I

Name.....

Roll No. .....Year 20.....20.....

Exam Seat No.....

COMPUTER GROUP | SEMESTER – VI | DIPLOMA IN ENGINEERING AND TECHNOLOGY

A LABORATORY MANUAL

FOR

MOBILE APPLICATION DEVELOPMENT

(22617)

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

(Autonomous) (ISO 9001 : 2015) (ISO / IEC 27001 : 2013)

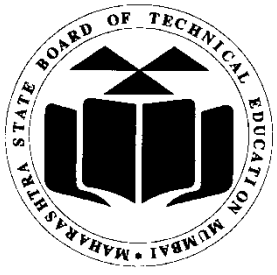
A Laboratory Manual for

Mobile Application Development

(22617)

Semester– VI

(CO/CW/CM/IF)



Maharashtra State
Board of Technical Education, Mumbai
(Autonomous)(ISO-9001-2008) (ISO/IEC27001:2013)

Maharashtra State
Board of Technical Education, Mumbai

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4th Floor, Government Polytechnic Building, 49, Kherwadi,
Bandra (East), Mumbai -400051.

(Printed on November 2019)

Maharashtra State
Board of Technical Education

Certificate

This is to certify that Mr. / Ms. ……. Roll No……. of Sixth Semester of Diploma in ……. of Institute ……...……..... (Code……) has completed the term work satisfactorily in subject **Mobile Application Development (22617)** for the academic year 20…….to 20…..... as prescribed in the curriculum.

Place ……. Enrollment No……
Date: ..... Exam Seat No. ……..

Subject Teacher **Head of the Department** **Principal**

Seal of the Institute

Preface

The primary focus of any engineering laboratory/field work in the technical education system is to develop the much-needed industry relevant competencies and skills. With this in view, MSBTE embarked on this innovative 'I' Scheme curricula for engineering Diploma programmes with outcome-based education as the focus and accordingly, relatively large amount of time is allotted for the practical work. This displays the great importance of laboratory work making each teacher, instructor and student to realize that every minute of the laboratory time need to be effectively utilized to develop these outcomes, rather than doing other mundane activities. Therefore, for the successful implementation of this outcome-based curriculum, every practical has been designed to serve as a ***'vehicle'*** to develop this industry identified competency in every student. The practical skills are difficult to develop through 'chalk and duster' activity in the classroom situation. Accordingly, the 'I' scheme laboratory manual development team designed the practical's to ***focus*** on ***outcomes***, rather than the traditional age-old practice of conducting practical's to 'verify the theory' (which may become a byproduct along the way).

This laboratory manual is designed to help all stakeholders, especially the students, teachers and instructors to develop in the student the pre-determined outcomes. It is expected from each student that at least a day in advance, they have to thoroughly read the concerned practical procedure that they will do the next day and understand minimum theoretical background associated with the practical. Every practical in this manual begins by identifying the competency, industry relevant skills, course outcomes and practical outcomes which serve as a key focal point for doing the practical. Students will then become aware about the skills they will achieve through procedure shown there and necessary precautions to be taken, which will help them to apply in solving real-world problems in their professional life.

This manual also provides guidelines to teachers and instructors to effectively facilitate student-centered lab activities through each practical exercise by arranging and managing necessary resources in order that the students follow the procedures and precautions systematically ensuring the achievement of outcomes in the students.

This manual is intended for the Third-Year students of Computer & Information Technology. This manual typically contains practical's related to Android studio covering various aspects related to the subject for enhanced understanding. Students are advised to thoroughly go through this manual rather than only topics mentioned in the curriculum. Mobiles, tablets and electronic gadgets are very popular and widely used as a requisite to run our life smoothly. And this is the reason Mobile Application Development Environments like Android OS, Symbian OS etc. are popular and fastest growing environments which are widely used by Smartphone, Tablets, and equipment's. This course is designed to introduce and familiarize students of computer engineering with such a popular environment so that respective skills on these environments help them as skill development and enhancement, placement assistance, and for their career growth.

Although all care has been taken to check for mistakes in this laboratory manual, yet it is impossible to claim perfection especially as this is the first edition. Any such errors and suggestions for improvement can be brought to our notice and are highly welcome.

Programme Outcomes (POs) to be achieved through Practicals of this Course

Following programme outcomes are expected to be achieved significantly out of the ten programme outcomes and Computer Engineering programme specific outcomes through the practicals of the course on **Mobile Application Development.**

PO 1. **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the broad-based Computer related problems.

PO 2. **Discipline knowledge:** Apply Computer engineering discipline - specific knowledge to solve core computer engineering related problems.

PO 3. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Computer related problems.

PO 4. **Engineering tools:** Apply relevant Computer programming tools with an understanding of the limitations.

PO 5. **The engineer and society:** Assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to practice in field of Computer engineering.

PO 6. **Environment and sustainability:** Apply Computer engineering solutions also for sustainable development practices in societal and environmental contexts and demonstrate the knowledge and need for sustainable development.

PO 7. **Ethics:** Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Computer engineering.

PO 8. **Individual and teamwork:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.

PO 9. **Communication:** Communicate effectively in oral and written form.

PO 10. **Life-long learning:** Engage in independent and life-long learning activities in the context of technological changes in the Computer engineering field and allied industry.

Practical- Course Outcome matrix

Course Outcomes (COs)

a. Interpret features of Android operating system.
b. Configure Android environment and development tools.
c. Develop rich user Interfaces by using layouts and controls.
d. Use User Interface components for android application development.
e. Create Android application using database.
f. Publish Android applications.

Sr. No.	Title of the Practical	CO a.	CO b.	CO c.	CO d.	CO e.	CO f.
1.	Compare various operating systems with Android OS.	√	-	-	-	-	-
2.	Install and configure java development kit (JDK), android studio and android SDK.	-	√	-	-	-	-
3.	Configure android development tools (ADT) plug-in and create android virtual device	-	√	-	-	-	-
4.	Develop a program to display Hello World on screen.	-	-	√	-	-	-
5.	Develop a program to implement linear layout and absolute layout.	-	-	√	-	-	-
6.	Develop a program to implement frame layout, table layout and relative layout.	-	-	√	-	-	-
7.	Develop a program to implement Text View and Edit Text.	-	-	√	√	-	-
8.	Develop a program to implement Auto Complete Text View.	-	-	√	√	-	-
9.	Develop a program to implement Button, Image Button and Toggle Button.	-	-	√	√	-	-
10.	Develop a program to implement login window using above UI controls.	-	-	√	√	-	-
11.	Develop a program to implement Checkbox.	-	-	-	√	-	-
12.	Develop a program to implement Radio Button and Radio Group.	-	-	√	√	-	-
13.	Develop a program to implement Progress Bar.	-	-	√	√	-	-
14.	Develop a program to implement List View, Grid View, Image View and Scroll View.	-	-	√	√	-	-
15.	Develop a program to implement Custom Toast Alert.	-	-	√	√	-	-
16.	Develop a program to implement Date and Time Picker.	-	-	-	√	-	-

17.	Develop a program to create an activity.	-	-	√	-	-	-
18.	Develop a program to implement new activity using explicit intent and implicit intent.	-	-	√	√	-	-
19.	Develop a program to implement content provider.			√	√	√	
20.	Develop a program to implement service.			√	√		
21.	Develop a program to implement broadcast receiver.	√	√	√			
22.	Develop a program to implement sensors.	√	√				
23.	Develop a program to build Camera.	√		√			
24.	Develop a program for providing Bluetooth connectivity.	√	√	√	√		
25.	Develop a program for animation.	√	√	√			
26.	Perform Async task using SQLite.		√	√		√	
27.	Create sample application with login module. (Check username and password) On successful login, Change TextView “Login Successful”. And on login fail, alert user using Toast “Login fail”.		√	√	√		
28.	Create login application where you will have to validate username and password till the username and password is not validated, login button should remain disabled.		√	√	√		
29.	Develop a program to a) Send SMS b)Receive SMS	√	√	√			
30.	Develop a program to send and receive e-mail.		√	√	√		
31.	Deploy map based application. Part I		√	√		√	√
32.	Deploy map based application. Part II		√	√		√	√

List of Industry Relevant Skills

The following industry relevant skills of the competency "Create simple Android applications**"** are expected to be developed in you by performing practicals of this laboratory manual.

1. Interpret features of Android operating system.
2. Configure Android environment and development tools.
3. Develop rich user Interfaces by using layouts and controls.
4. Use User Interface components for android application development.
5. Create Android application using database.
6. Publish Android applications.

Brief Guidelines to Teachers

Hints regarding strategies to be used

1. Teacher shall explain prior concepts to the students before starting each experiment.
2. For practical's requiring tools to be used, teacher should provide the demonstration of the practical emphasizing the skills, which the student should achieve.
3. Involve students in the activities during the conduct of each experiment.
4. Teachers should give opportunity to students for hands-on after the demonstration.
5. Assess the skill achievement of the students and COs of each unit.
6. Teacher is expected to share the skills and competencies to be developed in the students.
7. Teacher should ensure that the respective skills and competencies are developed in the students after the completion of the practical exercise.
8. Teacher may provide additional knowledge and skills to the students even though that may not be covered in the manual but are expected from the students by the industries.
9. Teacher may suggest the students to refer additional related literature of the reference books/websites/seminar proceedings.
10. During assessment teacher is expected to ask questions to the students to tap their knowledge and skill related to that practical.

Instructions for Students

Student shall read the points given below for understanding the theoretical concepts and practical applications.

1. Students shall listen carefully the lecture given by teacher about importance of subject, learning structure, course outcomes.
2. Students shall organize the work in the group of two or three members and make a record of all observations.
3. Students shall understand the purpose of experiment and its practical implementation.
4. Students shall write the answers of the questions during practical.
5. Student should feel free to discuss any difficulty faced during the conduct of practical.
6. Students shall develop maintenance skills as expected by the industries.
7. Student shall attempt to develop related hands on skills and gain confidence.
8. Students shall refer technical magazines; websites related to the scope of the subjects and update their knowledge and skills.
9. Students shall develop self-learning techniques.
10. Students should develop habit to submit the write-ups on the scheduled dates and time.

Content Page

List of Practicals and Progressive Assessment Sheet

S. No.	Title of the practical	Page No.	Date of performance	Date of submission	Assessment marks (25)	Dated sign. of teacher	Remarks (if any)
1.	Compare various operating systems with Android OS.	1					
2.	Install and configure java development kit(JDK), android studio and android SDK.	5					
3.	Configure android development tools (ADT)plug-in and create android virtual device.	9					
4.	Develop a program to display Hello World on screen.	14					
5.	Develop a program to implement linear layout and absolute layout.	20					
6.	Develop a program to implement frame layout, table layout and relative layout.	26					
7.	Develop a program to implement Text View and Edit Text.	31					
8.	Develop a program to implement AutoComplete Text View.	36					
9.	Develop a program to implement Button, Image Button and Toggle Button.	41					
10.	Develop a program to implement login window using above UI controls.	48					
11.	Develop a program to implement Checkbox.	54					
12.	Develop a program to implement Radio Button and Radio Group.	59					
13.	Develop a program to implement Progress Bar.	64					
14.	Develop a program to implement List View, Grid View, Image View and Scroll View.	69					
15.	Develop a program to implement Custom Toast Alert.	76					
16.	Develop a program to implement Date and Time Picker.	82					

17.	Develop a program to create an activity.	88					
18.	Develop a program to implement new activity using explicit intent and implicit intent.	94					
19.	Develop a program to implement content provider.	100					
20.	Develop a program to implement service.	105					
21.	Develop a program to implement broadcast receiver.	110					
22.	Develop a program to implement sensors.	115					
23.	Develop a program to build Camera.	121					
24.	Develop a program for providing Bluetooth connectivity.	126					
25.	Develop a program for animation.	131					
26.	Perform Async task using SQLite.	136					
27.	Create sample application with login module. (Check username and password) On successful login, Change Text View “Login Successful” and on login fail, alert user using Toast “Login fail”.	141					
28.	Create login application where you will have to validate username and password till the username and password is not validated, login button should remain disabled.	146					
29.	Develop a program to a) Send SMS b) Receive SMS	151					
30.	Develop a program to send and receive e-mail.	157					
31.	Deploy map-based application. Part I	161					
32.	Deploy map-based application. Part II	165					
				Total Marks			
				Total Marks (Scaled to 25 Marks)			

- **To be Transferred to Proforma of CIAAN-2017**

Practical No. 1: Compare various operating systems with Android OS.

I. Practical Significance

Android is an Operating System for mobile devices developed by Google, which is built upon Linux kernel. Android competes with Apple's iOS (for iPhone/iPad), RIM's Blackberry, Microsoft's Windows Phone, Symbian OS, and many other proprietary mobile. The latest Android supports Phone/Tablet, TV, Wear (watch and glass), Automobile and Internet of things.

