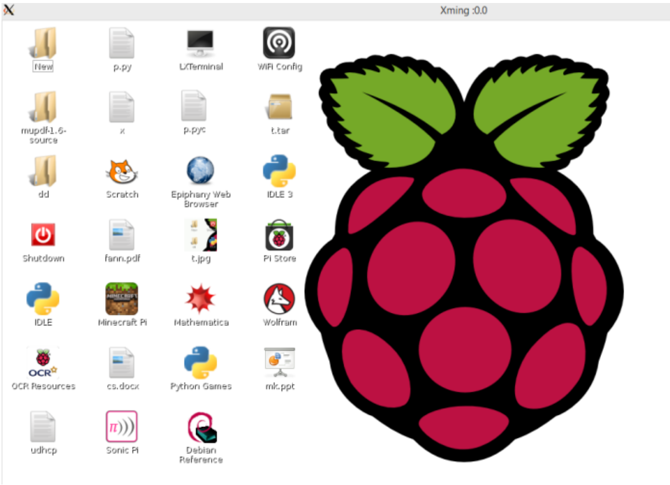
```
login as: pi
pi@192.168.137.2's password:
```

9- Then enter the following command to start the x11 forwarding Lxsession



```
pi@raspberrypi ~ $ lxsession
```

The xming server window will start to display the R pi desktop



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