

# **MOBILE COMPUTING-PROGRESS FILE**



**Submitted to:**

Sir Haq Nawaz

**Submitted by:**

Amber Shafique (Bsef18a019)

# LECTURE#1

## ❖ VCS (Version Control System):

A **version control system** is a kind of software that helps the developer team to efficiently communicate and manage track of all the changes that have been made to the source code along with the information like who made and what change has been made.

- Version control software keeps track of every modification to the code in a special kind of database.
- Using a VCS also generally means that if you screw things up or lose files, you can easily recover

### Benefits:-

1. **Code Synchronizing:** Same code available to all members on different repositories connected to a central repository. All the changes in the files are tracked under the central repository. The central repository includes all the information of versioned files, and list of users that check out files from that central place using **VCS**.
2. **Code Testing :VCS** helps to test changes without losing the original version of the application.
3. **Revert: VCS** allows us to revert back to previous versions of the file because it separately maintains each version of file.

## ❖ Git :

Git is software for tracking changes in any set of files, usually used for coordinating work among programmers collaboratively developing source code during software development.

### Step-0

#### 1.1 GitHub Account:

Sign up to **github.com** and create a new account.

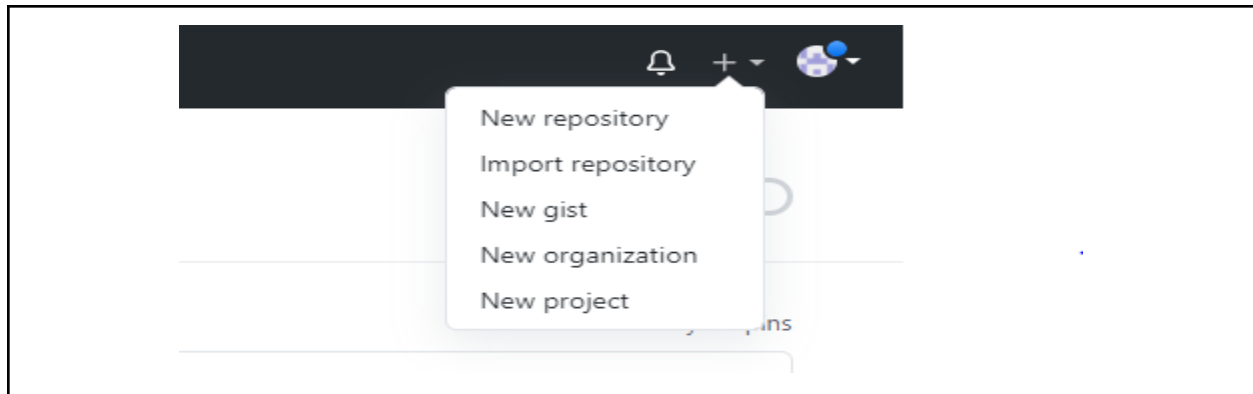
#### 1.2 Git CMD:

Install git cmd and configure it on your PC.

### Step-1

#### 1.1 Create a new Repository:

1.1.1 Click on add new repository button on your GitHub account.



1.1.2 Then provide details of your repository => Name, Description, Type.

**Public Repository:** It is visible to every user on your GitHub.

**Private Repository:** It is only available to the repository owner.

1.1.3 Click on the create repository button.

A screenshot of the 'Create new repository' form on GitHub. The form has two main sections: 'Repository details' and 'Repository options'. In the 'Repository details' section, the 'Owner' is set to 'amber-shafique' and the 'Repository name' is 'VCS', with a green checkmark indicating it's valid. Below this, a hint suggests repository names should be short and memorable. The 'Description (optional)' field contains the text 'Mobile Computing Lecture#1'. In the 'Repository options' section, the 'Public' radio button is selected, indicating the repository will be visible to everyone. Below this, there are three checkboxes for initializing the repository: 'Add a README file', 'Add .gitignore', and 'Choose a license'. Each checkbox has a brief description and a 'Learn more' link. At the bottom of the form is a green 'Create repository' button.

**1.2 Repository URL :** On creating a new repository GitHub will provide its url that is used to uniquely identify our repository on GitHub.

### Quick setup — if you've done this kind of thing before



Set up in Desktop

or

HTTPS

SSH

<https://github.com/amber-shafique/VCS.git>

Get started by [creating a new file](#) or [uploading an existing file](#). We recommend every repository include a

## LECTURE#2

### ❖ Git Clone:

- It is primarily used to point to an existing repository and make a clone or copy of that repository in a new directory, at another location.
- Makes connection between **local repository**(on PC) and **central repository** (on GitHub).

#### Step-1

Open **git CMD** and go to that folder path (using **cd**) where you want to clone the repository.

#### Step-2

Run the following command and give the **git url** of the repository you want to clone locally.

`git clone URL`

```
Git CMD
C:\Users\HP\Desktop>cd Git
C:\Users\HP\Desktop\Git>git clone https://github.com/amber-shafique/VCS.git
Cloning into 'VCS'...
warning: You appear to have cloned an empty repository.
C:\Users\HP\Desktop\Git>
```

Repository cloned Locally (see using **dir**)

```
Git CMD
C:\Users\HP\Desktop\Git>dir
Volume in drive C has no label.
Volume Serial Number is F8F2-04AE

Directory of C:\Users\HP\Desktop\Git

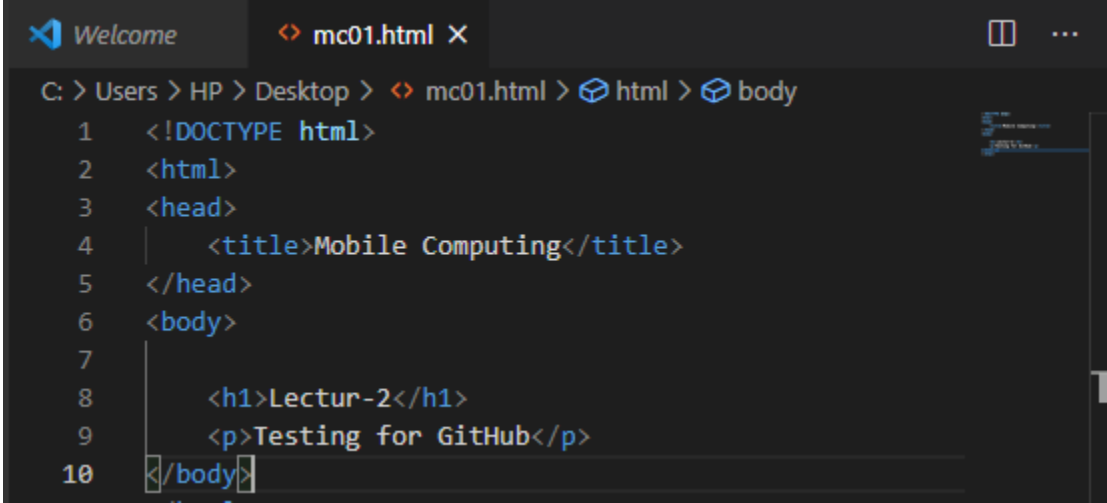
04/14/2021  12:25 AM    <DIR>          .
04/14/2021  12:25 AM    <DIR>          ..
04/14/2021  12:21 AM    <DIR>          VCS
               0 File(s)                0 bytes
               3 Dir(s)  40,968,900,608 bytes free
```

## ❖ Add File:

Add locally created file to the central(online) repository.

### Step-1

Creating file in local repository.



The screenshot shows a code editor with a dark theme. The top bar has a 'Welcome' tab and a file tab 'mc01.html'. The editor displays the following HTML code:

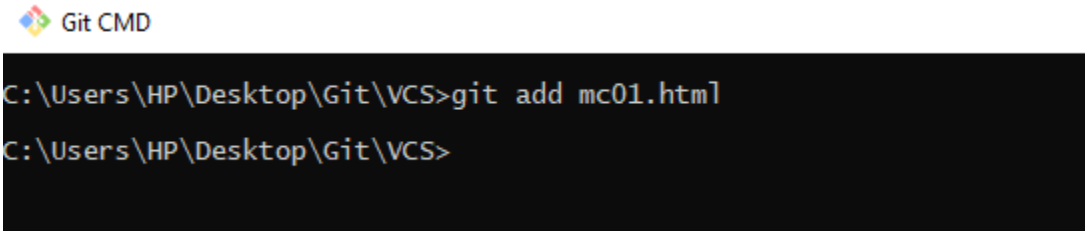
```
C: > Users > HP > Desktop > <> mc01.html > html > body
1  <!DOCTYPE html>
2  <html>
3  <head>
4    <title>Mobile Computing</title>
5  </head>
6  <body>
7
8    <h1>Lectur-2</h1>
9    <p>Testing for GitHub</p>
10 </body>
```

### Step-2

Run the following command and give the **File Name** you want to add on git repository.

```
git add FileName
```

No error, so file has been added successfully.



The screenshot shows a terminal window titled 'Git CMD'. The command prompt shows the following commands and output:

```
C:\Users\HP\Desktop\Git\VCS>git add mc01.html
C:\Users\HP\Desktop\Git\VCS>
```

## ❖ Add all files :

- `git add --all`
- `git add .`

## ❖ Add multiple files at same time:

```
git add FileName FileName FileName ...
```

## ❖ Git Commit

The "commit" command is used to save your changes and track messages.

### Step-3

Run the following command and give the **Message** you want to get displayed with added file.

```
git commit -m "message"
```

Message=> to inform the users about the change.



```
Git CMD
C:\Users\HP\Desktop\Git\VCS>git add mc01.html
C:\Users\HP\Desktop\Git\VCS>git commit -m "First commit done successfully"
[master (root-commit) 6f5a409] First commit done successfully
1 file changed, 11 insertions(+)
create mode 100644 mc01.html
```

## ❖ Add and commit simultaneously

```
git commit -am "message"
```

## ❖ Git Push:

To push the changes made in file locally to server (online repository).

### Step-4

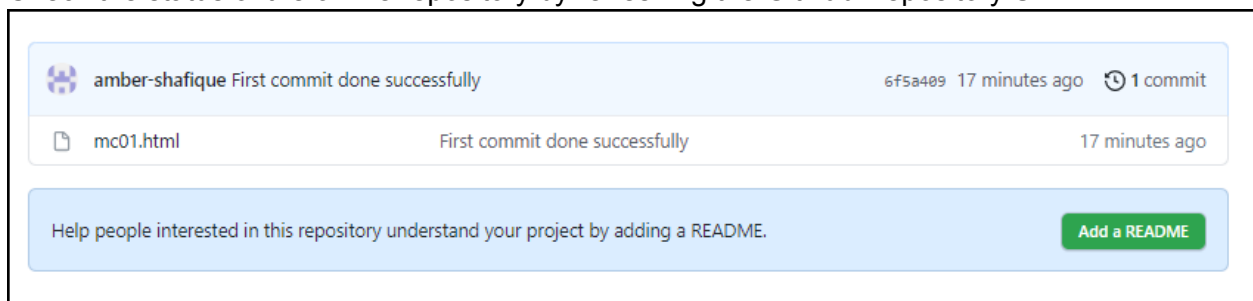
Run the following command to complete the synchronization.

```
git push
```

**Now we are synchronized with data available on local disk and online repository.**

```
Git CMD
C:\Users\HP\Desktop\Git\VCS>git push
info: please complete authentication in your browser...
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 345 bytes | 69.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/amber-shafique/VCS.git
 * [new branch]      master -> master
```

Check the status of the online repository by refreshing the GitHub Repository URL.



Content in online and local repository is synchronized.

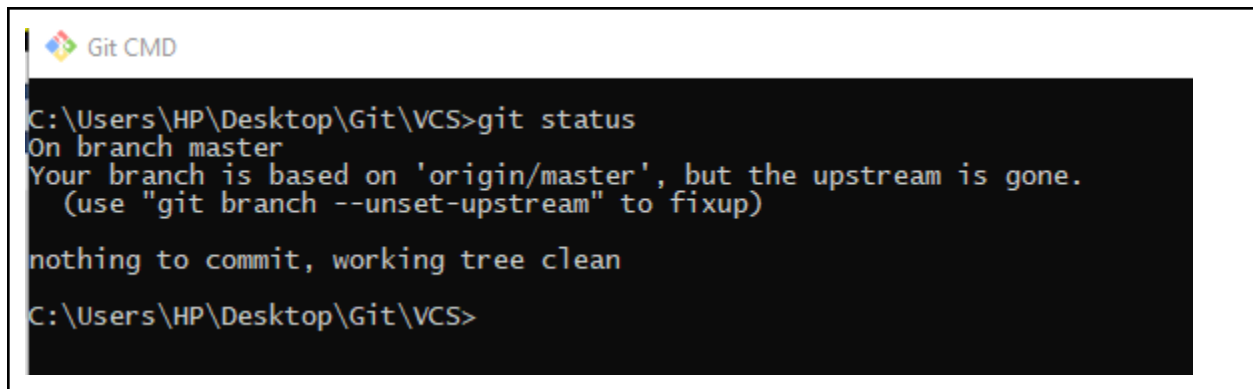
```
11 lines (10 sloc) | 146 Bytes
1  <!DOCTYPE html>
2  <html>
3  <head>
4      <title>Mobile Computing</title>
5  </head>
6  <body>
7
8      <h1>Lectur-2</h1>
9      <p>Testing for GitHub</p>
10 </body>
11 </html>
```

### ❖ Git Status:

Gives the status of repository.