II. Relevant Program Outcomes (POs)

PO1. Basic knowledge
PO2. Discipline knowledge
PO10. Life-long learning

III. Competency and Practical Skills

"Create simple Android applications."
This practical is expected to develop the following skills

1. Able to identify the different operating systems.
2. Able to distinguish between various operating systems.
3. Able to identify the features of various operating systems. (Windows, Linux, Unix and Android)

IV. Relevant Course Outcome(s)

Interpret features of Android operating system.

V. Practical Outcome (PrOs)

Compare various operating systems with Android OS.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team.
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Operating system basics like definition of operating systems, features of operating systems. What is the need of operating systems? Basic architecture of operating systems. Different types of operating systems. Distinguishing points between different operating systems. Android is an open source and Linux-based Operating System for mobile devices such as smartphones and tablet computers. Android was developed by the Open Handset Alliance, led by Google, and other companies. Android offers a unified approach to application development for mobile devices which means developers need to develop only for Android, and their applications should be able to run on different devices powered by Android. The first beta version of the Android Software Development Kit (SDK) was released by Google in 2007, whereas the first commercial version, Android 1.0, was released in September 2008. On June 27, 2012, at the Google I/O conference, Google announced the next Android version, 4.1 Jelly Bean. Jelly Bean is an incremental update, with the primary aim of improving the user

interface, both in terms of functionality and performance. The source code for Android is available under free and open source software licenses. Google publishes most of the code under the Apache License version 2.0 and the rest, Linux kernel changes, under the GNU General Public License version 2.

VIII. Resources required (Additional)

S. No.	Instrument /Object	Specification	Quantity	Remarks
1.				
2.				

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List different Android O.S. versions.
2. State characteristics of android operating system

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Draw the architectural diagram of Android operating system.
2. Differentiate between Windows operating system and Android operating system.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1.……...

2.……...

3.…….

4.……

Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 2: Install and configure java development kit (JDK), Android studio and android SDK.

I. Practical Significance

Android is based on Linux with a set of native core C/C++ libraries. Android applications are written in Java. However, they run on Android's own Java Virtual Machine, called Dalvik Virtual Machine (DVM) (instead of JDK's JVM) which is optimized to operate on the small and mobile devices. SDK provides a selection of tools required to build Android apps or to ensure the process goes as smoothly as possible. Whether creating an app with Java, Kotlin or C#, SDK should run on an Android device and access unique features of the OS.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge

PO 2. Discipline knowledge

PO 7. Ethics

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to know the android operating system installation and configuration steps.
2. Able to install different versions of android operating system using the knowledge of installation and configuration steps.

IV. Relevant Course Outcome(s)

Configure Android environment and development tools.

V. Practical Outcome (PrOs)

Install and configure java development kit (JDK), android studio and android SDK.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Step 1 - Setup Java Development Kit (JDK) You can download the latest version of Java JDK from Oracle's Java site: Java SE Downloads. You will find instructions for installing JDK in downloaded files, follow the given instructions to install and configure the setup. Finally, set PATH and JAVA_HOME environment variables to refer to the directory that contains java and javac, typically java_install_dir/bin and java_install_dir respectively. If you are running Windows and have installed the JDK in C:\jdk1.6.0_15, you would have to put the following line in your C:\autoexec.batfile.

set

PATH=C:\jdk1.6.0_15\bin;%PATH%

set JAVA_HOME=C:\jdk1.6.0_15

Step 2 - Setup Android SDK You can download the latest version of Android SDK

from Android's official website: http://developer.android.com/sdk/index.html. If you are installing SDK on Windows machine, then you will find ainstaller_rXX-windows.exe, so just download and run this exe which will launch Android SDK Tool Setup wizard to guide you throughout the installation, so just follow the instructions carefully. Finally, you will have Android SDK Tools installed on your machine. If you are installing SDK either on Mac OS or Linux, check the instructions provided along with the downloaded android-sdk_rXX-macosx.zip file for Mac OS and android-sdk_rXX-linux.tgz file for Linux. This tutorial will consider that you are going to setup your environment on Windows machine having Windows 7 operating system.

Step 3 - Setup Android Development Tools (ADT) Plugin This step will help you in setting Android Development Tool plugin for Eclipse. Let's start with launching Eclipse and then, choose Help > Software Updates > Install New Software. This will display the following dialogue box.

Step 4 - Create Android Virtual Device to test your Android applications you will need a virtual Android device. So before we start writing our code, let us create an Android virtual device. Launch Android AVD Manager using Eclipse menu options Window > AVD Manager> which will launch Android AVD Manager. Use New button to create a new Android Virtual Device and enter the following information, before clicking Create AVD button.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List all the steps to install android operating system
2. List various IDEs that can be used to execute android operating system.

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Differentiate between JVM and DVM.
2. What is IDE? Why Java development toolkit is essential to install an android operating system?

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1.……

2……..

3……..

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 3: Configure android development tools (ADT) plug-in and create android virtual device.

I. Practical Significance

Configuration set up steps should be known beforehand as learnt in the practical no.2 Android Development Tools (ADT) is a plugin for the Android studio that is designed to give you a powerful, integrated environment in which to build Android applications. ADT extends the capabilities of Android studio to let you quickly set up new Android projects, create an application UI, add components based on the Android Framework API, debug your applications using the Android SDK tools, and even export signed (or unsigned) APKs in order to distribute your application. Developing in Android studio with ADT is highly recommended and is the fastest way to get started. With the guided project setup, it provides, as well as tools integration, custom XML editors, and debug output pane, ADT gives you an incredible boost in developing Android applications.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge

PO 2. Discipline knowledge

PO 7. Ethics

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to install android operating system.
2. Able to differentiate between various versions of android operating system.

IV. Relevant Course Outcome(s)

Configure Android environment and development tools.

V. Practical Outcome (PrOs)

Install and configure java development kit (JDK), android studio and android SDK.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

- Setting up Android Development Tools (ADT)
- Get Android Development Tools (ADT) from ADT Bundle

The ADT Bundle includes everything you need to begin developing apps:

- Android studio + ADT plugin
- Android SDK Tools Android Platform-tools
- The latest Android platform
- The latest Android system image for the emulator

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List basic requirements for configuring android operating system?
2. Why bytecode cannot run in Android?

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. What is a Build Type in Gradle?
2. Explain the build process in Android.

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1……

2……...

3……

4……

Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 4: Develop a program to display Hello World on screen.

I. Practical Significance

In android studio students must be aware of the directory structure and the control flow of the program. Program should be either executed on the android mobile phones or on the suitable emulators. To execute a simple program, like to display Hello World on screen syntax of writing a program in android is pre-requisite as the programming language used is JAVA only. The main activity code is a Java file MainActivity.java. This is the actual application file which ultimately gets converted to a Dalvik executable and runs your application.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to use basic Java syntax to write a program.
2. Able to analyze the directory structure of android studio.

IV. Relevant Course Outcome(s)

Develop rich user Interfaces by using layouts and controls

V. Practical Outcome (PrOs)

Develop a program to display Hello World on screen.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Following is the default code generated by the application wizard for Hello World! application:

```
package com.example.helloworld; import android.os.Bundle;
import android.app.Activity; import android.view.Menu; import
android.view.MenuItem;
import android.support.v4.app.NavUtils; public class MainActivity extends
Activity
{
@Override
```

```
public void onCreate(Bundle savedInstanceState)

{
   super.onCreate(savedInstanceState);
   setContentView(R.layout.activity_main);
   }
   @Override
public boolean onCreateOptionsMenu(Menu menu)
   {
      getMenuInflater().inflate(R.menu.activity_main,menu);
      return true;
      }
      }
```

The Manifest File: Whatever component you develop as a part of your application, you must declare all its components in a manifest file called AndroidManifest.xml which resides at the root of the application project directory. This file works as an interface between Android OS and your application, so if you do not declare your component in this file, then it will not be considered by the OS. The <activity> tag is used to specify an activity and android:name attribute specifies the fully qualified class name of the Activity subclass and the android:label attributes specifies a string to use as the label for the activity. You can specify multiple activities using <activity> tags. The action for the intent filter is named android.intent.action.MAIN to indicate that this activity serves as the entry point for the application. The category for the intent-filter is named android.intent.category.LAUNCHER to indicate that the application can be launched from the device's launcher icon. The @string refers to the strings.xml file explained below. Hence, @string/app_name refers to the app_name string defined in the strings.xml file, which is "HelloWorld". Similar way, other strings get populated in the application. Following is the list of tags which you will use in your manifest file to specify different Android application components:

1) <activity>elements for activities
2) <service> elements for services
3) <receiver> elements for broadcast receivers
4) <provider> elements for content providers

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List the files used to write Hello World program.
2. What is an activity in Android programming?

(Space for answers)

X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to display HelloWorld.
2. Write a program to display student name and marks.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 5: Develop a program to implement linear layout and absolute layout.

I. Practical Significance

To develop and place the android components accurately on the display screen, android provides various layout managers. Layout managers can be used on the simple android program too. Various layout managers can be selected as per the program requirements.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to use layout managers to indent the android components on the display screen.
2. Able to analyze different layout managers and select the appropriate layout managers as per the program requirements.

IV. Relevant Course Outcome(s)

Develop rich user Interfaces by using layouts and controls

V. Practical Outcome (PrOs)

Develop a program to implement linear layout and absolute layout**.**

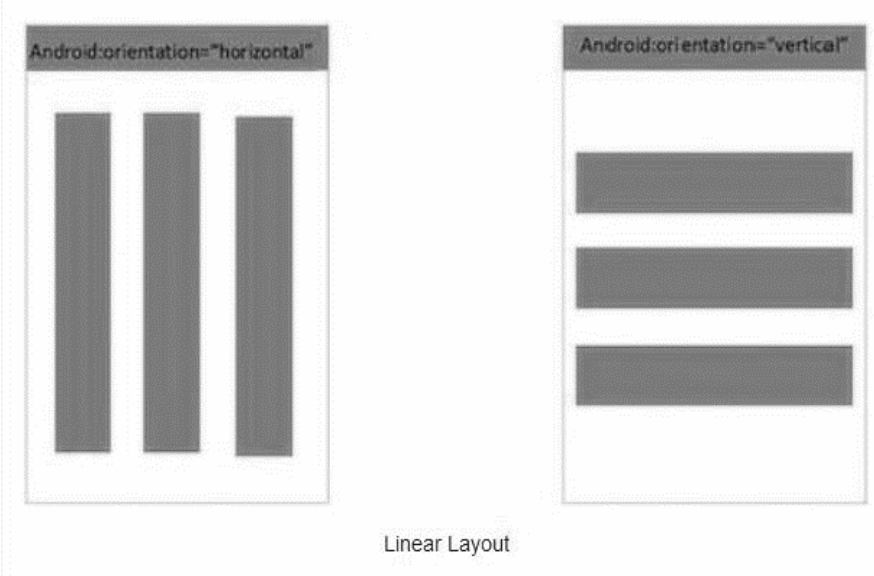
VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Layouts which are subclasses of View Group class and a typical layout defines the visual structure for an Android user interface and can be created either at run time using View/View Group objects or you can declare your layout using simple XML file main_layout.xml which is located in the res/layout folder of your project. layouts defined in XML file. A layout may contain any type of widgets such as buttons, labels, textboxes etc. Layout Attributes Each layout has a set of attributes which define the visual properties of that layout. There are few common attributes among all the layouts and there are other attributes which are specific to that layout. Types of layouts are Linear and Absolute layouts.

Linear Layout: -



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Name any three-layout manager?
2. What is Card View?

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to place Name, Age and mobile number linearly (Vertical) on the display screen using Linear layout.
2. Write a program to place Name, Age and mobile number centrally on the display screen using Absolute layout.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 6: Develop a program to implement frame layout, table layout and relative layout.

I. Practical Significance

To develop and place the android components accurately on the display screen, android provides various layout managers. Layout managers can be used on the simple android program too. Various layout managers can be selected as per the program requirements.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge
PO 2. Discipline knowledge
PO 3. Experiments and practice
PO 4. Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to use layout managers to indent the android components on the display screen.
2. Able to analyze different layout managers and select the appropriate layout managers as per the program requirements.

