



Ahmedabad Institute of Technology

IT Department

MOBILE APPLICATION & DEVELOPMENT

(3161612)

Laboratory Manual

NAME	
ENROLLMENT NUMBER	
BATCH	
YEAR	

SUBJECT COORDINATOR

SUBJECT MEMBER



DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

"To impart quality education and research in Information Technology to produce a competent, committed and goal oriented workforce to fulfill the needs of the local and global IT Industry"

Mission of the Department

The Department's Mission is to advance knowledge in the field of Information Technology and Allied Science by providing our students with the highest quality educational experience towards

1. M1: Producing quality workforce with cutting edge technology.
2. M2: Engaging in innovative teaching, learning, research and community service.
3. M3: Inculcating sense of ethical attitude, social responsibility and developing leadership quality required for a responsible IT professional.

Program Educational Objectives (PEO):

The Program Educational Objectives (PEO) of B.Tech Information Technology program at the Ahmedabad Institute of Technology are to produce graduates who are able to:

- PEO 1.** Apply the fundamentals of Information Technology and allied science, mathematics and scientific investigation to solve real world problems appropriate to the discipline.
- PEO 2.** Apply current industry accepted computing practices and emerging technologies to analyze, design, implement, and verify high quality IT-based solutions to real world problems.
- PEO 3.** Exhibit teamwork and effective communication skills for a successful professional career in their chosen field.
- PEO 4.** Understand the ethical obligations, social impacts and apply their technical knowledge positively and appropriately in the course of career and professional journey.



PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



MOBILE APPLICATION DEVELOPMENT PRACTICAL BOOK

DEPARTMENT OF INFORMATION TECHNOLOGY

PREFACE

It gives us immense pleasure to present the first edition of Mobile Application Development Practical Book for the B.E. 3rd year students of Ahmedabad Institute of Technology.

The lab exercises in this manual are designed to be both educational and practical. Each lab session provides clear instructions, code snippets, and real-world examples to help you understand and apply the concepts. Additionally, each exercise is accompanied by challenges to test your knowledge and encourage problem-solving skills. To successfully complete the labs, you will need access to certain tools and resources, including integrated development environments (IDEs) like Xcode and Android Studio, as well as emulators and physical devices for testing. Detailed instructions on setting up these tools are provided in the initial chapters..

The student is required to keep a laboratory manual in which the raw data will be recorded as well as the questions will be kept. The lab write-ups form a permanent record of your work.

Lab Manual Revised by:



MOBILE APPLICATION DEVELOPMENT PRACTICAL BOOK
DEPARTMENT OF INFORMATION TECHNOLOGY

Do's:

1. Enter the laboratory in student uniform and carry Student ID.
2. Leave footwear outside and keep bags or any other belongings in designated storage places. Do not keep any valuable things in bags.
3. Carry only the laboratory notebook into the laboratory and keep other belongings at the place designated for keeping belongings.
4. Know the location of the fire extinguisher and the first aid box and how to use them in case of an emergency.
5. Report fires or accidents to your lecturer/laboratory technician immediately
6. Report any broken plugs or exposed electrical wires to your lecturer/laboratory technician immediately.
7. Read and understand how to carry out an activity thoroughly before coming to the laboratory.
8. For system problems, call laboratory staff for resolving, and do not try to repair the system on your own.
9. Access to the internet is only on designated systems and against permission.
10. Ensure computer systems are properly shutdown and other equipment are turned-off after use.
11. Follow the rules of the laboratory strictly. Violation of rules may attract punishment.