`git status`

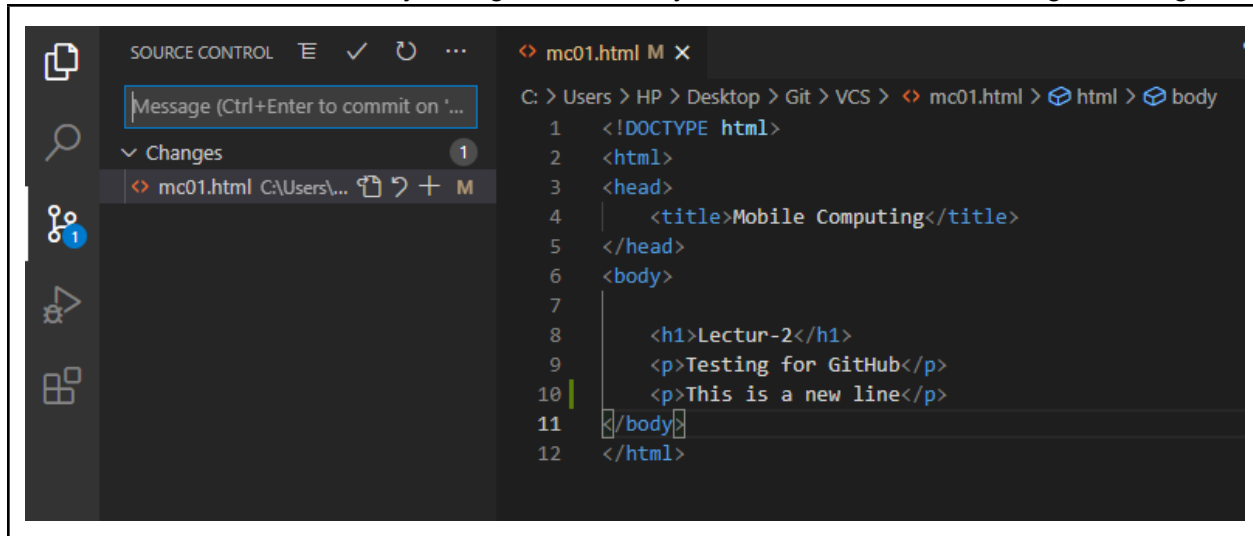


```
Git CMD
C:\Users\HP\Desktop\Git\VCS>git status
On branch master
Your branch is based on 'origin/master', but the upstream is gone.
(use "git branch --unset-upstream" to fixup)

nothing to commit, working tree clean
C:\Users\HP\Desktop\Git\VCS>
```

## Making change in file locally using IDE:

Whenever we make any change in file locally editor will show some change message



## ❖ Adding New Commit (To save locally made changes online) :

Run these previously discussed commands on git CMD in sequence.

### Step-1

`git add FileName`

### Step-2

`git commit -m "message"`

### Step-3

`git push`

```
Git CMD

C:\Users\HP\Desktop\Git\VCS>git add mc01.html

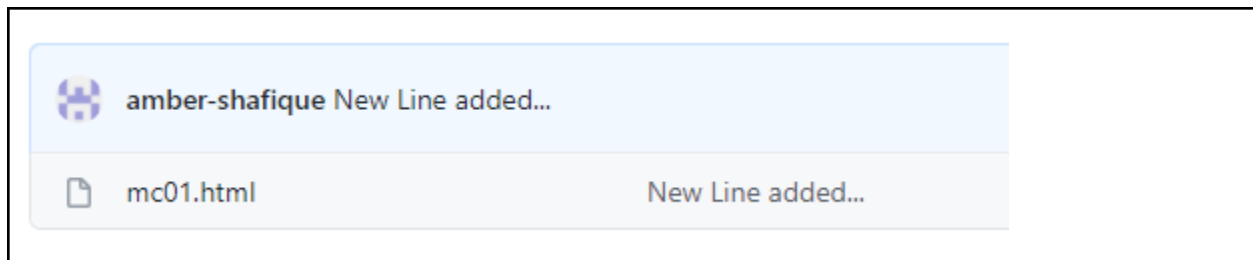
C:\Users\HP\Desktop\Git\VCS>git commit -m "New Line added..."
[master 0381540] New Line added...
1 file changed, 1 insertion(+)

C:\Users\HP\Desktop\Git\VCS>git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 319 bytes | 106.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/amber-shafique/VCS.git
6f5a409..0381540 master -> master

C:\Users\HP\Desktop\Git\VCS>
```

## Track of Changes:

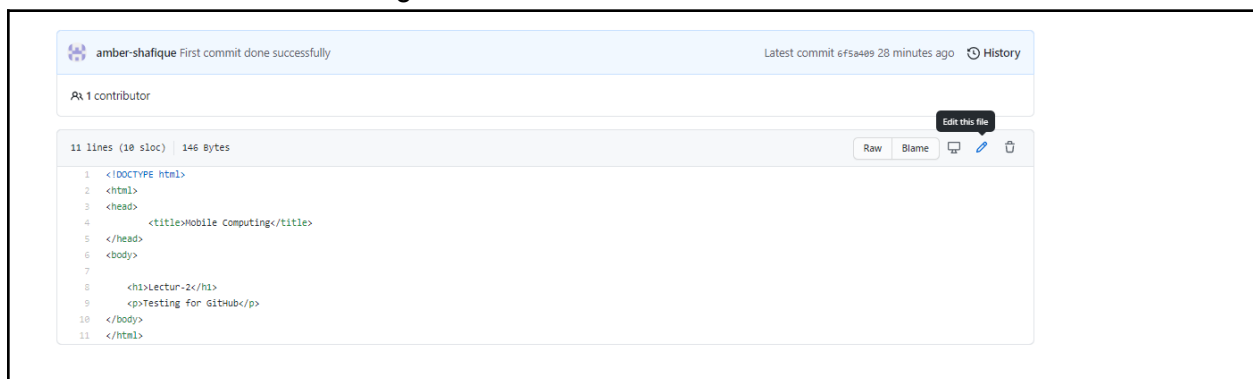
To preview change online refresh the repository url and see the changes have been made.



## ❖ Editing a file online in github repository:

### Step-1

Edit the file online using the edit button on file.



### Step-2

Save commit changes.

## Commit changes


Changes made online...


Add an optional extended description...

☒ Commit directly to the `master` branch.  
☐ Create a **new branch** for this commit and start a pull request. [L](#)

Commit changes

Cancel

 **amber-shafique** Changes made online...

 1 contributor

### ❖ Git Pull:

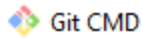
To get Changes from GitHub to local repository.

#### Step-1

After making changes online, run the following command on git CMD.

**git push**

Changes have been made to local repository.



```
C:\Users\HP\Desktop\Git\VCS>git pull
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 789 bytes | 39.00 KiB/s, done.
From https://github.com/amber-shafique/VCS
   0381540..80df6ba  master    -> origin/master
Updating 0381540..80df6ba
Fast-forward
 mc01.html | 5 ++++ -
 1 file changed, 4 insertions(+), 1 deletion(-)

C:\Users\HP\Desktop\Git\VCS>
```

### ❖ Version Hierarchy:

File showing with latest commit.

- **Red Highlighted lines:** The lines that have been deleted.
- **Green Highlighted lines:** The lines that have been changed.

5	5	</head>
6	6	<body>
7	7	
8	-	<h1>Lectur-2</h1>
	8	+ <h1>Lectur-2 changed by git</h1>
9	9	<p>Testing for GitHub</p>
10	10	
11	11	<p>This is a new line</p>

Parents=> previous versions of file.

1 parent 80df6ba commit

## LECTURE#3

### ❖ Merge Conflicts:

A merge conflict is an event that takes place when Git is unable to automatically resolve differences in code between two commits. Git can merge the changes automatically only if the commits are on different lines or branches.

#### Step-1

Changes in lin-8 online.

```
1 <!DOCTYPE html>
2 <html>
3 <head>
4     <title>Mobile Computing</title>
5 </head>
6 <body>
7
8     <h1>Lectur-2 changed by git</h1>
9
```

#### Step-2

Changes in same line-8 locally.

```
1 <!DOCTYPE html>
2 <html>
3 <head>
4     <title>Mobile Computing</title>
5 </head>
6 <body>
7
8     <h1>Lectur-2 chaged locally</h1>
9
```

#### Step-3

Run commands step by step to save file changes in git CMD.

Merge Conflict has occurred because we are trying to change the same line locally and in online repository.

```
Git CMD

C:\Users\HP\Desktop\Git\VCS>git add mc01.html

C:\Users\HP\Desktop\Git\VCS>git commit -m "Git Merge Conflict"
[master 2b363d5] Git Merge Conflict
1 file changed, 1 insertion(+), 1 deletion(-)

C:\Users\HP\Desktop\Git\VCS>git push
To https://github.com/amber-shafique/VCS.git
! [rejected]        master -> master (fetch first)
error: failed to push some refs to 'https://github.com/amber-shafique/VCS.git'
hint: Updates were rejected because the remote contains work that you do
hint: not have locally. This is usually caused by another repository pushing
hint: to the same ref. You may want to first integrate the remote changes
hint: (e.g., 'git pull ...') before pushing again.
hint: See the 'Note about fast-forwards' in 'git push --help' for details.

C:\Users\HP\Desktop\Git\VCS>git pull
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 684 bytes | 25.00 KiB/s, done.
From https://github.com/amber-shafique/VCS
80df6ba..b2332d9 master -> origin/master
Auto-merging mc01.html
CONFLICT (content): Merge conflict in mc01.html
Automatic merge failed; fix conflicts and then commit the result.
```

#### Step-4

Open the file in IDE to see the conflict and given options.

```
Accept Current Change | Accept Incoming Change | Accept Both Changes | Compare Changes
8 <<<<<< HEAD (Current Change)
9 <h1>Lectur-2 chaged locally</h1>
10 =====
11 <h1>Lectur-2 changed by git</h1>
12 >>>>>> b2332d9db23e90b369df00877e17db07d3dd6303 (Incoming Change)
13 <p>Testing for GitHub</p>
```

#### Step-5

Accept Change and resolve the merge conflict and **again** Run commands step by step to save file changes in git CMD.

Now changes have been saved successfully as conflict is resolved.

```
Git CMD

C:\Users\HP\Desktop\Git\VCS>git add mc01.html

C:\Users\HP\Desktop\Git\VCS>git commit -m "Git Merge Conflict Resolved"
[master 7d7438d] Git Merge Conflict Resolved

C:\Users\HP\Desktop\Git\VCS>git push
Enumerating objects: 10, done.
Counting objects: 100% (10/10), done.
Delta compression using up to 8 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (6/6), 678 bytes | 339.00 KiB/s, done.
Total 6 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 1 local object.
To https://github.com/amber-shafique/VCS.git
   b2332d9..7d7438d  master -> master

C:\Users\HP\Desktop\Git\VCS>
```

### ❖ Git Logs:

To see the details of all commits.