IV. Relevant Course Outcome(s)

Develop rich user Interfaces by using layouts and controls

V. Practical Outcome (PrOs)

Develop a program to implement frame layout, table layout and relative layout**.**

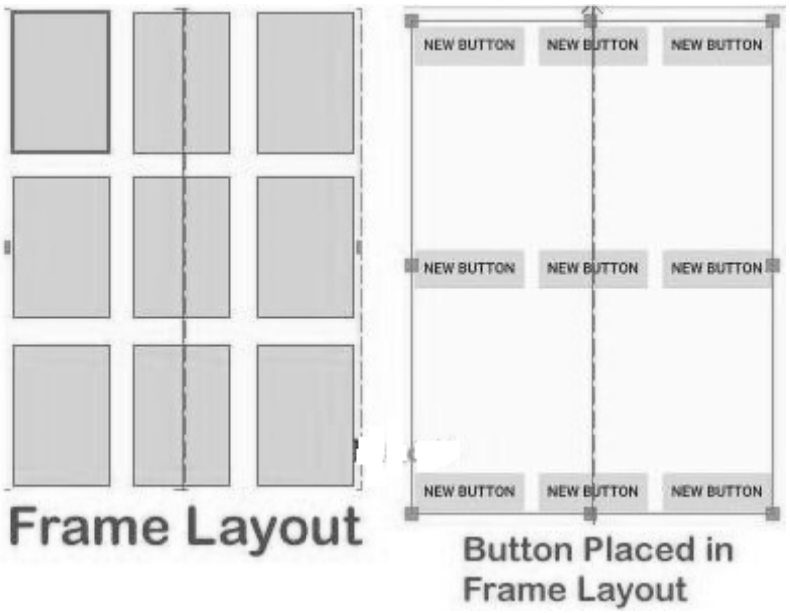
VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

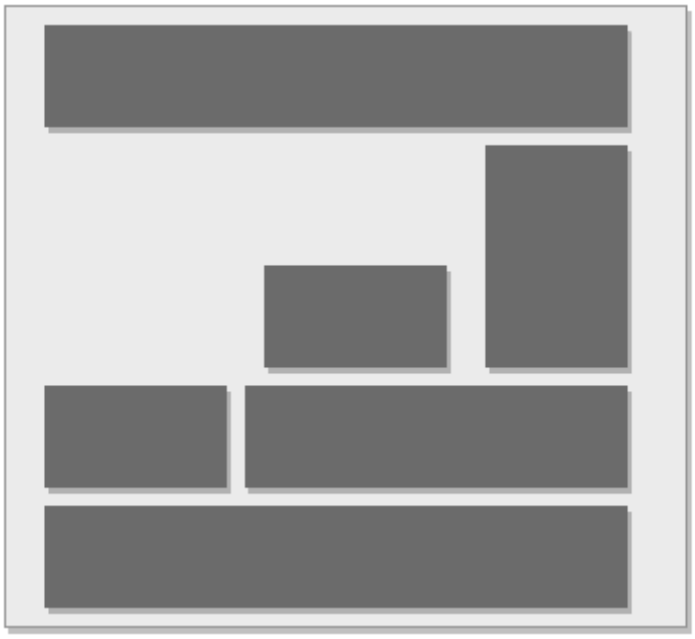
VII. Minimum Theoretical Background

1. Frame Layout:

Frame Layout is designed to block out an area on the screen to display a single item. Generally, Frame Layout should be used to hold a single child view, because it can be difficult to organize child views in a way that's scalable to different screen sizes without the children overlapping each other. You can, however, add multiple children to a Frame Layout and control their position within the Frame Layout by assigning gravity to each child, using the android: layout gravity attribute. Child views are drawn in a stack, with the most recently added child on top. The size of the Frame Layout is the size of its largest child (plus padding), visible or not (if the Frame Layout's parent permits).



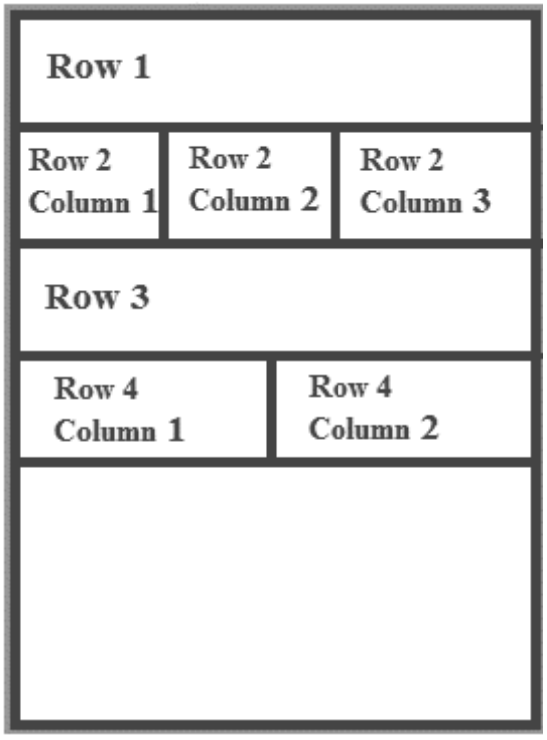
2. Relative Layout:



A Relative Layout is a very powerful utility for designing a user interface because it can eliminate nested view groups and keep your layout hierarchy flat, which improves performance. If you find yourself using several nested Linear Layout groups, you may be able to replace them with a single Relative Layout.

3. Table Layout:

A Table Layout consists of a number of Table Row objects, each defining a row (actually, you can have other children, which will be explained below). Table Layout containers do not display border lines for their rows, columns, or cells. Each row has zero or more cells; each cell can hold one View object. The table has as many columns as the row with the most cells. A table can leave cells empty. Cells can span columns,as they can in HTML. The width of a column is defined by the row with the widest cell in that column.



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List different attributes which can be used with any layout managers.
2. What is Grid Layout?

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to display 10 students basic information in a table form using Table layout.
2. Write a program to display all the data types in object-oriented programming using Frame layout.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 7: Develop a program to implement Text View and Edit Text.

I. Practical Significance

In this practical, UI controls in android like Text view and edit view are studied. Wherein the UI controls can be developed, used and placed on the screen using different layout managers as per the problem statement requirements.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge
PO 2. Discipline knowledge
PO 3. Experiments and practice
PO 4. Engineering tools
PO 7. Ethics
PO 10. Life-long learning

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop UI controls like Text View and Edit Text.
2. Able to test UI controls like Text View and Edit Text by checking its placing on the display screen.
3. Able to build UI controls like Text View and Edit Text, once testing is done and there are no errors.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program to implement Text View and Edit Text.

VI. Relevant Affective Domain Related Outcome(s)

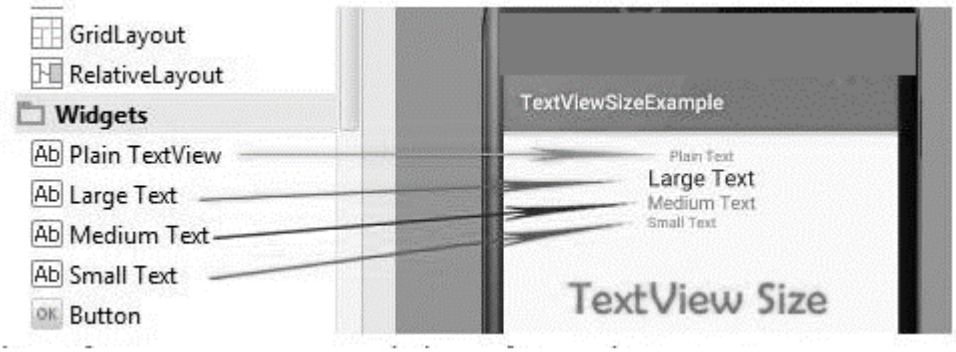
1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

1. Text View:

In Android, Text View displays text to the user and optionally allows them to edit it programmatically. Text View is a complete text editor, however basic class is configured to not allow editing but we can edit it. View is the parent class of Text View Being a subclass of view the text view component can be used in your app's.

GUI inside a View Group, or as the content view of an activity. We can create a Text View instance by declaring it inside a layout(XML file) or by instantiating it programmatically(Java Class).



2. Edit Text:

In Android, Edit Text is a standard entry widget in android apps. It is an overlay over Text View that configures itself to be editable. Edit Text is a subclass of Text View with text editing operations. Often use Edit Text in our applications in order to provide an input or text field, especially in forms. The simplest example of Edit Text is Login or Sign-in form. Text Fields in Android Studio are basically Edit Text.

Note: An Edit Text is simply a thin extension of a Text View. An Edit Text inherits all the properties of a Text View.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Which of these is not defined as a process state?
   a. Non-visible
   b. Visible
   c. Foreground
   d. Background

2. What is the name of the folder that contains the R.java file?
   a. src
   b. res
   c. bin
   d. gen

X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to accept username and password from the end user using Text View and Edit Text.
2. Write a program to accept and display personal information of the student.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 8: Develop a program to implement Auto Complete Text View.

I. Practical Significance

In this practical, UI controls in android like Auto complete Text view is studied. Wherein the UI controls can be developed, used and placed on the screen using different layout managers as per the problem statement requirements.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge
PO 2. Discipline knowledge
PO 3. Experiments and practice
PO 4. Engineering tools
PO 7. Ethics
PO 10. Life-long learning

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop UI controls like Auto complete Text View.
2. Able to test UI controls like Auto complete Text View by checking its placing on the display screen.
3. Able to build UI controls like Auto complete Text View, once testing is done and there are no errors.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program to implement Auto complete Text View.

VI. Relevant Affective Domain Related Outcome(s)

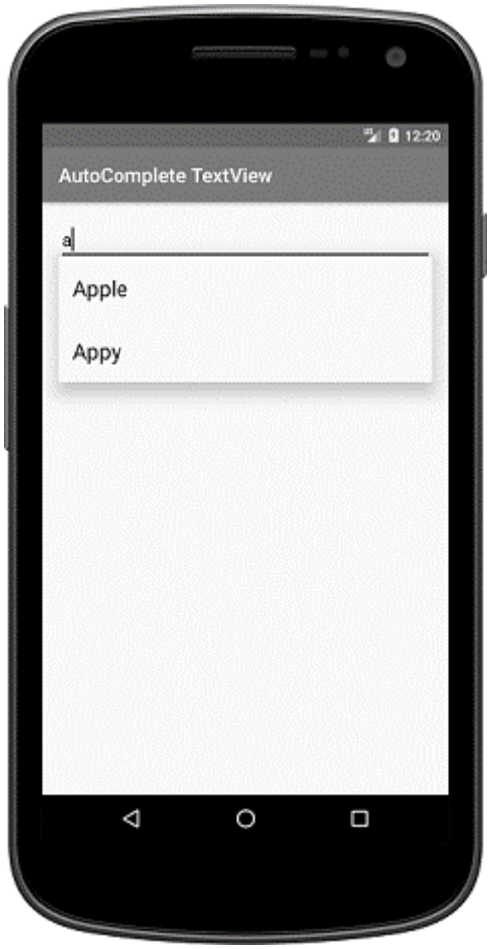
1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Auto Complete Text View:

Android Auto Complete Text View completes the word based on the reserved words, so no need to write all the characters of the word. Android Auto Complete Text View is a editable text field, it displays a list of suggestions in a drop down menu from which user can select only one suggestion or value. Android Auto Complete Text View is the subclass of Edit Text class. The Multi Auto Complete Text View is the subclass of AutoComplete Text View class. An editable text view that shows completion suggestions automatically while the user is typing. The list of suggestions

is displayed in a drop-down menu from which the user can choose an item to replace the content of the edit box. The drop down can be dismissed at any time by pressing the back key or, if no item is selected in the drop down, by pressing the enter center key. The list of suggestions is obtained from a data adapter and appears only after a given number of characters defined by the threshold. Auto Complete Text View is a component used to show suggestions while writing in an editable text field. The suggestions list is shown in a drop-down menu from which a user can select the desired item. The list of suggestions is obtained from an adapter and it appears only after a number of characters that are specified in the threshold. To use an Auto Complete Threshold field, it needs to be defined in the layout.



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. What does android:completionHint attribute in Auto Complete Text view does?
2. How to create AutoCompleteTextView field in XML?

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to create a first display screen of any search engine using Auto Complete Text View.
2. Write a program to display all the subjects of sixth semester using Auto Complete Text View.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 9: Develop a program to implement Button, Image Button and Toggle Button.

I. Practical Significance

In this practical, UI controls in android like Buttons are studied. There are various types of buttons like Image button and toggle button which is studied.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

PO 7. Ethics

PO 10. Life-long learning

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop UI controls like various types of buttons.
2. Able to use buttons which handles events.
3. Able to build Passive and Active UI controls.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program to implement Button, Image Button and Toggle Button.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

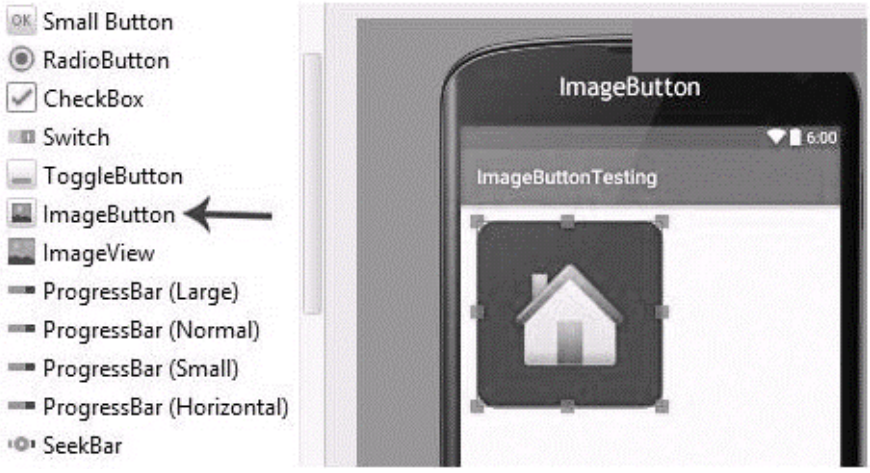
VII. Minimum Theoretical Background

1. Buttons-

In Android, Button represents a push button. The android. widget. Button is subclass of Text View class and Compound Button is the subclass of Button class. A Push buttons can be clicked, or pressed by the user to perform an action. There are different types of buttons used in android such as Compound Button, Toggle Button, Radio Button. Button is a subclass of Text View class and compound button is the subclass of Button class. On a button we can perform different actions or events likeclick event, pressed event, touch event etc. Android buttons are GUI components which are sensible to taps (clicks) by the user. When the user taps/clicks on button in an Android app, the app can respond to the click/tap. These buttons can be divided into two categories: the first is Buttons with text on, and second is buttons with an image on.