MOBILE APPLICATION DEVELOPMENT PRACTICAL BOOK
DEPARTMENT OF INFORMATION TECHNOLOGY

Don'ts:

1. Do not eat or drink in the laboratory.
2. Do not carry and use any pen drive, electronic gadget or cell phone in the laboratory.
3. Do not install, update or download any software on your own in any computer inside the laboratory.
4. Do not use any unauthorized software or tools.
5. Do not alter or delete configuration settings of any computer laboratory system.
6. Tampering, deleting or modifying CMOS/BIOS settings, IP Configuration, system parameters, or system files stored in the hard disk are strictly prohibited in the laboratory.
7. No student or personnel is allowed to attach or detach any peripheral to and from any IT equipment or devices without explicit permission from the Lab In charge/ Lab Technician.
8. Do not write/scratch on monitors, walls, tables or chairs in the laboratory.
9. Avoid stepping on electrical wires or any other computer cables.
10. Do not open the system unit casing or monitor casing particularly when the power is turned on. Some internal components hold electric voltages of up to 30000 volts, which can be fatal.
11. Do not insert metal objects such as clips, pins and needles into the computer casings. They may cause fire.



Ahmedabad Institute of Technology

IT Department

CERTIFICATE

This is to certify that Mr. / Ms. _____ Of
Enrolment No _____ has Satisfactorily completed
the course in _____ as by the Gujarat
Technological University for _____ Year (B.E.) semester _____ of Computer
Engineering in the Academic year _____.

Date of Submission:-

Faculty Name :

Dr. Ashish Chaurasia

Signature:

Head Of Department (IT)

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PRACTICAL – 1

AIM: Create “Hello World” application. That will display “Hello World” in the middle of the screen using TextView Widget in the red color.

Theory:

Prerequisites for this android project

Java: First of all you need to have the knowledge of Java Programming. Java programming plays a very important role as we will develop the app code in Java

XML: XML is another important part of our android application. It will be used for the development of the user interface for the application

Android Studio: Android Studio is the backbone of our application, as we will develop our app using android studio. Android virtual device is also shipped with android studio that will be helpful in testing whether the applications are working or not

Post Practical Questions:

1. Which of the following virtual machines is used by the Android operating system?
 - a. JVM
 - b. Dalvik Virtual Machine
 - c. Simple Virtual Machine
 - d. None of the above