[git log](#)

```
Git CMD - "C:\Program Files\Git\cmd\git.exe" log

C:\Users\HP\Desktop\Git\VCS>git log
commit 7d7438d3afbd57dcf9fa087cd89dd524c93e276a (HEAD -> master, origin/master)
Merge: 2b363d5 b2332d9
Author: amber-shafique <bsef18a019@pucit.edu.pk>
Date: Wed Apr 14 02:25:18 2021 +0500

    Git Merge Conflict Resolved

commit 2b363d5a3fa0c2651c944f5acf3b105deab9d3c2
Author: amber-shafique <bsef18a019@pucit.edu.pk>
Date: Wed Apr 14 02:15:59 2021 +0500

    Git Merge Conflict

commit b2332d9db23e90b369df00877e17db07d3dd6303
Author: amber-shafique <81466246+amber-shafique@users.noreply.github.com>
Date: Wed Apr 14 02:08:41 2021 +0500

    Merge Conflict by online changes...

commit 80df6ba5cf23b9e65b5e7cfb318838d2e56a367c
Author: amber-shafique <81466246+amber-shafique@users.noreply.github.com>
```



## ❖ Remove a File:

Files already present

```
C:\Users\HP\Desktop\Git\MC-1>dir
Volume in drive C has no label.
Volume Serial Number is F8F2-04AE

Directory of C:\Users\HP\Desktop\Git\MC-1

04/14/2021  03:44 PM    <DIR>          .
04/14/2021  03:44 PM    <DIR>          ..
04/14/2021  02:42 AM                6 file1.txt
04/14/2021  03:44 PM                6 file2.txt
04/14/2021  03:06 AM                7 file3.txt
               3 File(s)              19 bytes
               2 Dir(s)  41,993,297,920 bytes free
```

### Step-1

To remove file type the following command on git CMD, and give the name of file you want to delete.

```
git rm FileName
```

File deleted locally

```
Git CMD

C:\Users\HP\Desktop\Git\MC-1>git rm file1.txt
rm 'file1.txt'

C:\Users\HP\Desktop\Git\MC-1>
```

Now to update delete changes to git:

### Step-2

```
Git add .
```

### Step-3

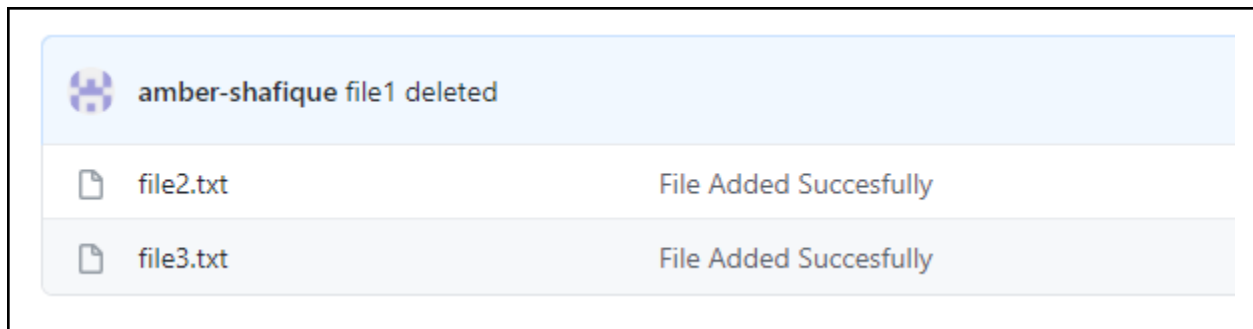
```
git commit -m "message"
```

### Step-4

```
git push
```

```
C:\Users\HP\Desktop\Git\MC-1>git add .  
C:\Users\HP\Desktop\Git\MC-1>git commit -m "file1 deleted"  
[master 37a39ee] file1 deleted  
1 file changed, 1 deletion(-)  
delete mode 100644 file1.txt  
C:\Users\HP\Desktop\Git\MC-1>git push  
Enumerating objects: 3, done.  
Counting objects: 100% (3/3), done.  
Delta compression using up to 8 threads  
Compressing objects: 100% (2/2), done.  
Writing objects: 100% (2/2), 264 bytes | 88.00 KiB/s, done.  
Total 2 (delta 0), reused 0 (delta 0), pack-reused 0  
To https://github.com/amber-shafique/MC-1.git  
f837866..37a39ee master -> master  
C:\Users\HP\Desktop\Git\MC-1>
```

Preview delete changes on GitHub



## ❖ Branching:

Branching is the practice of creating copies of programs or objects in development to work in parallel versions, retaining the original and working on the branch or making different changes to each.

### Step-1

#### Git Branch:

Run the following command on cmd to check available branches.

```
git branch
```

### Step-2

#### Git Checkout:

To create a new branch, type the following command on git CMD and give the name of branch.

```
git checkout -b newbranch
```

```
Git CMD

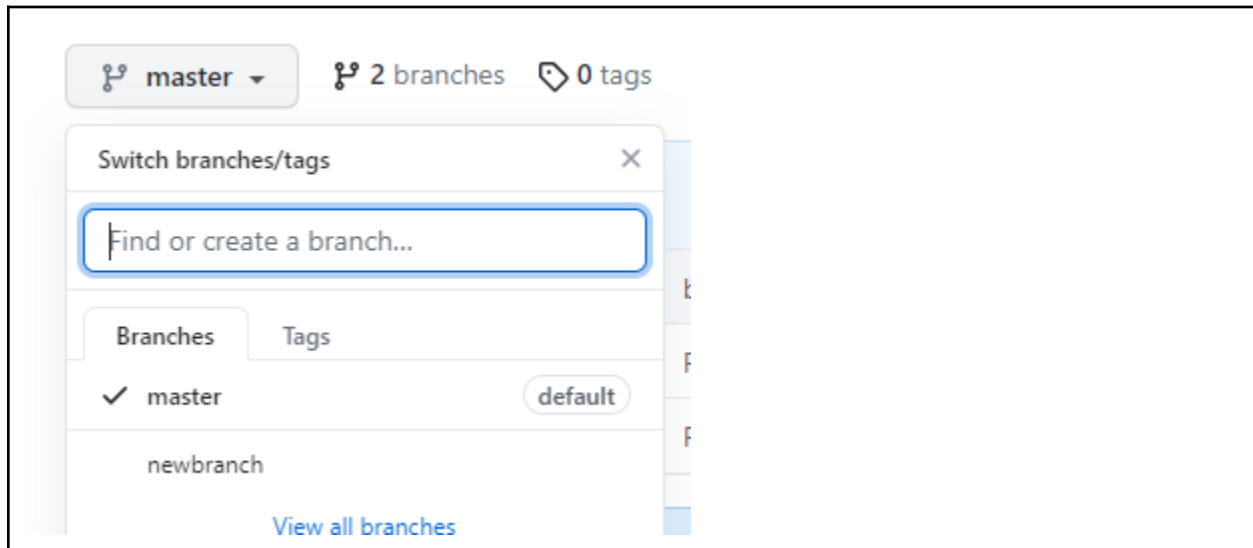
C:\Users\HP\Desktop\Git\MC-1>git branch
* master

C:\Users\HP\Desktop\Git\MC-1>git checkout -b newbranch
Switched to a new branch 'newbranch'

C:\Users\HP\Desktop\Git\MC-1>git branch
  master
* newbranch

C:\Users\HP\Desktop\Git\MC-1>
```

Branch Added on GitHub



### Step-3

#### Git Checkout Master:

To navigate from one branch to another. (master=>branch name )

[git checkout master](#)

```
Git CMD

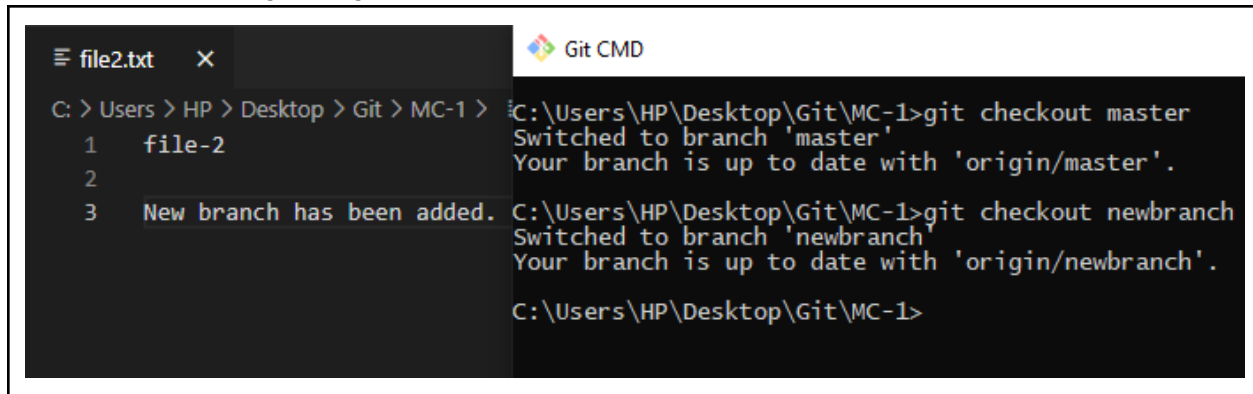
C:\Users\HP\Desktop\Git\MC-1>git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

C:\Users\HP\Desktop\Git\MC-1>
```

### To Check Branching:

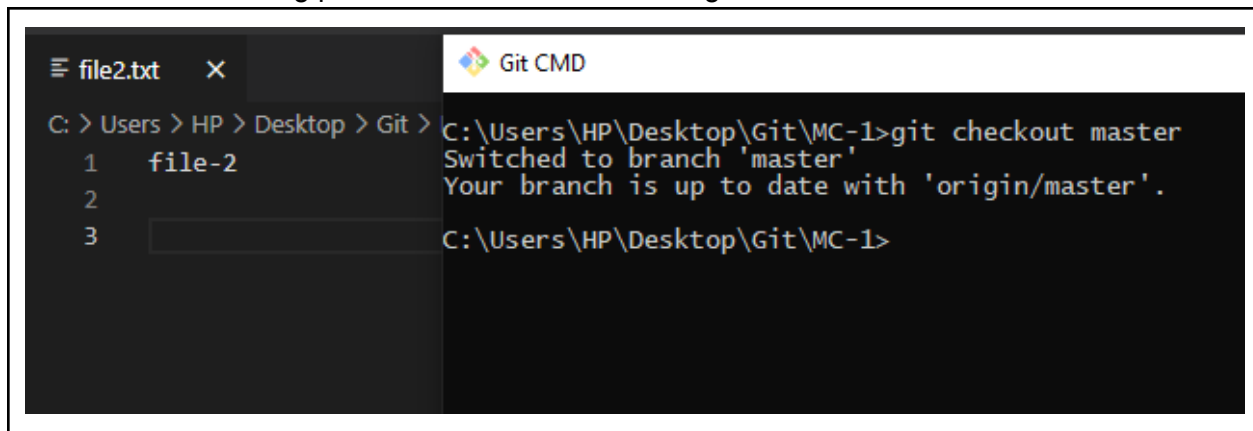
- Step-1** Add changes to a file on master branch.
- Step-2** Move to new branch and add file on the new branch.
- Step-3** Checkout file on both branches and see the changes accordingly on IDE.

New branch showing changes...



The screenshot shows a side-by-side view of a code editor and a terminal window. The code editor on the left has a tab for 'file2.txt' and shows three lines of code: '1 file-2', '2', and '3 New branch has been added.'. The terminal window on the right, titled 'Git CMD', shows the following commands and output: 'C:\Users\HP\Desktop\Git\MC-1>git checkout master', 'Switched to branch 'master'', 'Your branch is up to date with 'origin/master'.', 'C:\Users\HP\Desktop\Git\MC-1>git checkout newbranch', 'Switched to branch 'newbranch'', 'Your branch is up to date with 'origin/newbranch'.', and 'C:\Users\HP\Desktop\Git\MC-1>'.

Master branch showing previous version without changes...



The screenshot shows a side-by-side view of a code editor and a terminal window. The code editor on the left has a tab for 'file2.txt' and shows three lines of code: '1 file-2', '2', and '3'. The terminal window on the right, titled 'Git CMD', shows the following commands and output: 'C:\Users\HP\Desktop\Git\MC-1>git checkout master', 'Switched to branch 'master'', 'Your branch is up to date with 'origin/master'.', and 'C:\Users\HP\Desktop\Git\MC-1>'.

### ❖ Merging:

Merging is Git's way of putting a forked history back together again. The git merge command lets you take the independent lines of development created by git branch and integrate them into a single branch.

### Merge Branch:

To merge the changes in branches.

**Git merge [branchname](#)**

```

C:\Users\HP\Desktop\Git\MC-1>git merge newbranch
Removing file3.txt
Auto-merging file2.txt
CONFLICT (content): Merge conflict in file2.txt
CONFLICT (add/add): Merge conflict in BranchingPractice.html
Auto-merging BranchingPractice.html
Automatic merge failed; fix conflicts and then commit the result.
C:\Users\HP\Desktop\Git\MC-1>


```

### ❖ Delete Branch:

To delete a branch. NewBranch=>you want to delete.

**Git branch -D NewBranch**

Checking out branches before and after deletion...

 Git CMD

```

C:\Users\HP\Desktop\Git\MC-1>git branch
* master
  newbranch

C:\Users\HP\Desktop\Git\MC-1>git branch -D newbranch
Deleted branch newbranch (was ba2149a).

C:\Users\HP\Desktop\Git\MC-1>git branch
* master

C:\Users\HP\Desktop\Git\MC-1>

```

Before Deletion

Switch branches/tags

Find or create a branch...