2. **Types of buttons–**
   Buttons can be divided into two categories the first is Buttons with text on, and second is buttons with an image on.

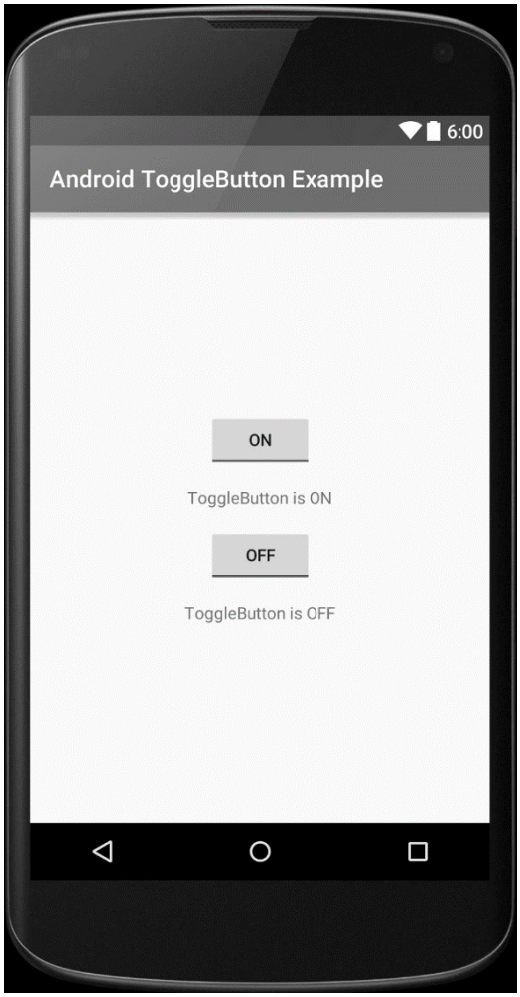
3. **Image Button –**
   A button with images on can contain both an image and a text. Android buttons with images on are also called Image Button. In Android, Image Button is used to display a normal button with a custom image in a button. In simple words we can say, Image Button is a button with an image that can be pressed or clicked by the users. By default it looks like a normal button with the standard button background that changes the color during different button states. An image on the surface of a button is defined within a xml (i.e. layout) by using src attribute or within java class by using setImageResource() method. We can also set an image or custom drawable in the background of the image button **.** Image Button has all the properties of a normal button so you can easily perform any event like click or any other event which you can perform on a normal button.
   Note: Standard button background image is displayed in the background of button whenever you create an image button. To remove that image, you can define your own background image in xml by using background attribute or in java class by using setBackground() method.



4. Toggle Button–

A toggle button allows the user to change a setting between two states. You can add a basic toggle button to your layout with the Toggle Button object. If you need to change a button's state yourself, you can use the Compound Button.setChecked() or Compound Button.toggle() method. To detect when the user activates the button or switch, create a Compound Button. OnCheckedChangeListener object and assign it to the button by calling setOnCheckedChangeListener().

It is beneficial if user have to change the setting between two states. It can be used to On/Off Sound, Wi-Fi, Bluetooth etc. By default, the android Toggle Button will be in OFF (Unchecked) state. We can change the default state of Toggle Button by using android:checked attribute. In case, if we want to change the state of Toggle Button to ON (Checked), then we need to set android:checked = “true” in our XML layout file.



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Write a piece of code to set id of the button.
2. How to add image to resources file?
3. List four Android Toggle Button control attributes.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to create a toggle button to display ON / OFF Bluetooth on the display screen.
2. Write a program to create a simple calculator.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 10: Develop a program to implement login window using above UI controls.

I. Practical Significance

In this practical, all the previous UI controls in android like Text View, Edit Text Buttons which are studied are implemented in this practical. Events are also handled on the android UI controls used in the practical.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge
PO 2. Discipline knowledge PO 4. Engineering tools
PO 7. Ethics
PO 10. Life-long learning

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to use the layout managers.
2. Able to develop android UI controls to create login window without using databases.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program to implement Button, Image Button and Toggle Button.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

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 etc. Define two Text View asking username and password of the user. The password Text View must have input Type set to password. Its syntax is given below

```
<EditText
   android:id = "@+id/editText2"
   android:layout_width = "wrap_content"
   android:layout_height = "wrap_content"
   android:inputType = "textPassword" />

<EditText
   android:id = "@+id/editText1"
   android:layout_width = "wrap_content"
   android:layout_height = "wrap_content"
/>
```

Define a button with login text and set its onClick Property. After that define the

```
<Button
   android:id = "@+id/button1"
   android:layout_width = "wrap_content"
   android:layout_height = "wrap_content"
   android:onClick = "login"
   android:text = "@string/Login"
/>
```

function mentioned in the onClick property in the java file.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Name the file in which respective XML components can be added.
2. List all the UI components which can be used to develop login window.

(Space for answers)

X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to create a login form for a social networking site.
2. Write a program to create a login form for student registration system

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 11: Develop a program to implement Checkbox.

I. Practical Significance

Android **CheckBox** is a type of two state button either checked or unchecked. There can be a lot of usage of checkboxes. For example, it can be used to know the hobby of the user, activate/deactivate the specific action etc.

II. Relevant Program Outcomes (POs)

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

PO 10. Life-long learning

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop an application using Checkbox control.

IV. Relevant Course Outcome(s)

Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

Develop a program to implement Checkbox.

VI. Relevant Affective Domain related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

Android Checkbox class is the subclass of Compound Button class.

Methods of Checkbox class

There are many inherited methods of View, Text View, and Button classes in the Checkbox class. Some of them are as follows:

- public boolean isChecked() : Returns true if it is checked otherwise false.
- public void setChecked(boolean status) : Changes the state of the Checkbox.

Following figure shows different checkboxes

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Name the different methods of Checkbox.
2. List different attributes of Checkbox.
3. Write xml tag to create a checkbox named “Android”.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different examples.

(Use blank space for answers or attach more pages if needed)

1. Write a program to show five checkboxes and toast selected checkboxes.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 12: Develop a program to implement Radio Button and Radio Group.

I. Practical Significance

Radio Buttons are used when we need to select only one item from a list of presented items. If Radio Buttons are in Radio Group, when one Radio Button within a group is selected, all others are automatically deselected.

II. Relevant Program Outcomes (POs)

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop an application using Radio Button and Radio Group controls.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

Use Develop a program to implement Radio Button and Radio Group.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

Radio Button is generally used with *Radio Group*. **Radio Group** is a set of radio buttons, marking one radio button as checked makes all other radio buttons as unchecked. A radio button consists of two states – checked and unchecked. Clicking an unchecked button changes its state to "checked" state and "unchecked" for the previously selected radio button. To toggle a checked state to unchecked state, we need to choose another item.

Following are the important attributes related to Radio Group control.

1. **android:checkedButton** : This is the id of child radio button that should be checked by default within this radio group.
2. **android:orientation** : This property on the Radio group defines the orientation to position its child view consisting of Radio Buttons.

Following are the few methods of radio button:

1. **check(id)**: This sets the selection to the radio button whose identifier is passed in parameter. -1 is used as the selection identifier to clear the selection.
2. **clearCheck()** : It clears the selection. When the selection is cleared, no radio button in this group is selected and getCheckedRadioButtonId() returns null.
3. **getCheckedRadioButtonId()** : It returns the identifier of the selected radio button in this group. If its empty selection, the returned value is-1.

4. **setOnCheckedChangeListener()** : This registers a callback to be invoked when the checked radio button changes in this group. We must supply instance of Radio Group. OnCheckedChangeListener to setOnCheckedChangeListener() method

VIII. Resources used (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Write xml tag to create a Radio button.
2. Write the purpose of Radio Button
3. List different methods of Radio Button

(Space for answers)

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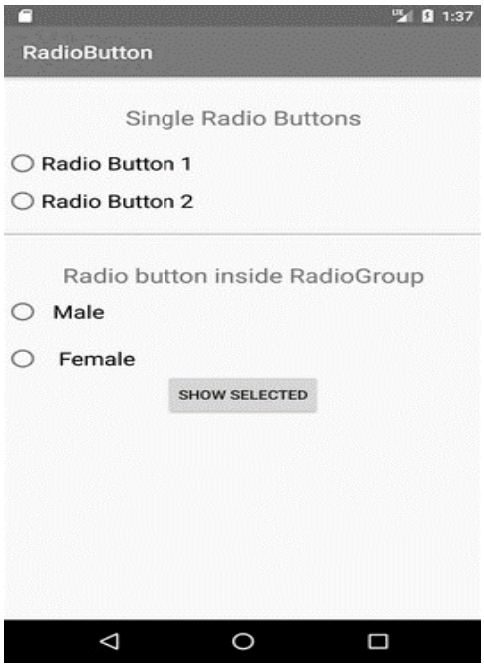
X. Exercise

Note: Faculty must ensure that every group of students use different examples.

(Use blank space for answers or attach more pages if needed)

1. Write a program to show the following output. First two radio buttons are without using radio group and next two radio buttons are using radio group. Note the changes between these two. Also toast which radio button has been selected.



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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of students/Team Members

1. ……...

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 13: Develop a program to implement Progress Bar

I. Practical Significance

Progress bars are used to show progress of a task. For example, when you are uploading or downloading something from the internet, it is better to show the progress of download/upload to the user. In android there is a class called Progress Dialog that allows you to create progress bar.

II. Relevant Program Outcomes (POs)

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

III. Competency and Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop an application using Progress bar.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

Develop a program to implement Progress Bar

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

A user interface element that indicates the progress of an operation. For a visual overview of the difference between determinate and indeterminate progress modes, see Progress & activity. Display progress bars to a user in a non-interruptive way.

Progress bar supports two modes to represent progress: determinate and indeterminate.

Indeterminate Progress

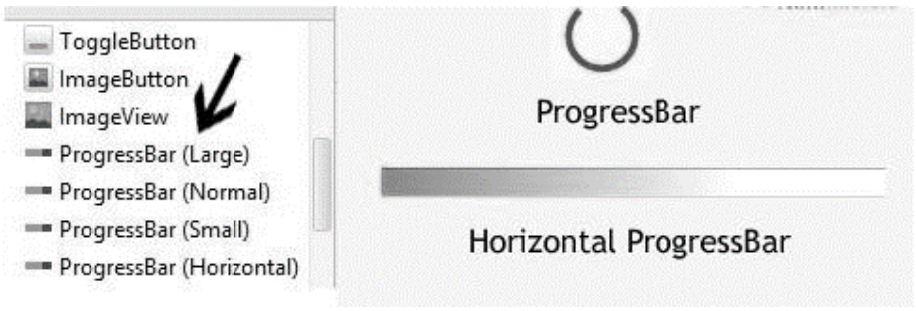
Use indeterminate mode for the progress bar when you do not know how long an operation will take. Indeterminate mode is the default for progress bar and shows a cyclic animation without a specific amount of progress indicated.

Determinate Progress

Use determinate mode for the progress bar when you want to show that a specific quantity of progress has occurred. For example, the percent remaining of a file being retrieved, the amount records in a batch written to database, or the percent remaining of an audio file that is playing.

Progress Dialog is a class that allows you to create progress bar. In order to do this, you need to instantiate an object of this class. Its syntax is.

ProgressDialog dialog=new ProgressDialog(this);



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. State different methods to update the percentage of progress displayed.
2. Write an xml tag for the determinate progress bar.
3. List different progress bar styles provided by the system.