2. Android is based on which of the following languages?
 - a. Java
 - b. C++
 - c. C

3. Android was developed by.
 - a. Microsoft
 - b. Google
 - c. IBM
 - d. Apple

PRACTICAL – 2

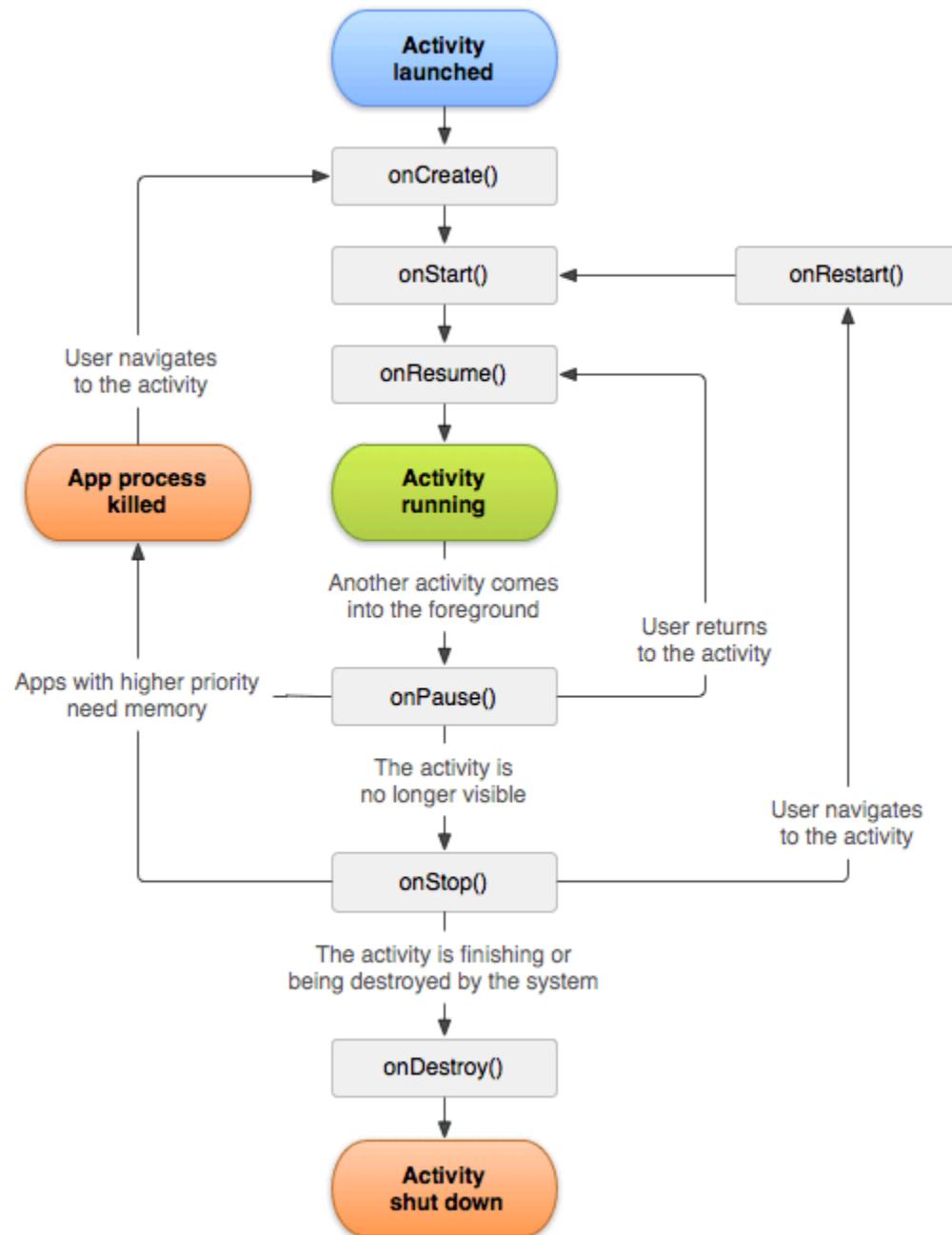
AIM: Create android application that demonstrates the android activity life cycle.

Theory:

Android Activity Lifecycle is controlled by 7 methods of android.app.Activity class. The android Activity is the subclass of ContextThemeWrapper class. An activity is the single screen in android. It is like window or frame of Java. By the help of activity, you can place all your UI components or widgets in a single screen. The 7 lifecycle method of Activity describes how activity will behave at different states.

Android Activity Lifecycle methods:

Method Description	
onCreate()	called when activity is first created.
onStart()	called when activity is becoming visible to the user.
onResume()	called when activity will start interacting with the user.
onPause()	called when activity is not visible to the user.
onStop()	called when activity is no longer visible to the user.
onRestart()	called after your activity is stopped, prior to start.
onDestroy()	called before the activity is destroyed.



Post Practical Questions:

- 1.** What is an Activity in Android?

 - a) Android class
 - b) Android package
 - c) A single screen in application with supporting java code
 - d) None of the above

2. How can we kill an activity in android?

 - a) Finish()
 - b) finishActivity(int requestCode)
 - c) both a and b
 - d) neither a nor b