Branches
Tags

master
newbranch

default

View all branches

After Deletion

 master
1 branch
0 tags

Switch branches/tags

Find or create a branch...

Branches
Tags

✓ master

default

View all branches

## LECTURE#4

### ❖ Android Studio:

Android Studio is the official Integrated Development Environment (IDE) for Android app development, based on IntelliJ IDEA. A unified environment where you can develop for all Android devices. Apply Changes to push code and resource changes to your running app without restarting your app.

#### Step-1

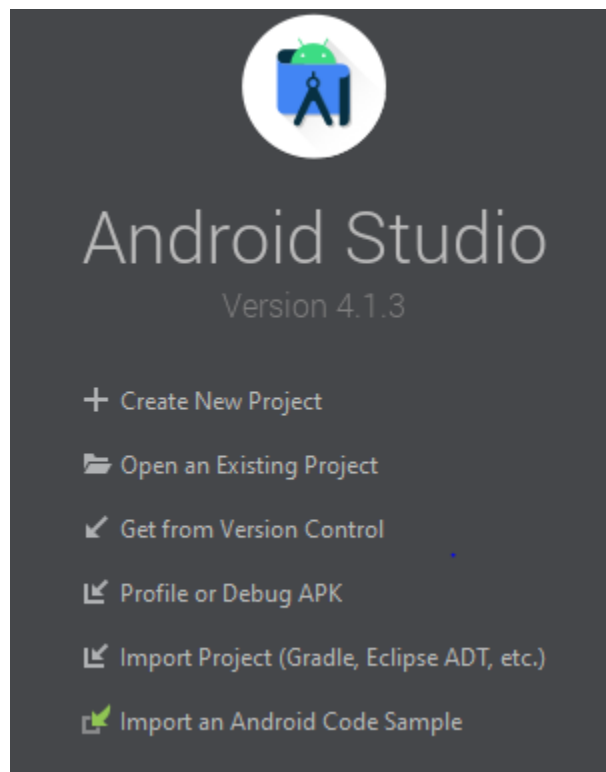
##### Installation:

Download any latest version of **Android Studio** and configure it on your PC.  
(<https://developer.android.com/studio>)

#### Step-2

##### Create a New Project:

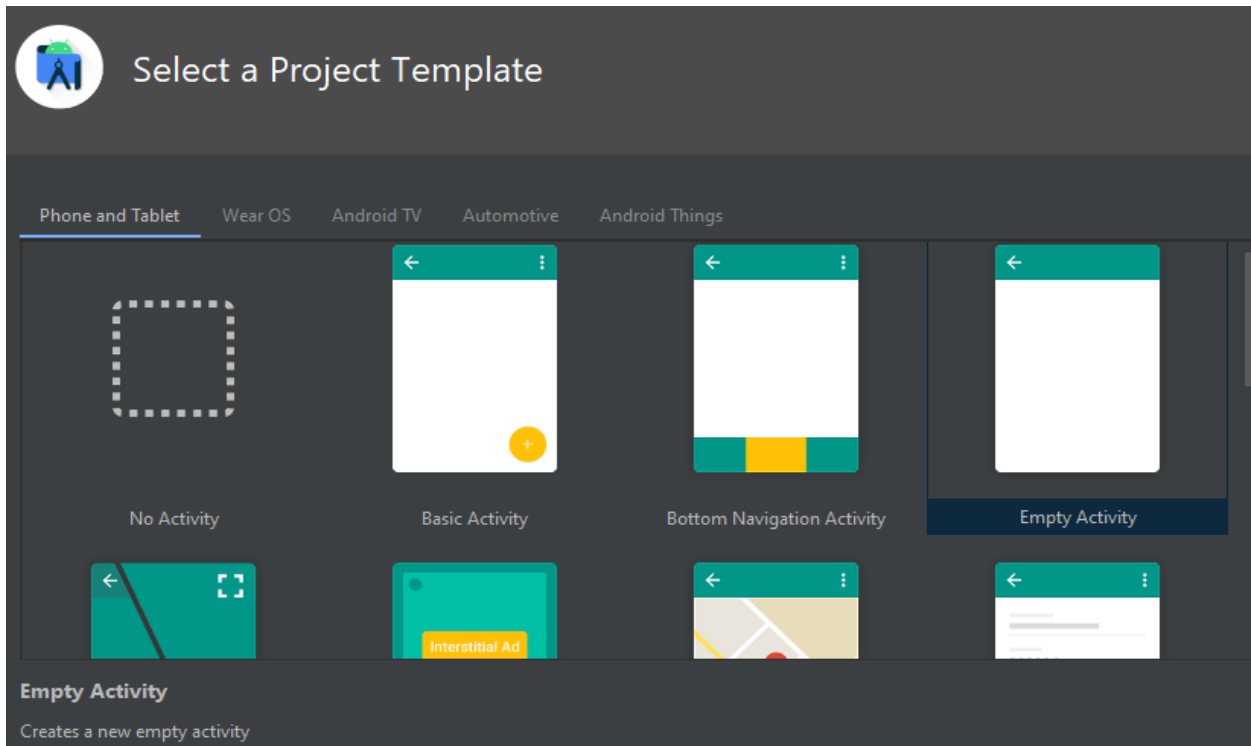
Open Android Studio and select the option to create a new project.



#### Step-3

##### Template Selection:

From templates choose Empty Activity.



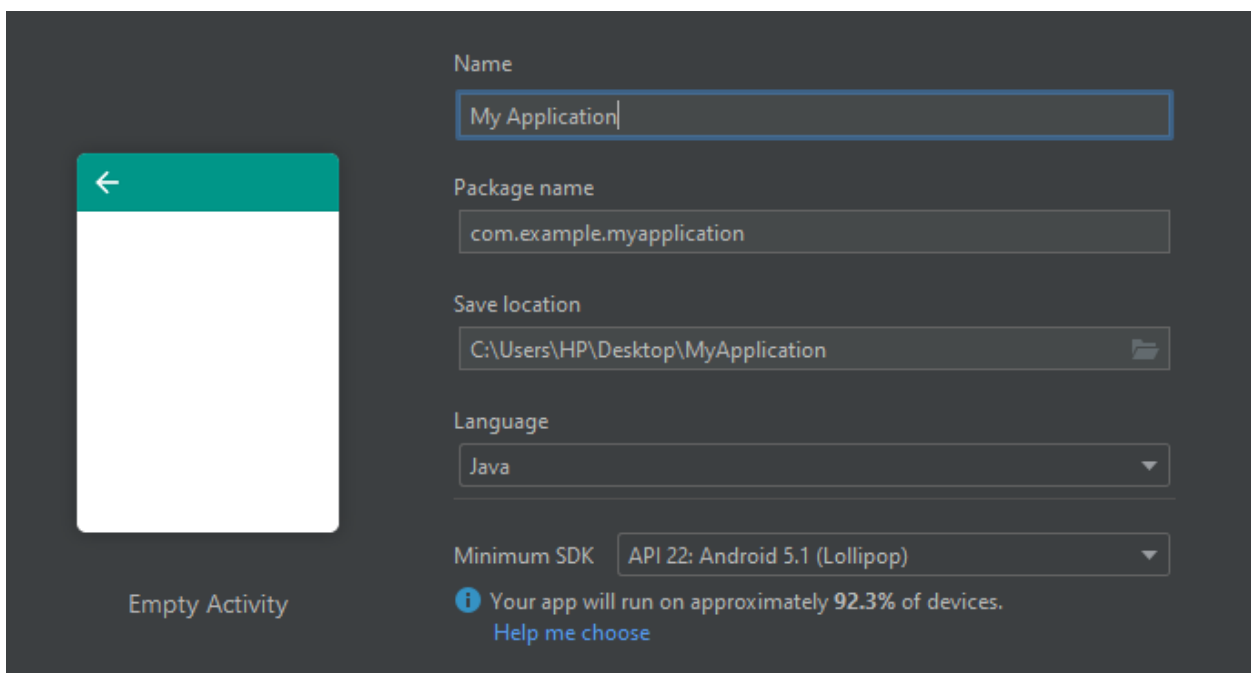
#### Step-4

##### Project Name:

Select a name and location for project for project.

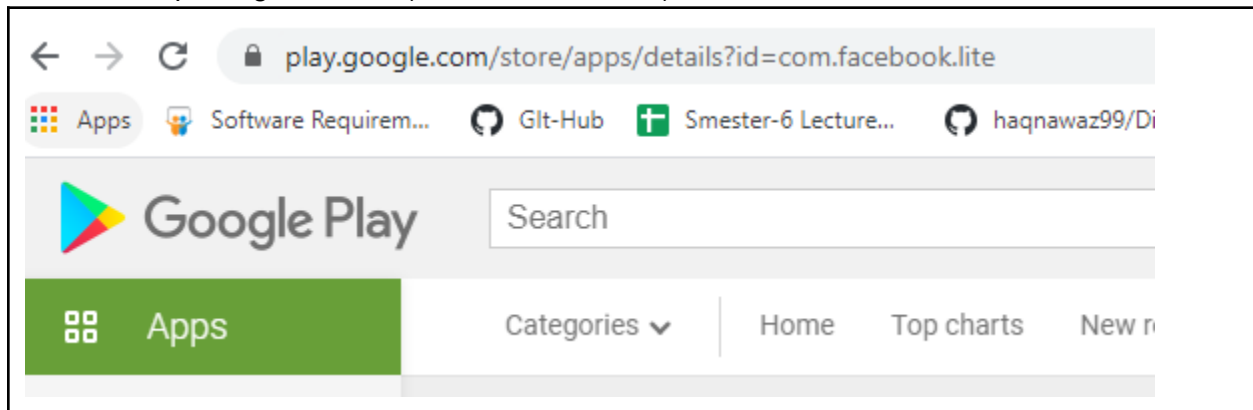
##### Package Name:

It is used to uniquely identify the APK file of our application and it should must be unique to publish the App on play store.

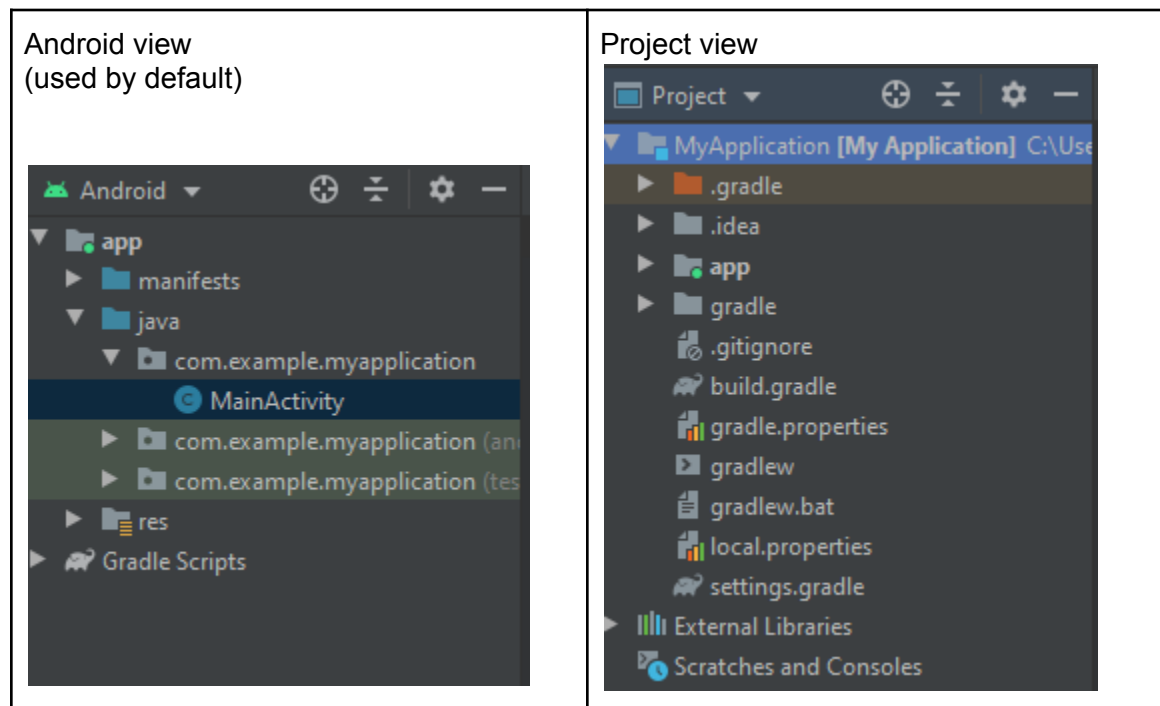


### Package Name Example:

Here package name is (**com.facebook.lite**)