(Space for answers)

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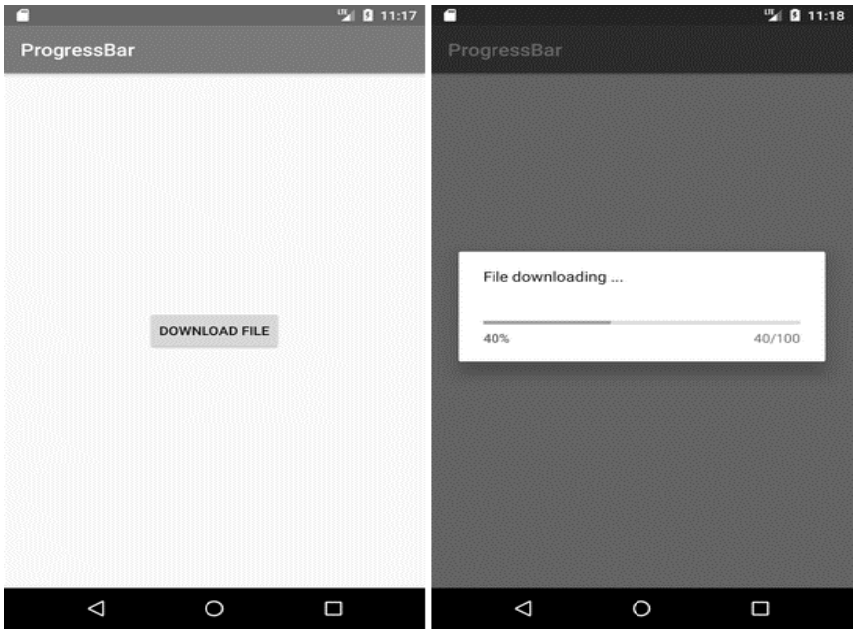
X. Exercise

Note: Below given are few sample questions for reference. Teachers must design different questions for practice.

(Use blank space for answers or attach more pages if needed)

1. Write a program to display circular progress bar.
2. Write a program to show the following output.



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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of students/Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 14: Develop a program to implement List View, Grid View, Image View and Scroll View.

I. Practical Significance

A View occupies a rectangular area on the screen and is responsible for drawing and event handling. View is the base class for *widgets*, which are used to create interactive UI components (buttons, text fields, etc.). The View Group subclass is the base class for *layouts*, which are invisible containers that hold other Views (or other View Groups) and define their layout properties.

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II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge

PO 2- Discipline knowledge

PO 3- Experiments and practice

PO 4- Engineering tools

III. Competency and Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop an application using list view
2. Able to develop an application using grid view
3. Able to develop an application using image view
4. Able to develop an application using scroll view

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program to implement List View, Grid View, Image View and Scroll View.

VI. Relevant Affective Domain Related Outcome(s)

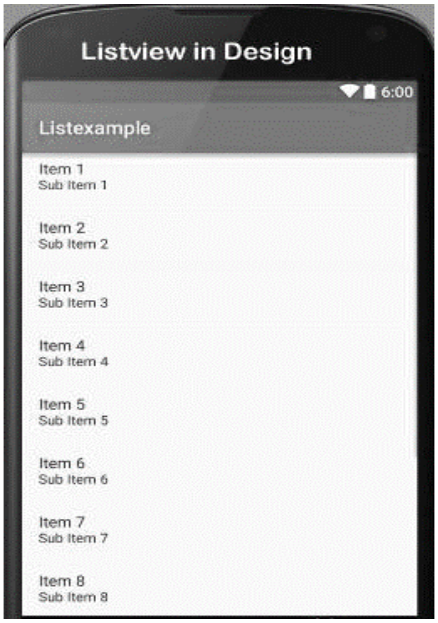
1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

List View

List of scrollable items can be displayed in Android using List View. It helps you to displaying the data in the form of a scrollable list. Users can then select any list item by clicking on it. List View is default scrollable so we do not need to use scroll View or anything else with List View.

List View is widely used in android applications. A very common example of List View is your phone contact book, where you have a list of your contacts displayed in a List View and if you click on it then user information is displayed.



Grid View

In android Grid View is a view group that display items in two dimensional scrolling grid (rows and columns), the grid items are not necessarily predetermined but they are automatically inserted to the layout using a List Adapter. Users can then select any grid item by clicking on it. Grid View is default scrollable so we don't need to use Scroll View or anything else with Grid View.

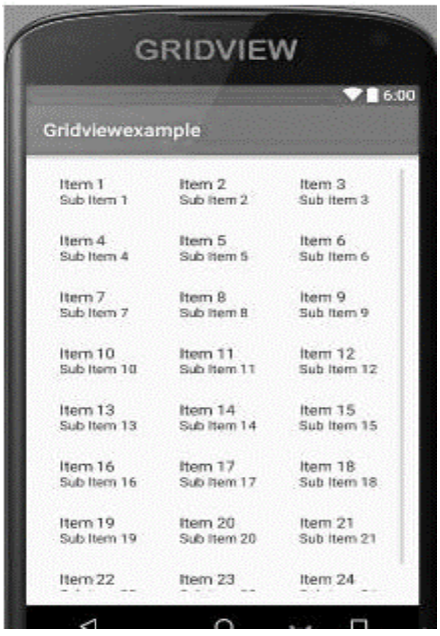
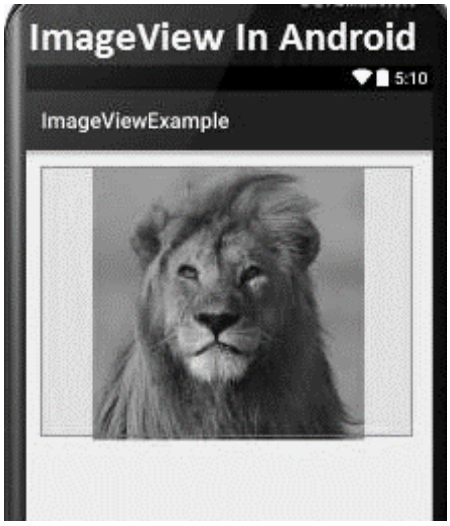


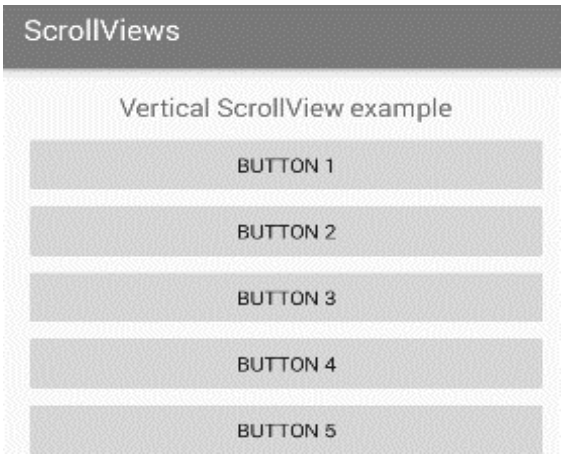
Image View

In Android, Image View class is used to display an image file in application. Image file is easy to use but hard to master in Android, because of the various screen sizes in Android devices. An android is enriched with some of the best UI design widgets that allows us to build good looking and attractive UI based application.



Scroll View

In android scroll View can hold only one direct child. This means that, if you have complex layout with more views(Buttons, Text Views or any other view) then you must enclose them inside another standard layout like Table Layout, Relative Layout or Linear Layout. You can specify layout_width and layout_height to adjust width and height of screen. You can specify height and width in dp(density pixel) or px(pixel). Then after enclosing them in a standard layout, enclose the whole layout in scroll View to make all the element or views scrollable.



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

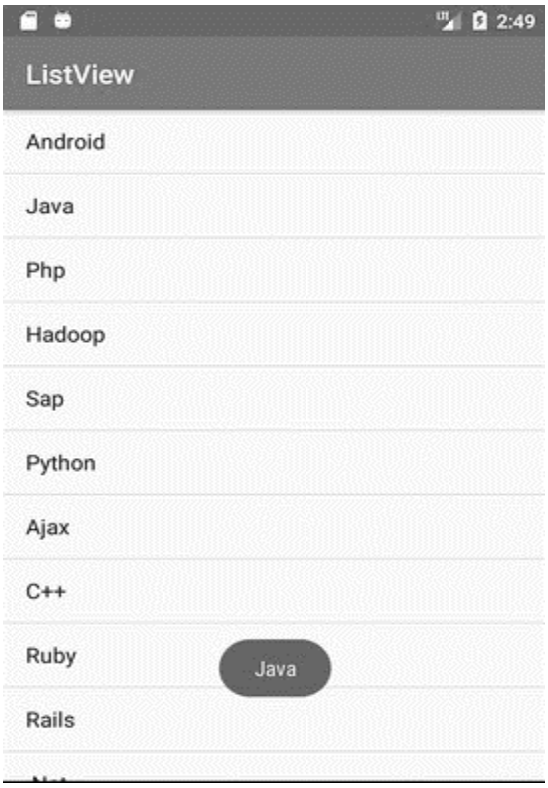
1. List all attributes of Image View.
2. Write steps to add following string array to grid view.
   static final String [] example= new String {“A”, “B”, “C”, “D”, “E”};
3. Describe android:stretchMode attribute of Grid view in detail.

(Space for answers)

X. Exercise

(Use blank space provide for answers or attached more pages if needed)

1. Write a program to show the following output. Use appropriate view for the same.



2. Write a program to display an image using Image View and a button named as “Change Image”. Once you click on button another image should get displayed.
3. Write a program to display 15 buttons using grid view.
4. Write a program to display a text view using vertical scroll view.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of students/Team Members

1. ……...

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 15: Develop a program to implement Custom Toast Alert.

I. Practical Significance

An Android Toast is a small message displayed on the screen, similar to a tool tip or other similar popup notification. Android Toast can be used to display information for the short period of time. A toast contains message to be displayed quickly and disappears after sometime. It provides simple feedback about an operation in a small popup. A Toast is displayed on top of the main content of an activity. For example, navigating away from an email before you send it triggers a "**Draft saved**" toast to let you know that you can continue editing later.

II. Relevant Program Outcomes (POs)

PO 2. Discipline knowledge

PO 3. Experiments and practice

PO 4. Engineering tools

III. Competency and Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to implement Toastalerts.

IV. Relevant Course Outcome(s)

Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

Develop a program to implement Custom ToastAlert.

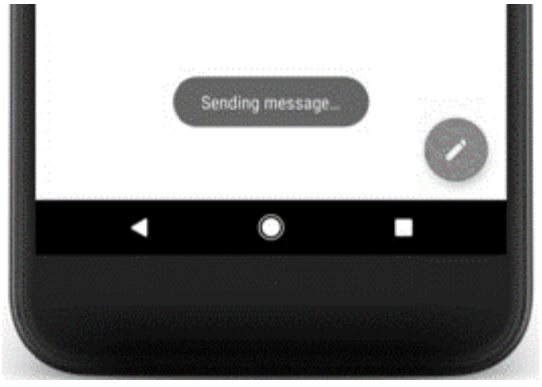
VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

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 button on an email triggers a "Sending message..." toast



Following is the example to create a toast.
Toast toast = Toast.makeText(getApplicationContext(),
"This is a message displayed in a Toast",
Toast.LENGTH_SHORT); toast.show();

The Toast.makeText() method is a factory method which creates a Toast object. The method takes 3 parameters. First the methods needs a Context object which is obtained by calling getApplicationContext(). Note: The getApplicationContext() method is a method that exists inside activities, so the above code has to be located in an Activity subclass towork.
The second parameter is the text to be displayed in the Toast. The third parameter is the time duration the Toast is to be displayed.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List all predefined constants to specify the overall positioning of the Toast. Which method is used to change the positioning of a Toast message on the screen?
2. List two constants of Toastclass.