3. Which of the following is not an activity lifecycle callback

method? a) onClick() method

b) onCreate() method

c) onStart() method

d) onBackPressed() method

4. Does android support other languages than java?

a) Yes

b) No

c) May be

d) Can't say

5. Which of the following is contained in the src folder?

a) XML

b) Java source code

c) Manifest

d) None of the above

Practical:-3

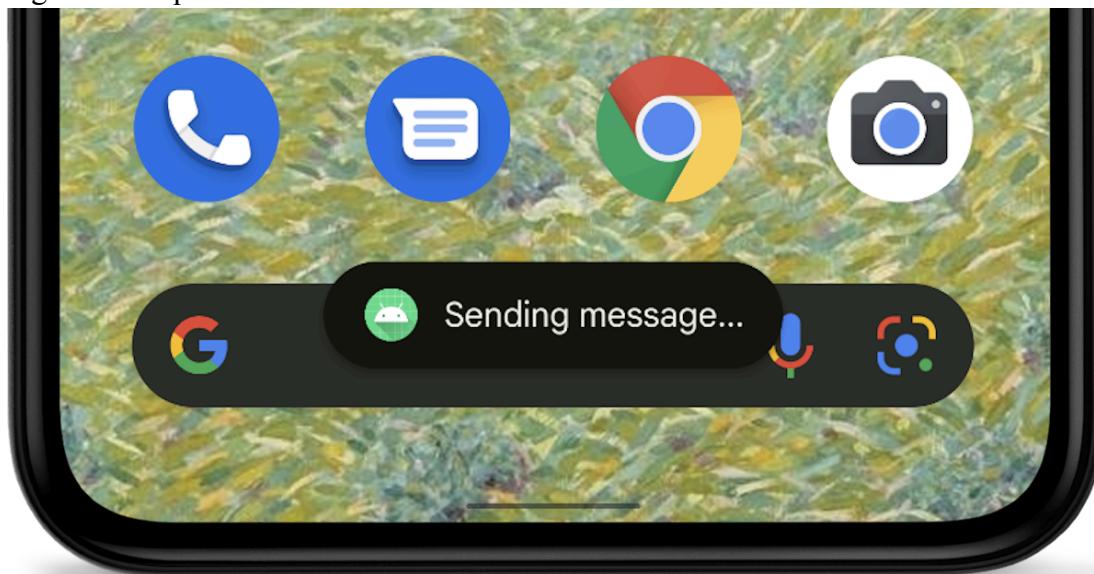
AIM:-Create an application that will get the Text Entered in Edit Text and display that Text using toast (Message).

Theory:

What is Toast Message?

A toast provides simple feedback about an operation in a small popup. It only fills the amount of space required for the message and the current activity remains visible and interactive. Toasts automatically disappear after a timeout.

For example, clicking Send on an email triggers a "Sending message..." toast, as shown in the following screen capture:



If your app targets Android 12 (API level 31) or higher, its toast is limited to two lines of text and shows the application icon next to the text. Be aware that the line length of this text varies by screen size, so it's good to make the text as short as possible.

Alternatives to using toasts

- If your app is in the foreground, consider using a Snackbar instead of using a toast. Snackbars include user-actionable options, which can provide a better app experience.
- If your app is in the background, and you want users to take some action, use a Notification instead.

Instantiate a Toast object

Use the `makeText()` method, which takes the following parameters:

- The application Context.
- The text that should appear to the user.
- The duration that the toast should remain on the screen.

The `makeText()` method returns a properly initialized `Toast` object.

```
Context context = getApplicationContext();
CharSequence text = "Hello toast!";
int duration = Toast.LENGTH_SHORT;

Toast toast = Toast.makeText(context, text, duration);
toast.show();
```

PRACTICAL – 4

AIM:-Create an application in which when a user clicks a button, the user will navigate to the next screen which displays a welcome message (using Explicit Intent).

Theory :

Android Intent is the *message* that is passed between components such as activities, content providers, broadcast receivers, services etc. It is generally used with `startActivity()` method to invoke activity, broadcast receivers etc.

The dictionary meaning of intent is *intention or purpose*. So, it can be described as the intention to do action.

Android intents are mainly used to:

- Start the service
- Launch an activity
- Display a web page
- Display a list of contacts
- Broadcast a message
- Dial a phone call etc.

Types of Android Intents :

There are two types of intents in android: **Implicit** and **Explicit**

1) Implicit Intent:

Implicit Intent doesn't specify the component. In such case, intent provides information of available components provided by the system that is to be invoked

For example, you may write the following code to view the webpage:

```
Intent intent=new Intent(Intent.ACTION_VIEW);
intent.setData(Uri.parse("web page url"));
startActivity(intent);
```

2) Explicit Intent:

Explicit Intent specifies the component. In such a case, intent provides the external class to be invoked.

Android Explicit intent specifies the component to be invoked from activity. In other words, we can call another activity in android by explicit intent.