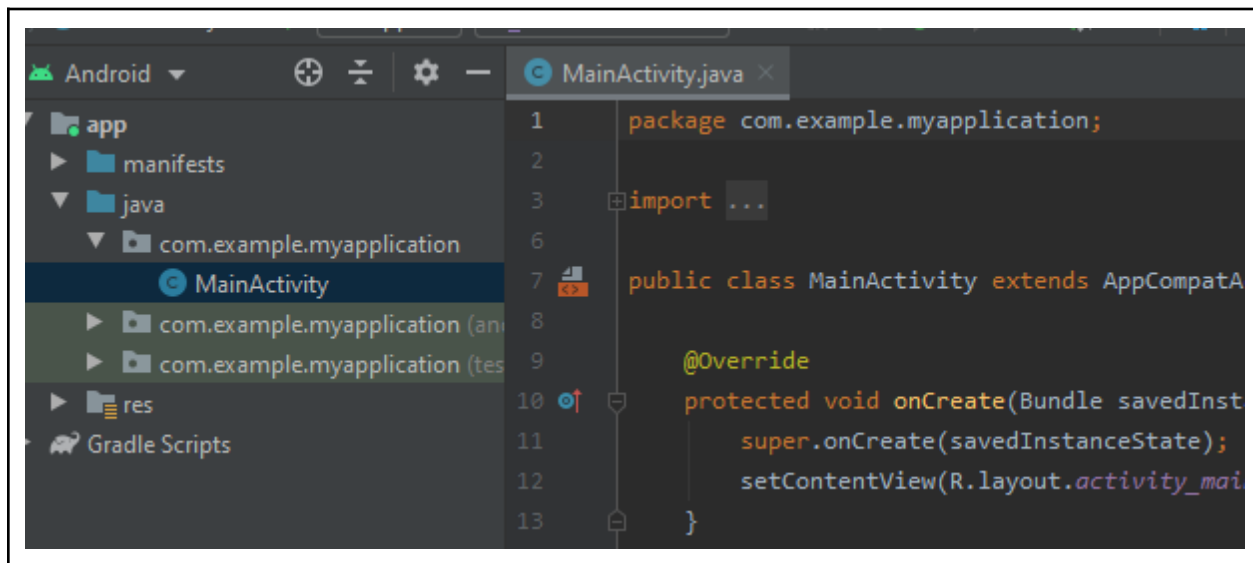
### ❖ Android Studio File Structure:



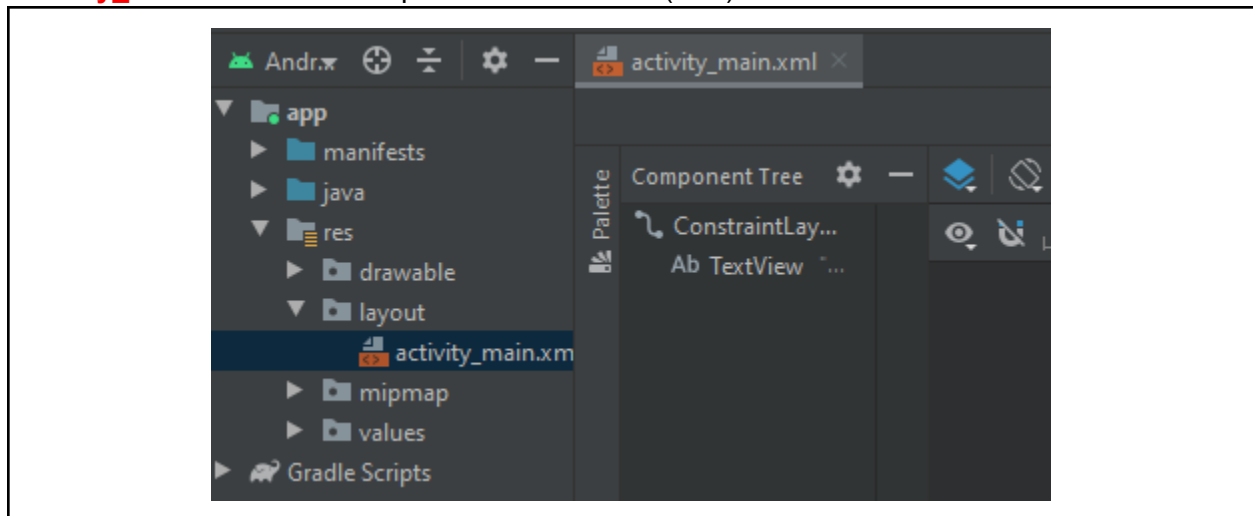


## Files for coding:

- **MainActivity.java** file for coding.



## **Activity\_main.xml** file for Graphical user interface(GUI).



## Step-4

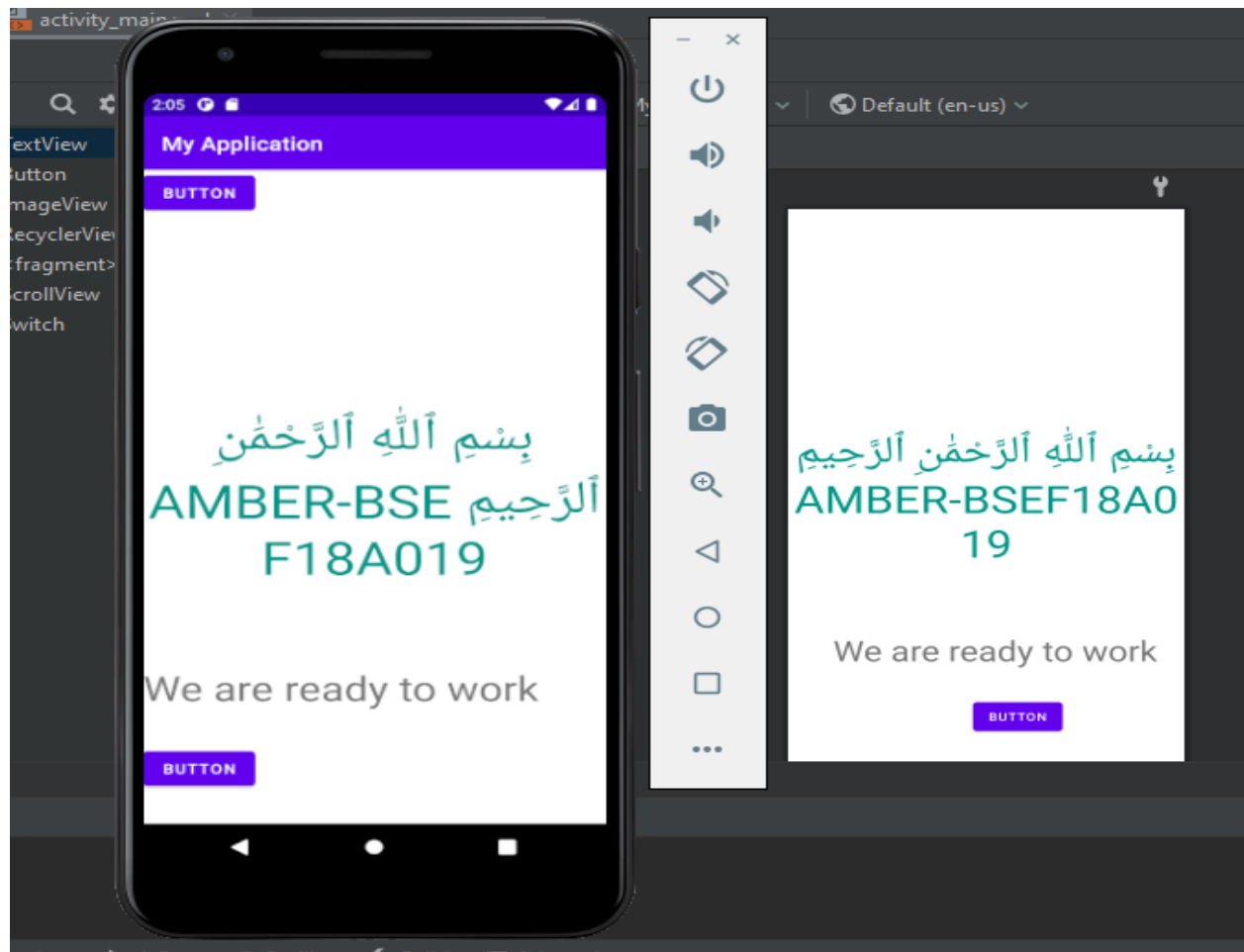
### Select Virtual Device:

Select **Virtual Devices** from AVD(Android Virtual Device) Manager to view output.

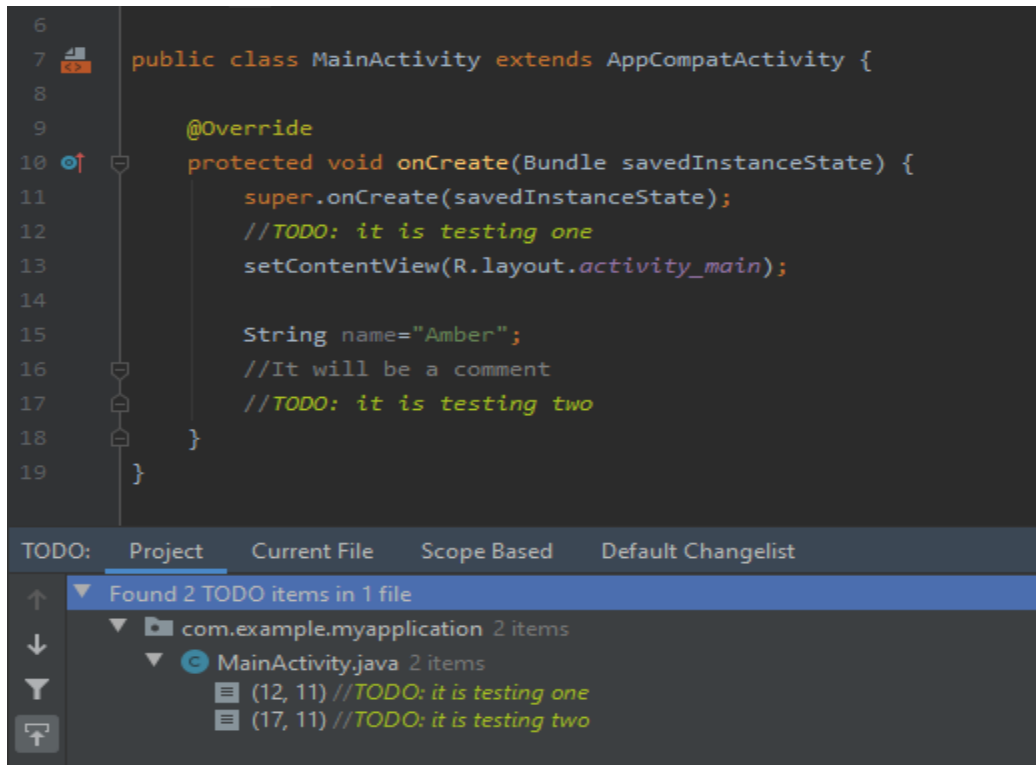
## Step-4

### To view output:

Run the **Emulator** choosing any virtual device and see the output.

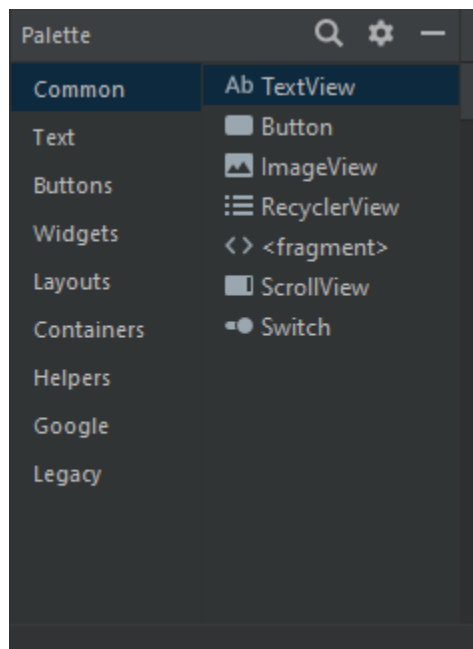


To Do list:



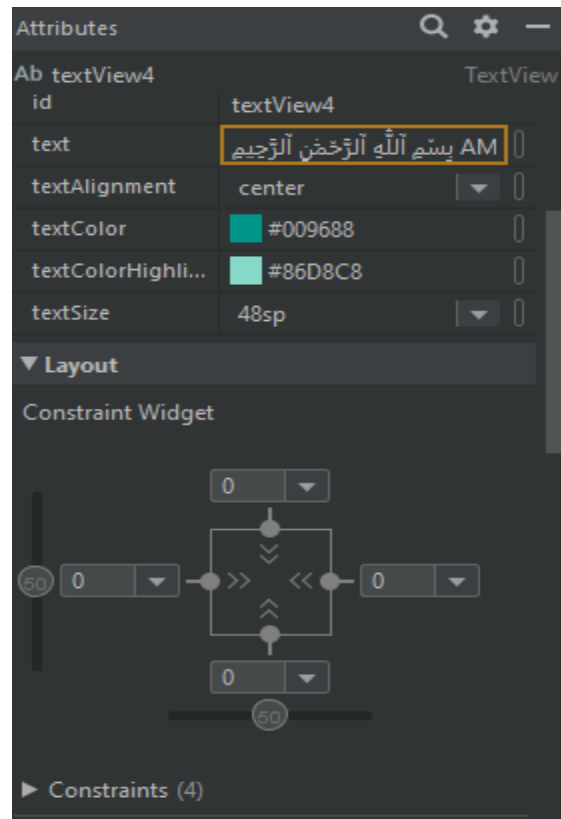
## Design Palette:

We can add text, Button, image and other controls by using drag and drop from this palette.