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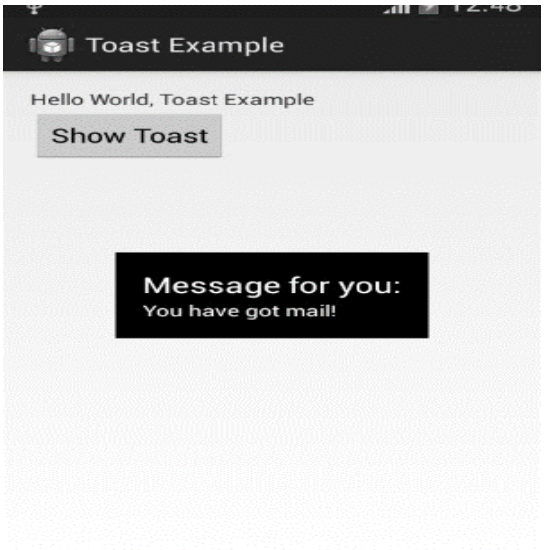
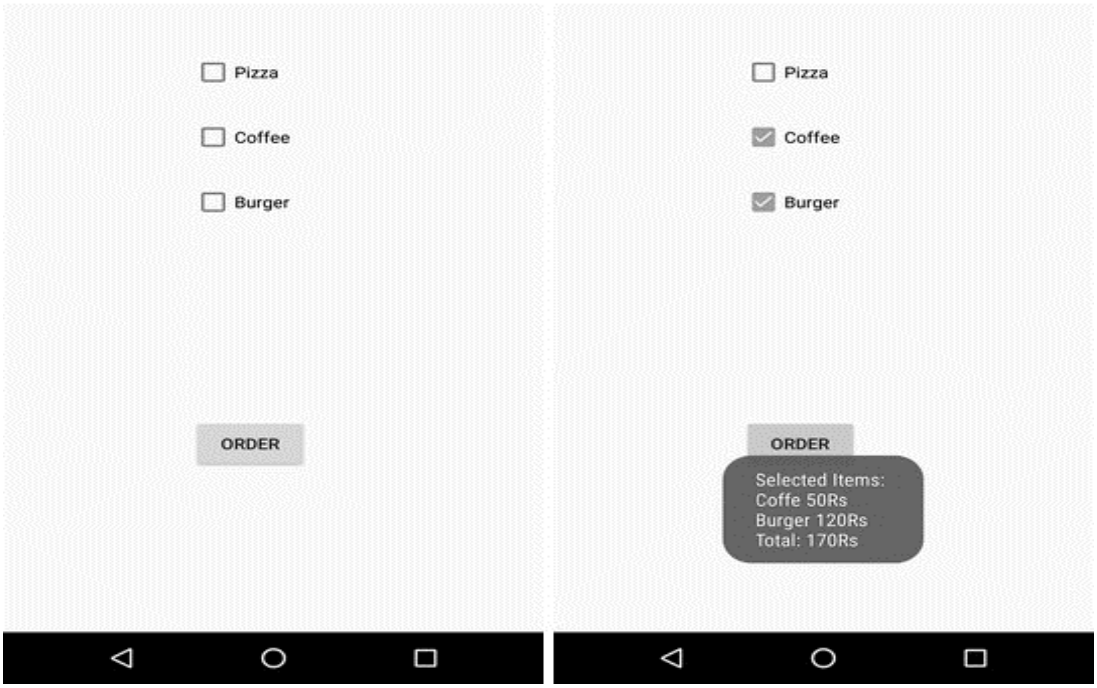
X. Exercise

(Use blank space provide for answers or attached more pages if needed)

1. Write a program to display following toast message.



2. Write a program to display three checkboxes and one button named “Order “as shown below. Once you click on button it should toast different selected checkboxes along with items individual and total price.



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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of students/Team Members

1. ……...

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 16: Develop a program to implement Date and Time Picker.

I. Practical Significance

Android provides controls for the user to pick a time or pick a date as ready-to-use dialogs. Each picker provides controls for selecting each part of the time (hour, minute, AM/PM) or date (month, day, year). Using these pickers helps ensure that your users can pick a time or date that is valid, formatted correctly, and adjusted to the user'slocale.

II. Relevant Program Outcomes (POs)

PO 2- Discipline knowledge

PO 3- Experiments and practice

PO 4- Engineering tools

III. Competency and Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Use time picker to display the time either in 24 Hour format or 12 Hour format.
2. Use Date picker to display the date.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

1. Develop a program to display a date using Date picker.
2. Develop a program to display a time using Time picker.

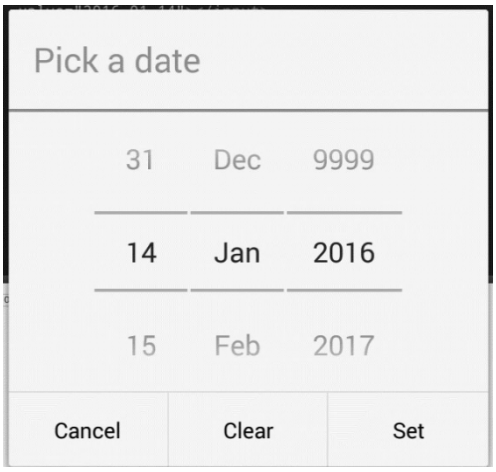
VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

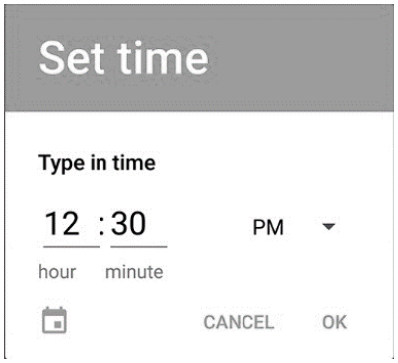
Date Picker:

Android Date Picker allows you to select the date consisting of day, month and year in your custom user interface. For this functionality android provides DatePicker and DatePickerDialog components.



Time Picker:

Android Time Picker allows you to select the time of day in either 24 hour or AM/PM mode. The time consists of hours, minutes and clock format. Android provides this functionality through TimePicker class. Following xml attribute is used to create time picker.



VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Write an xml Timepicker tag with all its attributes.
2. List and explain all methods of TimePickerclass
3. List and explain any five methods of DatePickerclass.

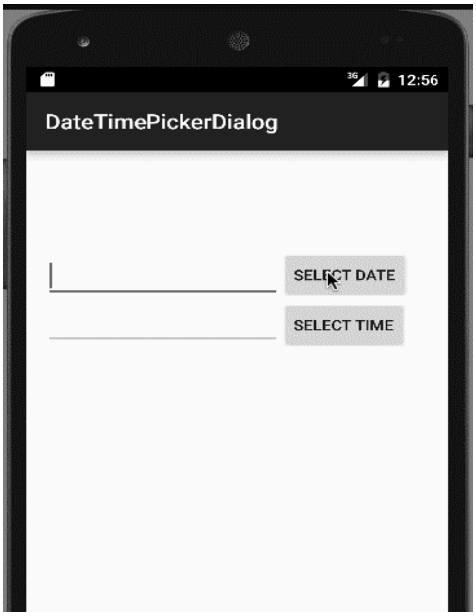
(Space for answers)

X. Exercise

(Use blank space provide for answers or attached more pages if needed)

1. Write a program to display following output. Use TimePicker with Spinnermode.

2. Write a program to display following output. Select and display date and time on click of “select date”, “select time” buttons respectively.



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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 17: Develop a program to create an activity

I. Practical Significance

An activity represents a single screen with a user interface. For example, an email application might have one activity that shows a list of new emails, another activity to compose an email, and one for reading emails.

II. Relevant Program Outcomes (POs)

PO 2- Discipline knowledge

PO 3- Experiments and practice

PO 4- Engineering tools practice

PO 10- Life-long learning

III. Competency and Skills

"Create simple Android applications"

This practical is expected to develop the following skills

1. Create an activity to load all the UI components.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

Develop a program to create an activity

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

VII. Minimum Theoretical Background

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.

If an application has more than one activity, then one of them should be marked as the activity that is presented when the application is launched.

As in C, C++ or Java programming language program starts from main () function, android system initiates its program within an Activity starting with a call on onCreate() method. Android **Activity** class is the subclass of ContextThemeWrapper class. An activity class loads all the UI component using the XML file available in res/layout folder of the project. Following statement loads UI components from res/layout/activity_main.xmlfile:

setContentView(R.layout.activity_main);

To write our own activity the new activity must be the derived from
Activity class as given below

```
public class MainActivity extends Activity
        {
                @Override
                 public void onCreate(Bundle savedInstanceState) {
```

```
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        /*Code goes here*/
    }
    /** Called when the activity is about to
     become visible. */ @Override
     protected void onStart() { super.onStart();
        /*Code goes here*/
     }
      /** Called when the activity has
     become visible. */ @Override
    protected void onResume() { super.onResume();
        /*Code goeshere*/
     }
     /** Called when another activity is
     taking focus. */ @Override
      protected void
      onPause() {
      super.onPause();
      /*Code goes here*/
    }
     /** Called when the activity is no
    longer visible. */ @Override
    protected void onStop() { super.onStop();
        /*Code goes here*/
    }
     /** Called just before the activity is
    destroyed. */ @Override
    public void onDestroy() { super.onDestroy();
        /*Code goes here*/
    }
}
```

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android versionsupporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Draw the activity life cycle diagram.
2. Give the hierarchy of directory structure where you store activity file.
3. Write difference between onStop() and onDestroy() methods, also between onPause() and onResume()methods.

(Space for answers)

X. Exercise

(Use blank space provide for answers or attached more pages if needed)

1. Write a program to create a HelloWorld Activity using all lifecycles methods to display messages using Log.d.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(15)	**Product Related(10)**	**Total (25)**	

Practical No.18: Develop a program to implement new activity using explicit intent and implicit intent.

I. Practical Significance

Android Intent is the message that is passed between components such as activities, content providers, broadcast receivers, services etc. It facilitates communication between different android components

II. Relevant Program Outcomes (POs)

PO 1- Basic knowledge:
PO 2- Discipline knowledge
PO 3- Experiments and practice
PO 4- Engineering tools practice

III. Competency and Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Create an activity using implicit intent.
2. Create an activity and call another activity using explicit intent.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.

V. Practical Outcomes (PrOs)

Develop a program to implement new activity using explicit intent and implicit intent.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices

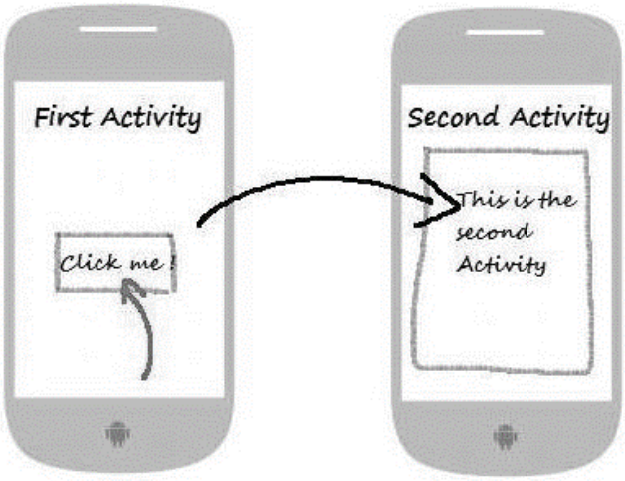
VII. Minimum Theoretical Background

Android application components can connect to other Android applications. This connection is based on a task description represented by an Intent object.

Intents are asynchronous messages which allow application components to request functionality from other Android components. Intents allow you to interact with components from the same applications as well as with components contributed by other applications. For example, an activity can start an external activity for taking a picture.

Mostly Intents are used for:

a. For Launching an Activity
b. To start a New Service
c. For Broadcasting Messages
d. To Display a list of contacts in List View



Types of intents:

There are two types of intents

a. Implicit Intent
b. Explicit Intent

Implicit Intent:

The implicit intent is the intent where instead of defining the exact components, you define the action that you want to perform for different activities.

Syntax:

```
Intent i=new Intent();
i.setAction(Intent.ACTIO
N_SEND);
```

Explicit Intent:

An explicit intent is an Intent where you explicitly define the component that needs to be called by the Android System. An explicit intent is one that you can use to launch a specific app component, such as a particular activity or service in your app.

Syntax:

```
Intent I = new
Intent(getApplicationContext(),NextActivity.class);
I.putExtra("value1" , "This value for Next Activity");
I.putExtra("value2" , "This value for Next Activity");
```

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List different methods used in Intent.
2. Write an intent to display the phone dialer with the given number filled in.

(Space for answers)

X. Exercise

(Solve any one of the following. Use blank space provide for answers or attached more pages if needed)

1. Write a program to create a text field and a button “Navigate”. When you enter “www.google.com” and press navigate button it should open google page.
2. Write a program to create button “Start Dialer”. When u click on this button it should open the phone dialer.
3. Write a program to create two screens. First screen will take one number input from user. After click on Factorial button, second screen will open and it should display factorial of the same number. Also specify which type of intent you will use in this case.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(15)	**Product Related(10)**	**Total (25)**	

Practical No. 19: Develop a program to implement content provider

I. Practical Significance

Content Provider is one of the pillars of Android. It is a component which
i)- hides database details (database name, table name, column info. etc.)
ii)- allows the application to share data among multiple applications.

II. Relevant Program Outcomes (POs)

PO 1. Basic knowledge
PO 2- Discipline knowledge
PO 3- Experiments and practice
PO 4- Engineering tools

III. Competency and Skills

"Create simple Android applications"
This practical is expected to develop the following skills
1. Able to access database with the help of content provider.

IV. Relevant Course Outcome(s)

1. Develop rich user Interfaces by using layouts and controls.
2. Use User Interface components for android application development.
3. Create Android application using database.

V. Practical Outcome (PrOs)

Develop a program to implement content provider.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices.

VII. Minimum Theoretical Background

A content provider component supplies data from one application to other on request. Such requests are handled by the methods of the Content Resolver class. A content provider can use different ways to store its data and the data can be stored in a database, in files, or even over a network.

Content providers let you centralize content in one place and have many different applications access it as needed. A content provider behaves very much like a database where you can query it, edit its content, as well as add or delete content using insert(), update(), delete(), and query() methods. In most cases this data is stored in an SQlite database.

A content provider is implemented as a subclass of Content Provider class and must implement a standard set of APIs that enable other applications to perform transactions.

```
public class MyApp extends Content Provider
{
}
```

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Write in detail which methods are needed to implement Content Provider class.
2. Explain different parts of an URI in android application. Also write the format of URI.
3. Write steps to create a content provider in android applications.