We can also pass the information from one activity to another using explicit intent. Here, we are going to see an example to call one activity from another and vice-versa.

Android calling one activity from another activity example:

```
Intent i = new Intent(getApplicationContext(), ActivityTwo.class);
startActivity(i);
```

Post Practical Questions:

1. How can we stop the services in android?
 - A. Stopself() and stopservice()
 - B. Finish()
 - C. System.exit()
 - D. None of the above
2. What is the use of content provider in android?
 - A. Storing data in database
 - B. Sharing data between application
 - C. Sending data from one app to another app
 - D. None
3. Which of the following method is used to handle what happens after clicking a button?
 - A. onClick
 - B. onCreate
 - C. onSelect
 - D. None
4. An Intent is an abstract description of an operation to be performed. It can be used with startActivityForResult to launch an Activity.
 - A. Filters
 - B. Intent
 - C. Service
 - D. Broadcast receiver
5. Which of the following action will display the phone dialer with the given number filled in?
 - A. ACTION_VIEW tel:123
 - B. ACTION_SET
 - C. ACTION_DIAL tel:123
 - D. None

Practical:- 5

AIM:-Create an application that will pass two numbers using EditText to the next screen , and on the next screen display the sum of that number.

Theory:-

Text view to display any text. In this example we are going to create an app to add two numbers.

Create an android project and use the following Text Fields control to take input from the user.

I have taken two textView to display messages and one textView to display output. Two plan text fields i.e EditText to take input and one button.

In XML:

STEP-1: Declare a few variables and the values entered in the Text Views can be read by using an id which we have set in the XML code above.

STEP-2: Add the click listener to the Add button.

STEP-3: When the Add button has been clicked, add the values and store it into the sum variable.

STEP-4: To show the output in the result textView, set the sum in the textView.

Example:

```
public void sum(View v)
{
    //get the edit text
    EditText
    t1=(EditText)findViewById(R.id.edi
tText);
    EditText
    t2=(EditText)findViewById(R.id.edi
tText2);

    //convert value into int
    int
    x=Integer.parseInt(t1.getText().to
String());
    int
    y=Integer.parseInt(t2.getText().to
String());

    //sum these two numbers
    int z=x+y;

    //display this text to
    TextView
    TextView
    tv_data=(TextView)findViewById(R.i
d.tv_result);
    tv_data.setText("The sum is
"+z);

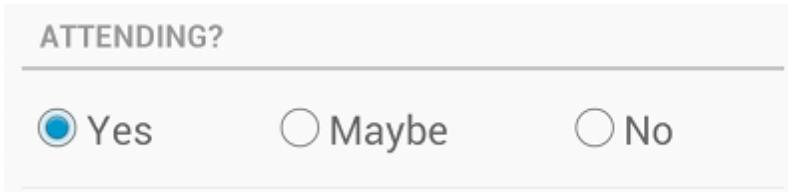
}
```

Practical :-6

AIM:-Create an application with three different Radio Button and by clicking them change the background of activity.

Theory:-

Radio buttons allow the user to select one option from a set. You should use radio buttons for optional sets that are mutually exclusive if you think that the user needs to see all available options side-by-side. If it's not necessary to show all options side-by-side, use a spinner instead.



To create each radio button option, create a RadioButton in your layout. However, because radio buttons are mutually exclusive, you must group them together inside a RadioGroup. By grouping them together, the system ensures that only one radio button can be selected at a time.

Key classes are the following:

- RadioButton
- RadioGroup

Responding to Click Events

When the user selects one of the radio buttons, the corresponding RadioButton object receives an on-click event.

To define the click event handler for a button, add the android:onClick attribute to the <RadioButton> element in your XML layout. The value for this attribute must be the name of the method you want to call in response to a click event. The Activity hosting the layout must then implement the corresponding method.

The method you declare in the android:onClick attribute must have a signature exactly as shown above. Specifically, the method must:

- Be public
- Return void
- Define a View as its only parameter (this will be the View that was clicked)

Practical -7

AIM:- Create an android application to perform addition, subtraction, multiplication, division operations of two numbers and also find maximum from them. Display toast message.