## Attributes:

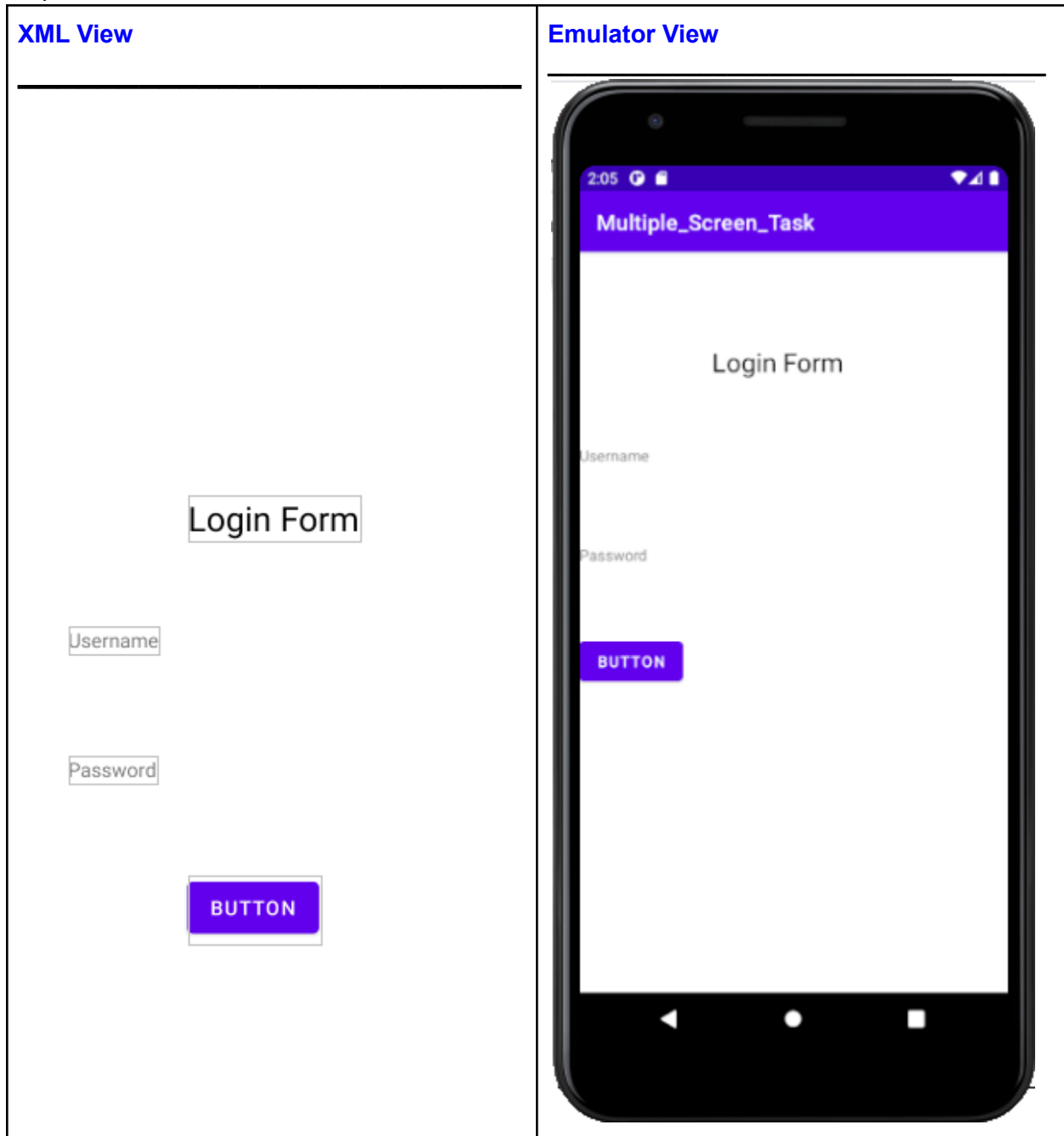
To set the values of elements added in xml.



## ❖ Multiple Screen Task:

### Screen-1

**Step-1** Add elements of text box and buttons on the screen from palette by drag and drop.



## Screen-2

**Step-2** Adding more elements of plain text and password to take input.

### XML View

Login Form

Username

type name here

Password

Phone No

SUBMIT

### Emulator View

Multiple\_Screen\_Task

Login Form

Username

type name here

Password

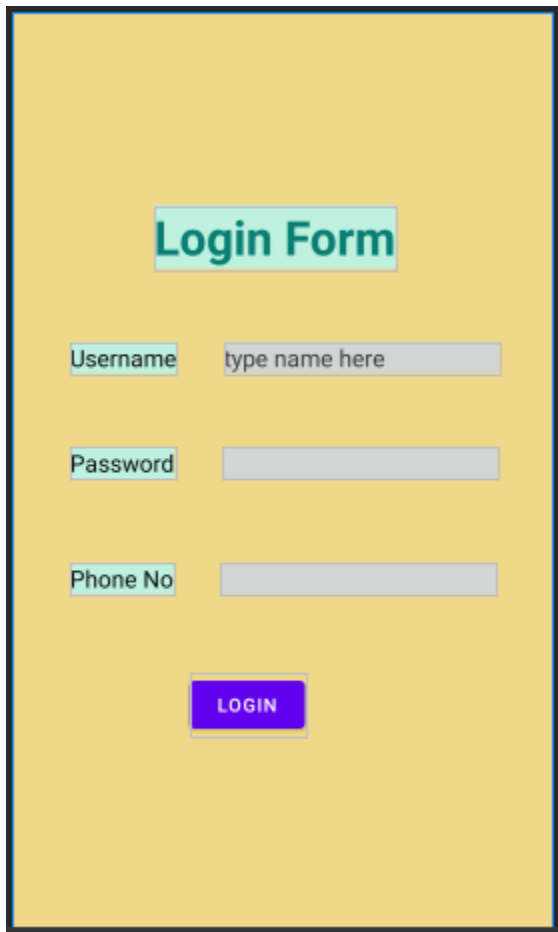
Phone No

SUBMIT

## Screen-3

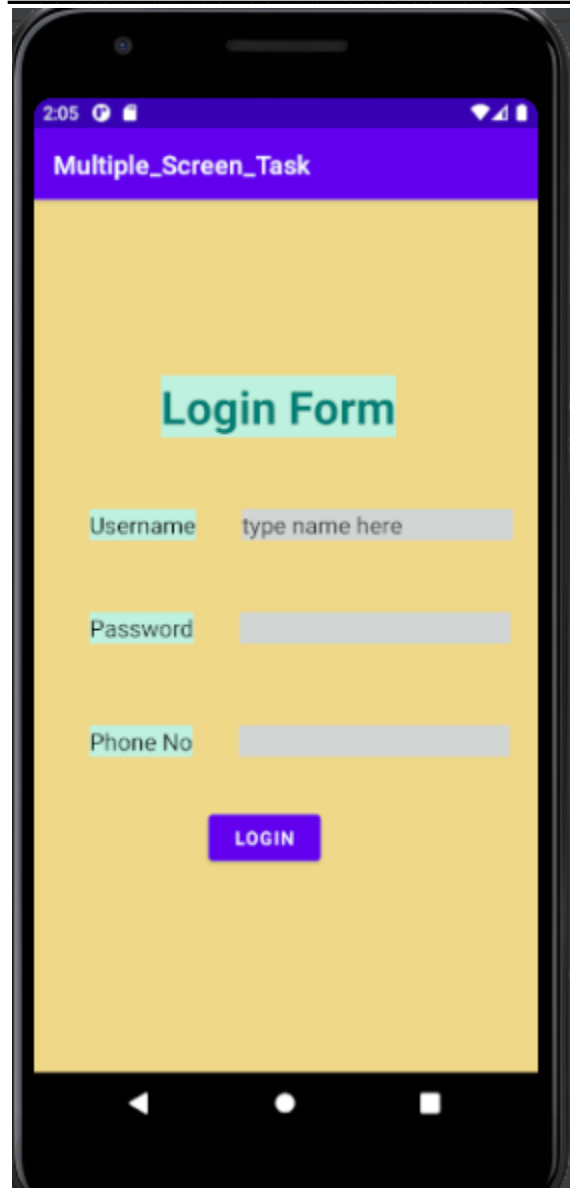
**Step-3** Setting constraints and others attributes to each element to set the screen presentation.

XML View



The XML View shows a design preview of the login form. It features a yellow rectangular container with a dark border. Inside, the text "Login Form" is centered at the top in a teal font. Below it, there are three input fields, each with a teal label and a light gray text box: "Username" with the placeholder "type name here", "Password", and "Phone No". At the bottom center of the container is a purple button with the text "LOGIN" in white.

Emulator View



The Emulator View shows the login form as it would appear on a mobile device. The screen has a purple status bar at the top with the time "2:05" and icons for signal, Wi-Fi, and battery. Below the status bar is a purple header with the text "Multiple\_Screen\_Task" in white. The main content area has a yellow background. The "Login Form" title is centered in teal. The input fields and the "LOGIN" button are arranged vertically, matching the XML View layout. The bottom of the screen shows the standard Android navigation bar with back, home, and recent apps buttons.

Final Screen view taking input:

The image shows a mobile application interface for a login form. The screen has a yellow background. At the top, there is a status bar with the time 2:05 and various icons. The title 'Login Form' is displayed in a green box. Below the title, there are three input fields: 'Username' with the value 'Amber', 'Password' with masked characters '\*\*\*\*\*', and 'Phone No' with the value '0333112233'. A purple 'LOGIN' button is positioned below the input fields. At the bottom of the screen, a standard Android keyboard is visible, showing the numeric keypad, QWERTY keys, and a blue backspace key.

2:05

## Login Form

Username: Amber

Password: \*\*\*\*\*

Phone No: 0333112233

LOGIN



## LECTURE#5

### ❖ View Group:

A ViewGroup is an **invisible container**. It is a special view that can contain other views (called children.)