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X. Exercise

(Use blank space for answers or attach more pages if needed)

1. Write a program to create your own content provider to insert and access data in android application.

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 20: Develop a program to implement service.

I. Practical Significance

In android, Service is a component which keep an app running in the background to perform long running operations based on our requirements. For Service, we don't have any user interface and it will run the apps in background like playing the music in background or handle network operations when the user in different app.

II. Relevant Program Outcomes (POs)

PO 1- Basic knowledge:
PO 2- Discipline knowledge
PO 3- Experiments and practice
PO 10- Life-long learning

III. Competency and Skills

"Create simple Android applications"

This practical is expected to develop the following skills.

1. Able to open any activity using service.
2. Able to use other application in background.

IV. Relevant Course Outcome(s)

1. Use User Interface components for android application development.
2. Develop rich user Interfaces by using layouts and controls.

V. Practical Outcome (PrOs)

Develop a program to implement service.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical practices.

VII. Minimum Theoretical Background

A service is a component which runs in the background without direct interaction with the user. As the service has no user interface, it is not bound to the lifecycle of an activity.

Services are used for repetitive and potentially long running operations, i.e., Internet downloads, checking for new data, data processing, updating content providers. Services run with a higher priority than inactive or invisible activities and therefore it is less likely that the Android system terminates them. Services can also be configured to be restarted if they get terminated by the Android system once sufficient system resources are available again.

There are the three different types of services:

1. Foreground service
2. Background service
3. Bound service

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Draw the lifecycle of service.
2. Differentiate between bounded service and unbounded service.
3. Describe startService() and bindService()methods.

(Space for answers)

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X. Exercise

(Use blank space for answers or attach more pages if needed)

1. Write a program to start a Wi-Fi using service.
2. Write a program to display the following output.

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 21: Develop a program to implement broadcast receiver

I. Practical Significance

Broadcast Receivers simply respond to broadcast messages from other applications or from the system. For example, applications can also initiate broadcasts to let other applications know that some data has been downloaded to the device and is available for them to use, so this is broadcast receiver who will intercept this communication and will initiate appropriate action.

II. Relevant Program Outcomes (POs)

PO1- Basic knowledge

PO2- Discipline knowledge

PO3- Experiments and practice

PO4- Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to Create the Broadcast Receiver.
2. Able to Register Broadcast Receiver.

IV. Relevant Course Outcome(s)

1. Interpret features of Android operating system.
2. Configure Android environment and development tools.
3. Develop rich user Interfaces by using layouts and controls.

V. Practical Outcome (PrOs)

Develop a program to implement broadcast receiver.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Creating the Broadcast Receiver:

A broadcast receiver is implemented as a subclass of Broadcast Receiver class and overriding the onReceive() method where each message is received as an Intent object parameter.

Registering Broadcast Receiver:

An application listens for specific broadcast intents by registering a broadcast receiver in AndroidManifest.xml file. Consider we are going to register MyReceiver for system generated event ACTION_BOOT_COMPLETED which is fired by the system once the Android system has completed the boot process.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Differentiated between Activity Intent and Broadcasting Intent.
2. Draw Broadcast Receivers Lifecycle.
3. List the System Events related to Broadcast Receivers.

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to demonstrate all the system broadcast messages.

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 22: Develop a program to implement sensors.

I. Practical Significance

Most of the android devices have built-in sensors that measure motion, orientation, and various environmental condition. Android allows us to get the raw data from these sensors and use it in our application.

II. Relevant Program Outcomes (POs)

PO2- Discipline knowledge
PO3- Experiments and practice
PO4- Engineering tools
PO5- The engineer and society
PO7- Ethics

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to get a list of sensors supported by the device.
2. Able to demonstrate the use of Sensor Manager class.

IV. Relevant Course Outcome(s)

1. Interpret features of Android operating system.
2. Configure Android environment and development tools.

V. Practical Outcome (PrOs)

Develop a program to implement sensors.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

The android platform supports three broad categories of sensors. Motion Sensors, Environmental sensors, Position sensors. Some of the sensors are hardware based and some are software-based sensors. Whatever the sensor is, android allows us to get the raw data from these sensors and use it in our application. For this, android provides us with some classes. Android provides Sensor Manager and Sensor classes to use the sensors in our application. In order to use sensors, first thing you need to do is to instantiate the object of SensorManager class.

Example: SensorManager sMgr;
sMgr = (SensorManager)this.getSystemService(SENSOR_SERVICE);

The next thing you need to do is to instantiate the object of Sensor class by calling the getDefaultSensor() method of the SensorManager class. Its syntax is given below:

Sensor light;
light = sMgr.getDefaultSensor(Sensor.TYPE_LIGHT);

Once that sensor is declared, you need to register its listener and override two methods which are onAccuracyChanged and onSensorChanged. Its syntax is as follows:

```
sMgr.registerListener(this, light,SensorManager.SENSOR_DELAY_NORMAL);
public void onAccuracyChanged(Sensor sensor, int accuracy)
{}
public void onSensorChanged(SensorEvent event) { }
```

Methods:

1. getDefaultSensor(int type) :- This method get the default sensor for a given type. Explain methods
2. getOrientation(float[] R, float[] values) :- This method returns a description of the current primary clip on the clipboard but not a copy of its data.
3. getInclination(float[] I) :- This method computes the geomagnetic inclination angle in radians from the inclination matrix.
4. registerListener(SensorListener listener, int sensors, int rate) :-This method registers a listener for the sensor
5. unregisterListener(SensorEventListener listener, Sensor sensor) :-This method unregisters a listener for the sensors with which it is registered.
6. getOrientation(float[] R, float[] values) :-This method computes the device's orientation based on the rotation matrix.
7. getAltitude(float p0, float p) :-This method computes the Altitude in meters from the atmospheric pressure and the pressure at sea-level.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List the best practices for accessing and using sensors.
2. Differentiate between Sensor Class and Sensor Manager Class.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to changes the background color when device is shuffled.
2. Write a program to display the list of sensors supported by the mobile device.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1. ……...
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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 23: Develop a program to build Camera.

I. Practical Significance:

The Android framework includes support for various cameras and camera features available on devices, allowing you to capture pictures and videos in your application.

II. Relevant Program Outcomes (POs)

PO2- Discipline knowledge
PO3- Experiments and practice
PO4. Engineering tools.
PO5.The engineer and society.
PO7- Ethics

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to Launch the existing camera application.
2. Able to use the camera API to integrate the camera in any application.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.

V. Practical Outcome (PrOs)

Develop a program for Camera

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Camera can be used in your application in following ways.

1. Using existing android camera application in our application
2. Directly using Camera API provided by android in our application

You will use MediaStore.ACTION_IMAGE_CAPTURE to launch an existing camera application installed on your phone. Its syntax is given below:

```
Intent intent = new
Intent(android.provider.MediaStore.ACTION_IMAGE_CAPTURE);
```

We will be using the camera API to integrate the camera in our application. First you will need to initialize the camera object using the static method provided by the api called Camera. Open. Its syntax is:

```
Camera object = null;
object = Camera.open();
```

Methods:

1. startActivityForResult(Intent intent, int requestCode, Bundle options) It starts an activity, but can take extra bundle of options withit.
2. startActivityFromChild(Activity child, Intent intent, int requestCode) It launches

the activity when your activity is child of any otheractivity.

3. startActivityFromChild(Activity child, Intent intent, int requestCode, Bundle options) It work same as above, but it can take extra values in the shape of bundle with it.
4. startActivityFromFragment(Fragment fragment, Intent intent, int requestCode)It launches activity from the fragment you are currentlyinside.
5. startActivityFromFragment(Fragment fragment, Intent intent, intrequestCode, Bundle options) It not only launches the activity from the fragment, but can take extra values withit.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List all the methods related to camera class.
2. Explain the method that is used to detect the face.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Solve any one of the following. Use blank space for answers or attach more pages if needed)

1. Write a program to capture an image and display it using image view.
2. Write a program to record a video using various camera methods.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 24: Develop a program for providing Bluetooth connectivity.

I. Practical Significance

Bluetooth is a way to send or receive data between two different devices. Android platform includes support for the Bluetooth framework that allows a device to wirelessly exchange data with other Bluetooth devices.

II. Relevant Program Outcomes (POs)

PO2- Discipline knowledge
PO3- Experiments and practice
PO4- Engineering tools.
PO7- Ethics

III. Competency and Practical Skills

"Create simple Android applications."
This practical is expected to develop the following skills

1. Able to communicate with Bluetooth hardware.
2. Able to integrate Bluetooth in any application.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program for Bluetooth.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team.
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Android provides Bluetooth API to perform these different operations.

1. Scan for other Bluetooth devices
2. Get a list of paired devices.
3. Connect to other devices through service discovery.

Android provides Bluetooth Adapter class to communicate with Bluetooth. Create an object of this calling by calling the static method getDefaultAdapter(). Its syntax is given below.

```
private BluetoothAdapter BA;
BA = BluetoothAdapter.getDefaultAdapter();
```

In order to enable the Bluetooth of your device, call the intent with the following Bluetooth constant ACTION_REQUEST_ENABLE. Its syntax is.

```
Intent turnOn = new Intent(BluetoothAdapter.ACTION_REQUEST_ENABLE);
startActivityForResult(turnOn, 0);
```

Once you enable the Bluetooth, you can get a list of paired devices by calling getBondedDevices() method. It returns a set of Bluetooth devices. Its syntax is.

```
private
Set<BluetoothDevice>pairedDevi
ces; pairedDevices =
BA.getBondedDevices();
```

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Name the methods which are used to enable and disable Bluetooth adapter.
2. Explain the purpose of ACTION_REQUEST_DISCOVERABLE Constant.
3. List the uses of setName(String name)method.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to turn on, get visible, list devices and turnoff Bluetooth with the help of following GUI.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1. ……...

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 25: Develop a program for animation.

I. Practical Significance

Animation is the process of creating motion and shape change. Tween Animation takes some parameters such as start value, end value, size, time duration, rotation angle etc., and perform the required animation on that object. It can be applied to any type of object.

II. Relevant Program Outcomes (POs)

PO1- Basic Knowledge
PO2- Discipline knowledge
PO3- Experiments and practice
PO8- Individual and team work

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to write a program using Tween and Zoom animation.
2. Able to integrate image view and animation function together in one application.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Interpret features of Android operating system.

V. Practical Outcome (PrOs)

Develop a program for animation.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

In order to perform animation in android, we are going to call a static function loadAnimation() of the class AnimationUtils. We are going to receive the result in an instance of Animation Object. Its syntax is as follows:

```
Animation animation =
        AnimationUtils.loadAnimation(getApplicationContext(),
R.anim.myanimation);
```

In order to apply this animation to an object, we will just call the startAnimation() method of the object. Its syntax is:

```
ImageView image1 = (ImageView)findViewById(R.id.imageView1);
image.startAnimation(animation);
```

Methods:

1. start(): This method starts the animation.

2. setDuration(long duration) :This method sets the duration of an animation.
3. getDuration() : This method gets the duration which is set by above method.
4. end() : This method ends the animation.
5. cancel() : This method cancels the animation.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Write the steps to perform Tween Animation.
2. Explain the use of from XScale and from YScale method in detail.

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to rotate the image in clockwise/anticlockwise, Zoom IN/Zoom OUT, Fade IN/Fade OUT by using the following GUI.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1. ……...

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 26: Perform Async task using SQLite.

I. Practical Significance

Android AsyncTask is an abstract class provided by Android which gives us the liberty to perform heavy tasks in the background and keep the UI thread light thus making the application more responsive.

II. Relevant Program Outcomes (POs)

PO2- Discipline knowledge

PO3- Experiments and practice

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop the application using the Async task.
2. Able to keep the GUI light for heavy database applications.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Create Android application using database

V. Practical Outcome (PrOs)

Demonstrate Async task using SQLite.

VI. Relevant Affective Domain related Outcomes

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Android application runs on a single thread when launched. Due to this single thread model tasks that take longer time to fetch the response can make the application non-responsive. To avoid this, we use android AsyncTask to perform the heavy tasks in background on a dedicated thread and passing the results back to the UI thread. Hence use of AsyncTask in android application keeps the UI thread responsive at all times.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List the basic methods used in an android AsyncTaskclass.
2. Differentiate between AsyncTask andServices.
3. Name the method used, if a process takes a long time to do its work?

(Space for answers)

X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to insert data in SQLite database using AsyncTask

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 27: Create sample application with login module. (Check username and password) On successful login, Change Text View “Login Successful” and on login fail, alert user using Toast “Login fail”.

I. Practical Significance

This day Login and Registration form in Android are part of every application. So, when we are programming, we work with many registration forms. Forms can be very different from a simple login or registration to a complex ordering form for any application.

II. Relevant Program Outcomes (POs)

PO1- Basic knowledge
PO2- Discipline knowledge
PO3- Experiments and practice
PO7- Ethics

III. Competency and Practical Skills

“Create simple Android applications.”