Theory:-

Step 1: Project Setup

1. Launch Android Studio and create a new Android project with a suitable name and package.
2. Choose an appropriate form factor and minimum API level for your project.

Step 2: XML Layout

1. Open the activity_main.xml layout file.
2. Define the UI elements: two EditText views for input numbers, Buttons for each operation (add, subtract, multiply, divide, and square root), and a TextView to display the result.

Step 3: Java Code (MainActivity.java)

1. Create a new Java class named MainActivity that extends AppCompatActivity.
2. Declare private instance variables for the EditText views, TextView, and Buttons.
3. Inside the onCreate method, use findViewById to initialize the UI elements by their respective IDs.
4. Set OnClickListener for each operation Button to perform calculations when clicked.
5. Define a performCalculation method that takes an operator as an argument and performs the calculation based on the operator (+, -, *, /).
6. Inside the performCalculation method, parse the input numbers from the EditText views, perform the calculation, and display the result in the TextView.
7. Create a calculateSquareRoot method to calculate the square root of a number.
8. In both calculation methods, format the result using DecimalFormat to show a maximum of two decimal places.

Practical -8

AIM:- Create sample application with login module. (Check username and password) On successful login, display welcome message in next activity. And on failing login, alert the user.

Theory:

A login application is the screen asking your credentials to login to some particular application. You might have seen it when logging into facebook,twitter e.t.c

This chapter explains, how to create a login screen and how to manage security when false attempts are made.

First you have to define two TextView asking username and password of the user. The password TextView must have inputType set to password

In the java file, inside the method of onClick get the username and passwords text using getText() and toString() method and match it with the text using equals() function.

Steps	Description
1	You will use Android studio to create an Android application under a package com.example.sairamkrishna.myapplication.
3	Modify src/MainActivity.java file to add necessary code.
4	Modify the res/layout/activity_main to add respective XML components
5	Run the application and choose a running android device and install the application on it and verify the results

Practical -9

AIM:- Create an application that uses the image button and clicking this button changes the image of it and also handles the onLongClick event.

Theory:-

Events are a useful way to collect data about a user's interaction with interactive components of Applications. Like button presses or screen touch etc. The Android framework maintains an event queue as a first-in, first-out (FIFO) basis. You can capture these events in your program and take appropriate action as per requirements.

There are following three concepts related to Android Event Management –

Event Listeners – An event listener is an interface in the View class that contains a single callback method. These methods will be called by the Android framework when the View to which the listener has been registered is triggered by user interaction with the item in the UI.

Event Listeners Registration – Event Registration is the process by which an Event Handler gets registered with an Event Listener so that the handler is called when the Event Listener fires the event.

Event Handlers – When an event happens and we have registered an event listener for the event, the event listener calls the Event Handlers, which is the method that actually handles the event.

Event Listeners & Event Handlers

Event Handler	Event Listener & Description
onClick()	OnTouchListener() This is called when the user either clicks or touches or focuses upon any widget like button, text, image etc. You will use onClick() event handler to handle such event.
onLongClick()	OnLongClickListener() This is called when the user either clicks or touches or focuses upon any widget like button, text, image etc. for one or more seconds. You will use onLongClick() event handler to handle such event.
onFocusChange()	OnFocusChangeListener() This is called when the widget loses its focus ie. user goes away from the view item. You will use onFocusChange() event handler to handle such event.

onKey()	OnFocusChangeListener() This is called when the user is focused on the item and presses or releases a hardware key on the device. You will use onKey() event handler to handle such event.
onTouch()	OnTouchListener() This is called when the user presses the key, releases the key, or any movement gesture on the screen. You will use onTouch() event handler to handle such event.
onMenuItemClick()	OnMenuItemClickListener() This is called when the user selects a menu item. You will use onMenuItemClick() event handler to handle such event.
onCreateContextMenu() ()	onCreateContextMenuListener() This is called when the context menu is being built(as the result of a sustained "long click")