- **Layouts:**

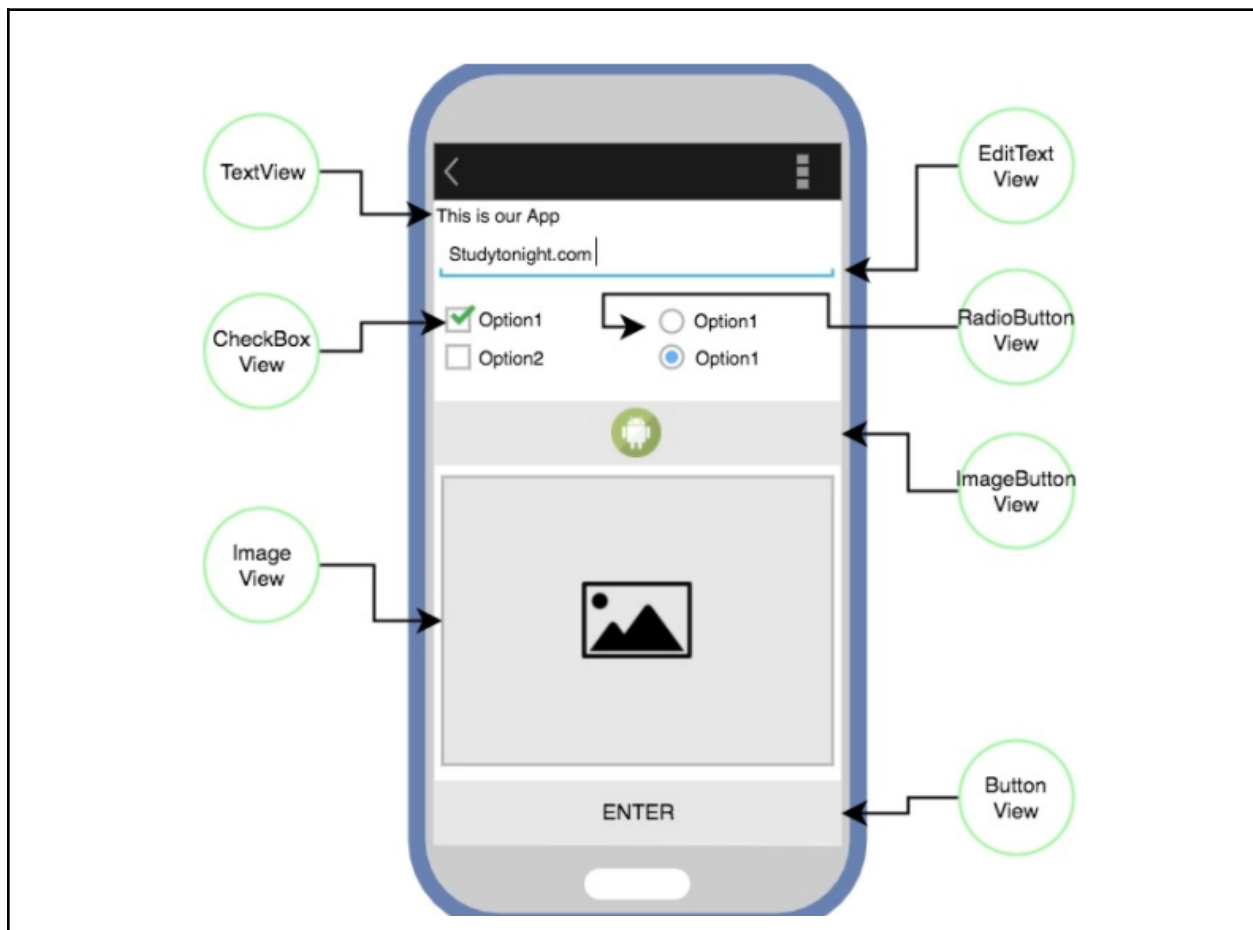
View group objects are called “**layouts**” can be one of many types that provide a different layout structure, such as LinearLayout or ConstraintLayout .

### ❖ View:

View is the basic building block of **UI**(User Interface) in android. View refers to the android.view.View class, which is the super class for all the GUI components like TextView, ImageView, Button etc. It draws something that user can see and interact with.

- **Widgets:**

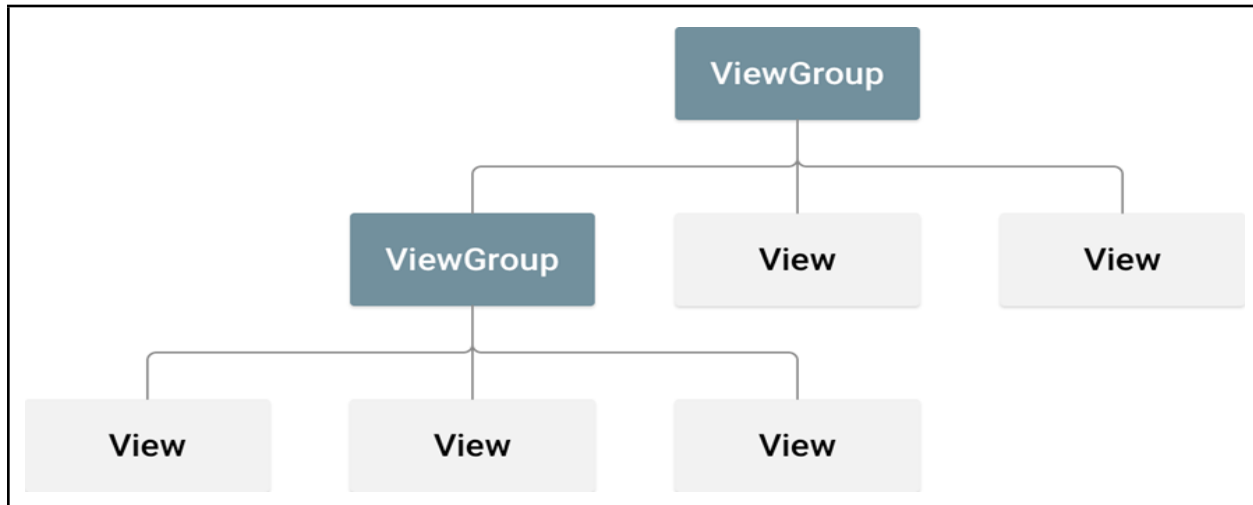
The View objects are usually called “**widgets**” and can be one of many subclasses, such as Button or TextView.



## Root Element:

Each layout file must contain exactly one **root element**, which must be a **View** or **ViewGroup** object. Once you've defined the root element, you can add additional layout objects or widgets as child elements to gradually build a View hierarchy that defines your layout. For example, here's an XML layout that uses a vertical `LinearLayout` to hold a `TextView` and a `Button`.

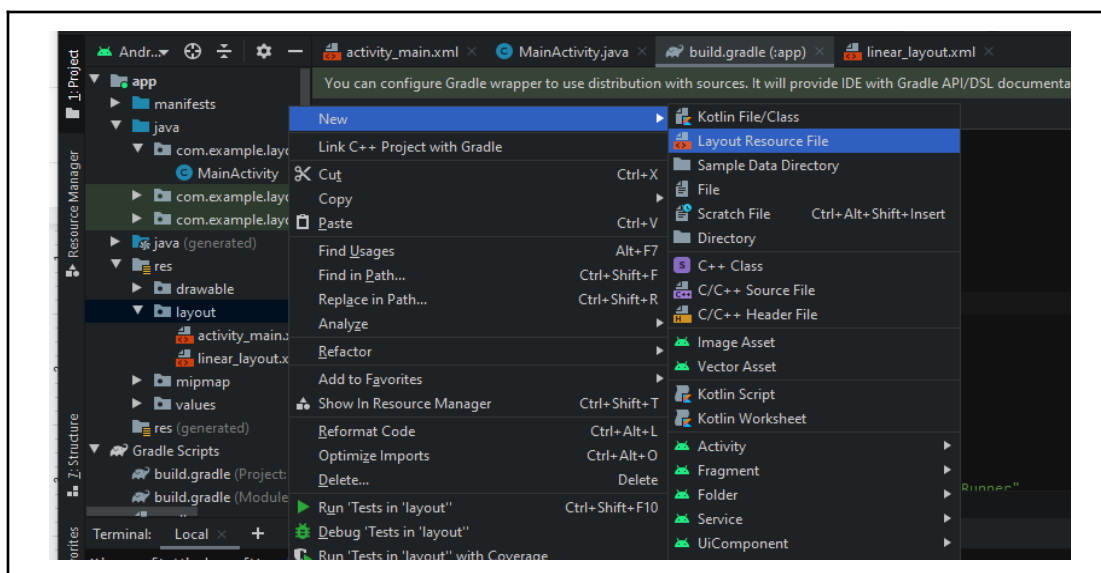
**Constraint Layout** is the root element by default.



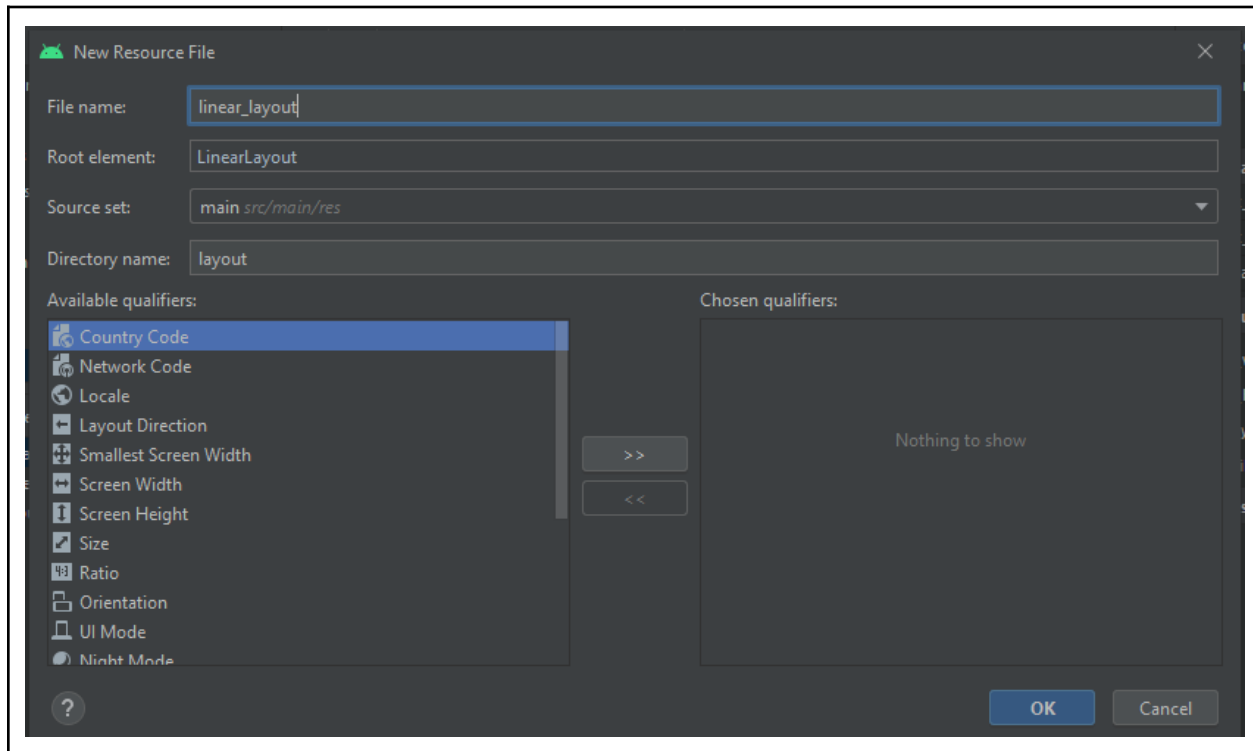
## ❖ Layouts Practice:

**Step-1** Create a new project with empty template.

**Step-2** Add a new resource file.



**Step-3** Select the root element of **LinearLayout**.

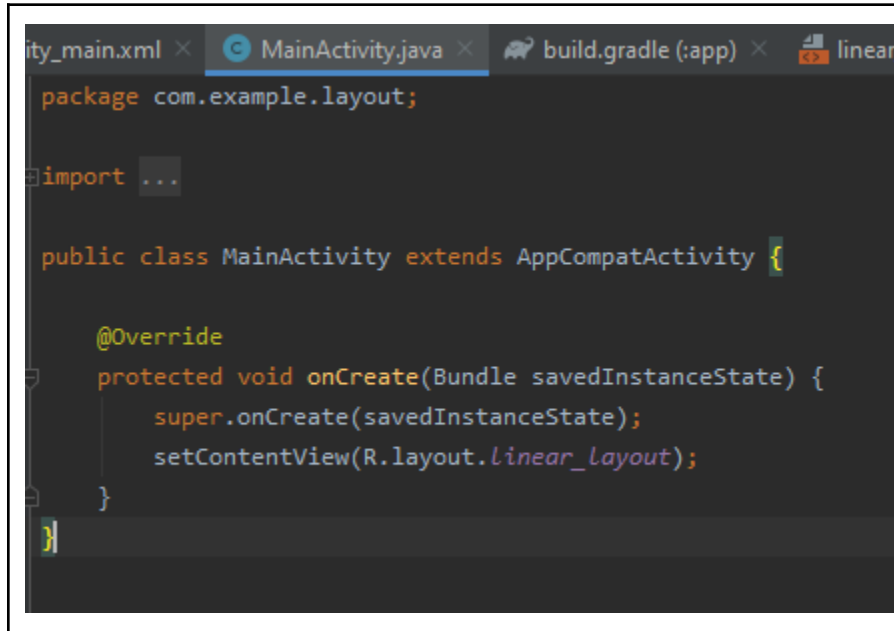


**Step-4** Add a text view and button, and you will see that these elements are displayed in a linear layout on xml design view.



## ❖ Load XML Resources:

**Step-5** In MainActivity.java file change the **setContentView(R.layout .\_\_\_)**, to the layout file you want to run on emulator.