1. This practical is expected to develop the following skills
2. Able to design the GUI framework for any application.
3. Able to develop simple login form.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Create sample application with login module. (Check username and password) On successful login, Change Text View “Login Successful” and on login fail, alert user using Toast “Login fail”.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

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 etc.
First you have to define two Text View asking username and password of the user. Define a button with login text.
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.

The last thing you need to do is to provide a security mechanism, so that unwanted attempts should be avoided. For this initialize a variable and on each false attempt, decrement it. And when it reaches to 0, disable the login button.

VIII. Resources required(Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Explain the use of equals()function.
2. List the important functions which are related to GUI component “Button”.
3. State the uses of Toast message.

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to create the login form and display login successful/ Unsuccessful toastmessage.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 28: Create login application where you will have to validate username and password till the username and password is not validated, login button should remain disabled.

I. Practical Significance

This day Login and Registration form in Android are part of every application out there. So, when we are programming, we work with many registration forms. Forms can be very different from a simple login or registration to a complex ordering form for any application.

II. Relevant Program Outcomes (POs)

PO1- Basic knowledge
PO2- Discipline knowledge
PO3- Experiments and practice
PO7- Ethics

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to develop various registration forms.
2. Able to develop the application with various kinds of validations.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Create sample application with login module. (Check username and password) On successful login, Change Text View "Login Successful". And on login fail, alert user using Toast "Login fail".

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

With registration, how you can check data that the user has entered with simple validation. Validation can check many conditions. We can verify if an email address is a valid email and if a user entered all the required data, for instance, we check if Edit Text is empty for the first and last name. We can prepare a way to notify the user that the data is not valid. On login activity, we should check for password length. There are a few things login and registration form need:

- Clean user interface.
- Validation (check if the email is an email and if the user entered all the data).
- Notifications for the user that the data is incorrect.
- Instructions for the user (e.g. how many characters are required for password).

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Explain validation of user input?
2. List and explain various GUI components used to design the login form with validation.
3. Differentiate between Text View and Edit Text View.

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to create the login form with necessary validations like length of username and password, empty text fields, count of unsuccessful login attempts. Display the login successful/Unsuccessful toastmessage.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 29: Develop a program to: a) Send SMS b) Receive SMS

I. Practical Significance

Android devices can send and receive messages to or from any other phone that supports Short Message Service (SMS). Android offers the Messenger application that can send and receive SMS messages.

II. Relevant Program Outcomes (POs)

PO2- Discipline knowledge
PO3- Experiments and practice
PO4-Engineering tools
PO7- Ethics

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Develop the application to send SMS.
2. Develop the application to receive SMS with customized GUI.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Interpret features of Android operating system

V. Practical Outcome (PrOs)

Develop a program to: a) Send SMS b) Receive SMS.

VI. Relevant Affective Domain related Outcomes

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

A host of third-party apps for sending and receiving SMS messages are also available in Google Play. The SMS protocol was primarily designed for user-to-user communication and is not well-suited for apps that want to transfer data. You should not use SMS to send data messages from a web server to your app on a user device. SMS is neither encrypted nor strongly authenticated on either the network or the device

Access to the SMS features of an Android device is protected by user permissions. Just as your app needs the user's permission to use phone features, so also does an app need the user's permission to directly use SMS features.

You have two choices for *sending* SMS messages:

- Use an implicit Intent to launch a messaging app such as Messenger, with the ACTION_SENDTOaction.
- Send the SMS message using the sendTextMessage() method or other methods of the SmsManagerclass.

To receive SMS messages, the best practice is to use the onReceive() method of the Broadcast Receiver class. The Android framework sends out system broadcasts of events such as receiving an SMS message, containing intents that are meant to be received using a Broadcast Receiver. Your app receives SMS messages by listening for the SMS_RECEIVED_ACTION broadcast.

Methods :

1 ArrayList<String> divideMessage(String text) :-This method divides a message text into several fragments, none bigger than the maximum SMS message size.

2 static SmsManager getDefault() :- This method is used to get the default instance of the Sms Manager

3 void sendDataMessage(String destination Address, String scAddress, short destinationPort, byte[] data, PendingIntent sentIntent, PendingIntent deliveryIntent):- This method is used to send a data based SMS to a specific application port.

4 void sendTextMessage(String destinationAddress, String scAddress, String text, PendingIntent sentIntent, PendingIntent deliveryIntent) :-Send a text based SMS.

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Explain the use of SmsManagerClass.
2. List changes that are need to be done in AndroidMainfest.XML file to send and receive messages.

(Space for answers)

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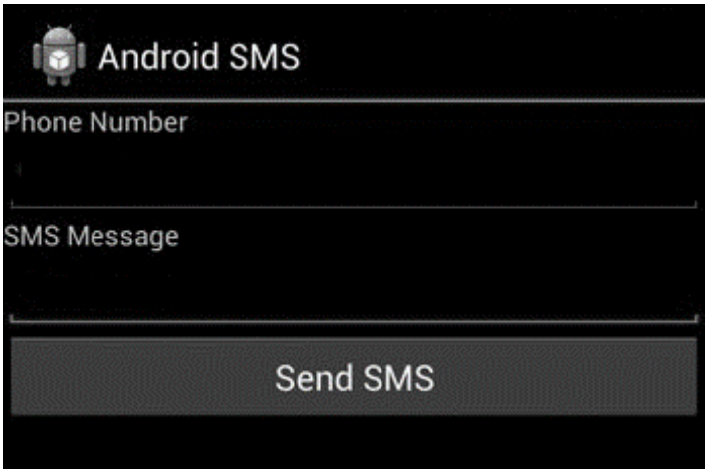
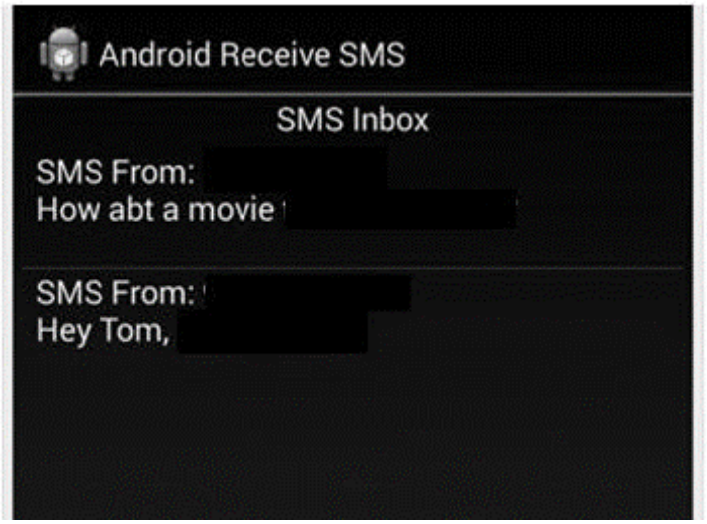
X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to send and receive SMS, make use of following GUI.





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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 30: Develop a program to send and receive e-mail.

I. Practical Significance

To send email from your Android application, you have to write an Activity that needs to launch an email client and sends an email using your Android device. This practical focuses on integrating the existing email clients in the new applications.

II. Relevant Program Outcomes (POs)

PO1- Basic knowledge
PO2- Discipline knowledge
PO3- Experiments and practice
PO7- Ethics

III. Competency and Practical Skills

"Create simple Android applications."
This practical is expected to develop the following skills

1. Able to use the existing email clients in any android applications.
2. Able to develop the application for sending the emails.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Use User Interface components for android application development.

V. Practical Outcome (PrOs)

Develop a program to send and receive e-mail.

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Intent Object - Action to send Email:

You will use ACTION_SEND action to launch an email client installed on your Android device. Following is simple syntax to create an intent with ACTION_SEND action.

```
Intent emailIntent = new Intent(Intent.ACTION_SEND);
```

Intent Object – Data Type to send Email

To send an email you need to specify mailto: as URI using setData() method and data type will be to text/plain using setType() method as follows:

```
emailIntent.setData(Uri.parse("mailto:"));
emailIntent.setType("text/plain");
```

VIII. Resources required(Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Why it becomes necessary to have inbuilt email module in mobile applications.
2. List the extra fields that can be used in an application to send emails.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to send email.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1. ……..
2. ……...
3. …….
4. …….

Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 31: Deploy map-based application. Part I

I. Practical Significance

Android allows us to integrate google maps in our application. You can show any location on the map, or can show different routes on the map. You can also customize the map according to your choices.

II. Relevant Program Outcomes (POs)

PO1- Basic knowledge
PO2- Discipline knowledge
PO3- Experiments and practice
PO4- Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."

This practical is expected to develop the following skills

1. Able to integrate Maps in any application.
2. Demonstrate the benefits of Maps and its uses.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Create Android application using database.
4. Publish Android applications.

V. Practical Outcome (PrOs)

Deploy map-based application. Part I

VI. Relevant Affective Domain related Outcomes

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Add the map fragment into xml layout file. Its syntax is given below –

```
<fragment
android:id="@+id/map
"
android:name="com.google.android.gms.maps.MapFragment"
android:layout_width="match_parent"
android:layout_height="match_parent"/>
```

Add some permissions along with the Google Map API key in the AndroidManifest.XML file. Its syntax is given below:

```
<!--Permissions-->
<uses-permission
android:name="android.permission.ACCESS_NETWORK_STATE"
/>
```

```
<uses-permission android:name="android.permission.INTERNET" />
<uses-permission
android:name="com.google.android.providers.gsf.permission.
READ_GSERVICES" />
<uses-permission
android:name="android.permission.WRITE_EXTERNAL_STO
RAGE" />
```

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. List the names of map type and write the syntax to change it.
2. Name the methods used to enable and disable zoom feature.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to locate user's current location.

(Space for answers)

XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1. ……...
2. ……...
3. ……
4. ……

Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	

Practical No. 32: Deploy map-based application. Part II

I. Practical Significance

Android allows us to integrate google maps in our application. You can show any location on the map, or can show different routes on the map. You can also customize the map according to your choices.

II. Relevant Program Outcomes (POs)

PO1- Basic knowledge
PO2- Discipline knowledge
PO3- Experiments and practice
PO4- Engineering tools

III. Competency and Practical Skills

"Create simple Android applications."
This practical is expected to develop the following skills

1. Able to integrate Maps in any application.
2. Demonstrate the benefits of Maps and its uses.

IV. Relevant Course Outcome(s)

1. Configure Android environment and development tools.
2. Develop rich user Interfaces by using layouts and controls.
3. Create Android application using database.
4. Publish Android applications.

V. Practical Outcome (PrOs)

Deploy map-based application. Part II

VI. Relevant Affective Domain Related Outcome(s)

1. Work collaboratively in team
2. Follow ethical Practices.

VII. Minimum Theoretical Background

Methods available in the Google Map class are given below.

1.addCircle(CircleOptions options) : This method add a circle to the map
2.addPolygon(PolygonOptions options) : This method add a polygon to the map
3.addTileOverlay(TileOverlayOptions options) : This method add tile overlay to the map
4.animateCamera(CameraUpdate update) : This method Moves the map according to the update with an animation
5.clear() : This method removes everything from the map
6.getMyLocation() : This method returns the currently displayed user location
7.moveCamera(CameraUpdate update) : This method repositions the camera according to the instructions defined in the update
8.setTrafficEnabled(boolean enabled) : This method Toggles the traffic layer on or off
9.snapshot(GoogleMap.SnapshotReadyCallback callback) : This method Takes a snapshot of the map
10. stopAnimation() : This method stops the camera animation if there is one in progress

VIII. Resources required (Additional)

Sr. No.	Instrument /Object	Specification	Quantity	Remarks
1	Android enabled smartphone / Android version supporting emulator	2 GB RAM	1	Data cable is mandatory for emulators

IX. Practical related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions to ensure the achievement of identified CO.

1. Explain the ways to add Markers on the Google Map.
2. Write the syntax for method which is used to add compass in Google Map.

(Space for answers)

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X. Exercise

Note: Faculty must ensure that every group of students use different input value.

(Use blank space for answers or attach more pages if needed)

1. Write a program to draw a route between two locations.

(Space for answers)

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XI. References / Suggestions for further Reading

1. https://www.tutorialspoint.com/android
2. https://stuff.mit.edu
3. https://www.tutorialspoint.com/android/android_advanced_tutorial.pdf
4. https://developer.android.com

XII. Assessment Scheme

Performance indicators		Weightage
Process related (10 Marks)		**30%**
1.	Logic Formation	10%
2.	Debugging ability	15%
3.	Follow ethical practices	5%
Product related (15 Marks)		**70%**
4.	Interactive GUI	20%
5.	Answer to Practical related questions	20%
6.	Expected Output	20%
7.	Timely Submission	10%
	Total (25 Marks)	**100%**

List of student Team Members

1. ……...
2. ……...
3. ……
4. ……

Marks Obtained			Dated signature of Teacher
Process Related(10)	**Product Related(15)**	**Total (25)**	