A screenshot of an IDE showing the MainActivity.java file. The code is as follows:

```
package com.example.layout;

import ...

public class MainActivity extends AppCompatActivity {

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

The tabs at the top of the IDE show 'ity\_main.xml', 'MainActivity.java' (which is selected), 'build.gradle (:app)', and 'linear'.

## Layout Parametres:

They are used by views to tell their parents how they want to be laid out.

## ❖ Constraint Layout:

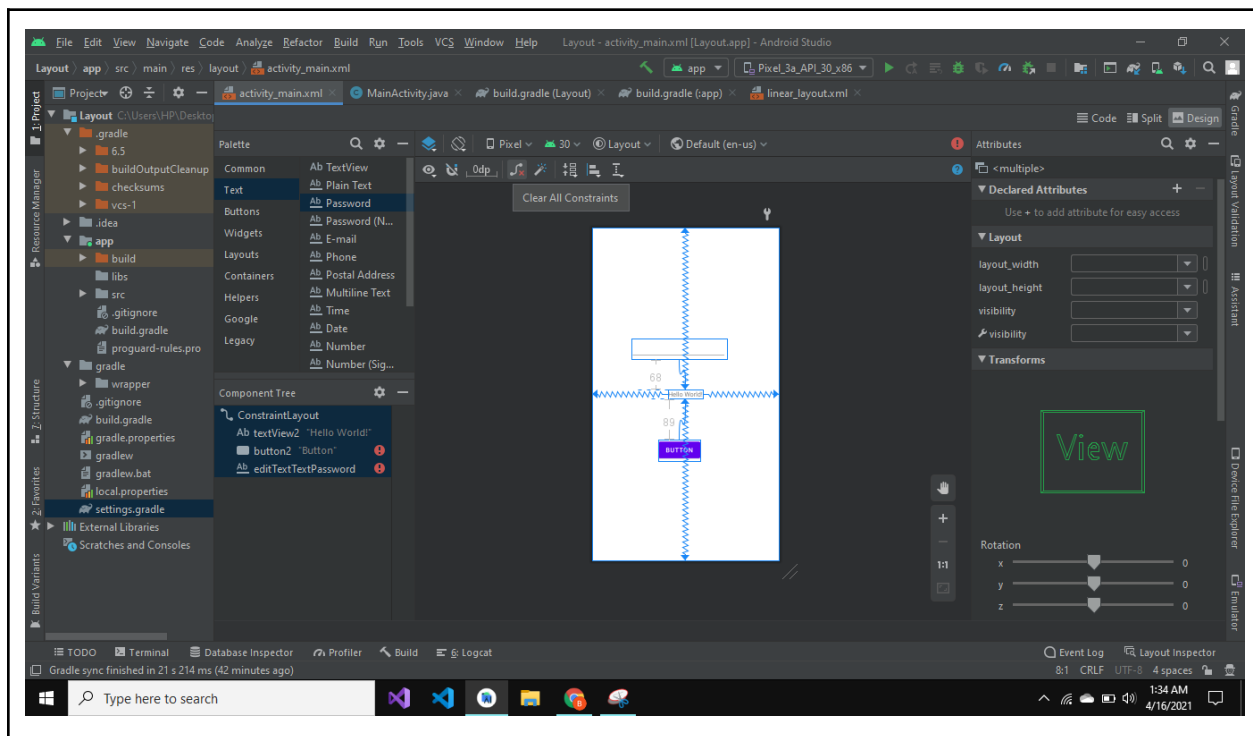
In Constraint Layout, you can connect all the view components to each other and place them on screen.

- To define a **view's position** in ConstraintLayout , you must add at least one horizontal and one vertical constraint for the view. Each constraint represents a connection or alignment to another view, the parent layout, or an invisible guideline.

## Clear All constraints:

**Step-1** Select all on xml design layout by **ctrl+a**

**Step-2** Select the option Clear All constraints.



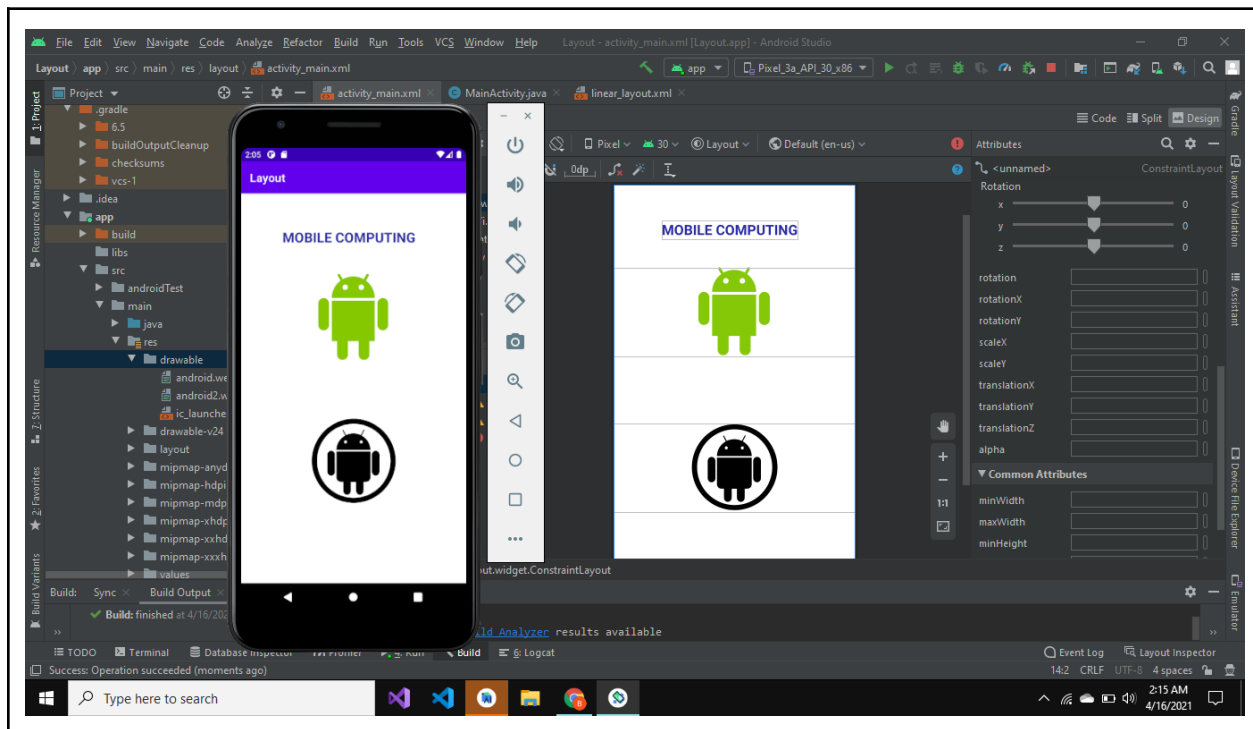
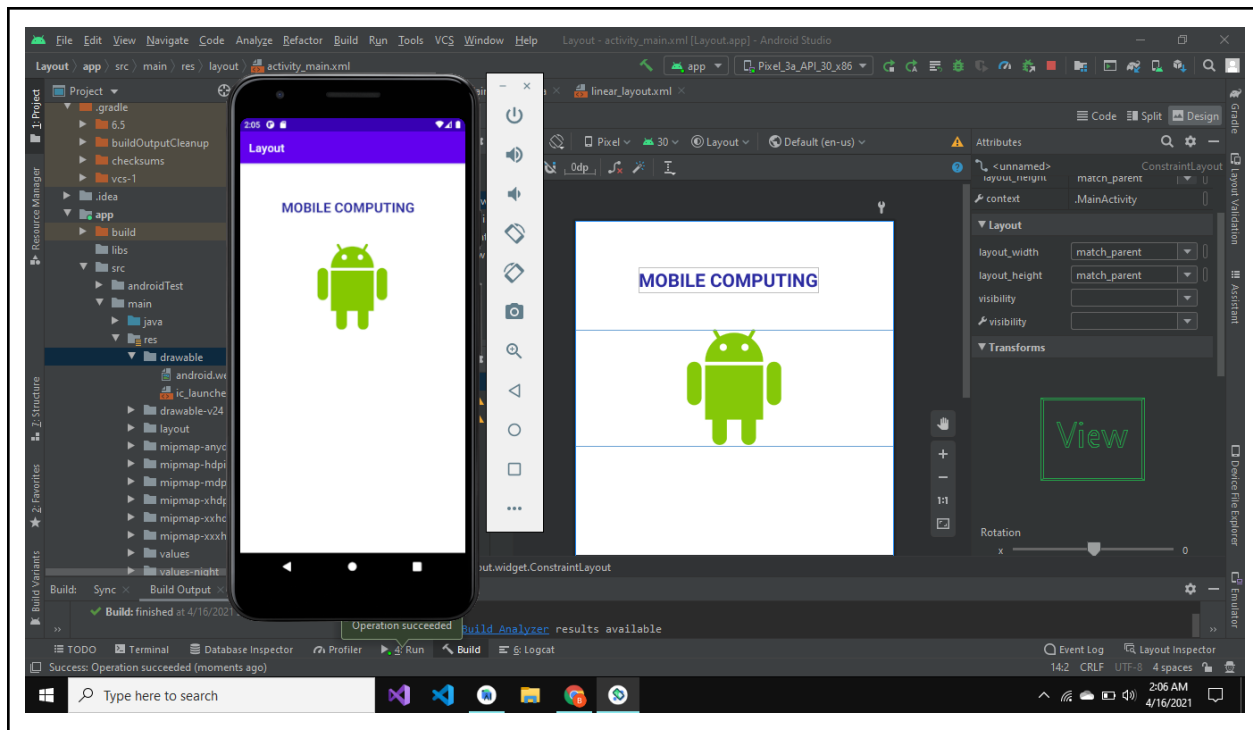
## ❖ Adding Image in Android Layout:

### Step-1

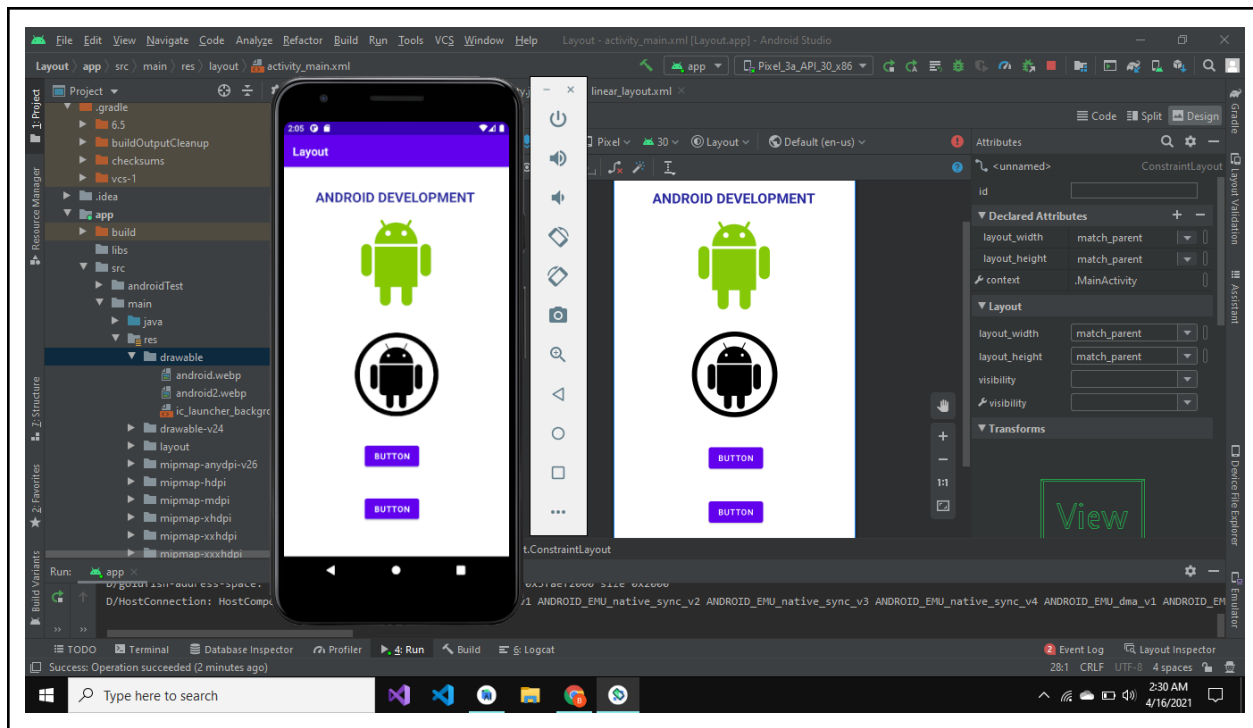
In drawable paste any image from your system

### Step-2

Add an image view from palette and select the image you want to add.



❖ **Adding buttons with alignment:**



## ❖ Buttons using Layout Constraint Center-Horizontally:

