

Paradigms of Programming

Android App

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1 Problem Statement

A vide player app. The app shall allow loading a video, play, pause, stop the playback, (fast) forward, (fast) backwards etc.

2 OOPs in Android

- Android programming is done in Java, which is a pure Object Oriented Programming Language unlike C++ which still allows some imperative parts. Designing an app usually involves creation of several components which have independent properties, and at the same time, interact with each other. OOP is the best way to represent this kind of interaction.
- Android uses activities which are similar to Windows in Java. Activity essentially generates a screen and there can be transitions between activities. The interaction with objects can thus visually be shown on the activity. For example, in our case, we use a *Floating Action Button*, which is essentially an object with which a user can interact by touching the screen.
- Android provides a brilliant example of **Data Abstraction and Encapsulation**. Borrowing the previous example, the user has no idea about the implementation details of *Floating Action Button*, but there are functions like, *onClick* which are defined for the object, which will determine the behavior of the object upon interaction. Encapsulation and Data Abstraction are successfully implemented to thus give a "real-world" object.
- Java objects use Inheritance to a very large degree. The reason it is very important is because, say there is an object called *button*. It is a primitive object which will have attributes like colour, transparency and will have functions like *onClick*. We can however create many more buttons, like in our case *Floating Action Button* which has a few additional properties, but all other attributes are the same. This gives us a window for code reuse. Following is a flow chart to show the inheritance structure of the button.

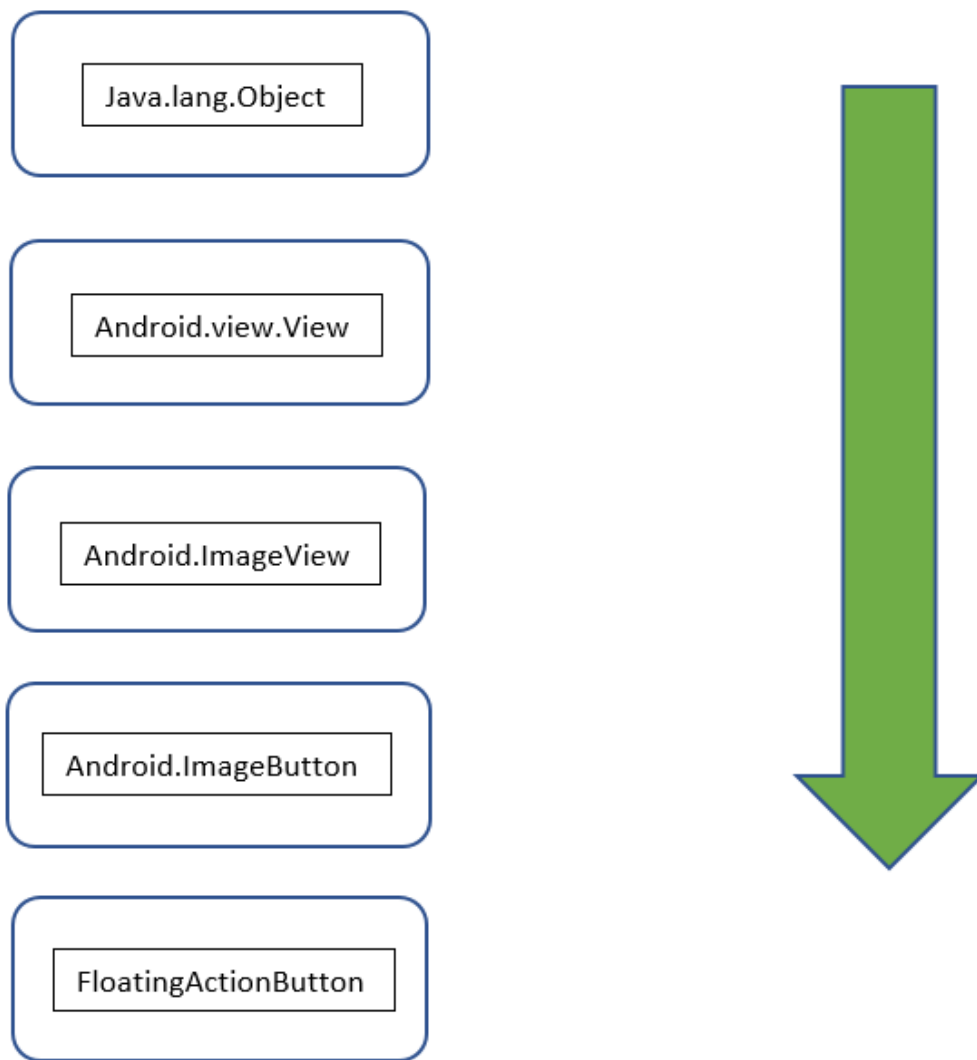


Figure 1: Inheritance Structure

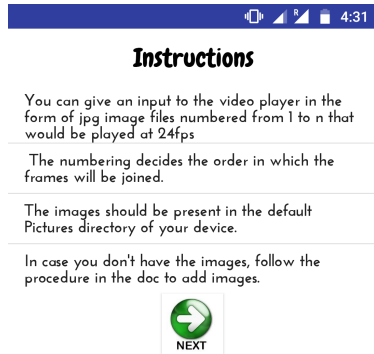
3 Usage of OOPs in App

- The app uses objects like seek bar, buttons and Floating Action Buttons so that the user can interact with the video.
- The seekbar object controls where the video should start playing from. The user can interact by touching the bar along the length
- The buttons controls which video is played.

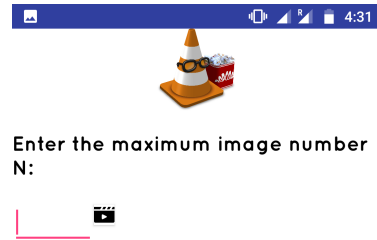
- The Floating Action Button lets the user decide if there should be a fast forward etc.

4 How to use the App

- The video player app starts with an instruction screen highlighting what to do. The images which should be played as a slideshow need to be present in the default folder and need to be numbered from 1 to N .
- The user has the flexibility to choose the maximum number of frames that need to be played by supplying the number. Hitting the play button after that starts the video.
- The video has a seek bar which can control where the video should play from.
- The menu right above the seekbar allows the user to skip ahead or behind a few frames and also lets them pause or play the video.
- The Floating Action Button allows the user to control the speed of the video.
- The ScreenShots below show the main screens of the app. The video has been omitted on purpose.

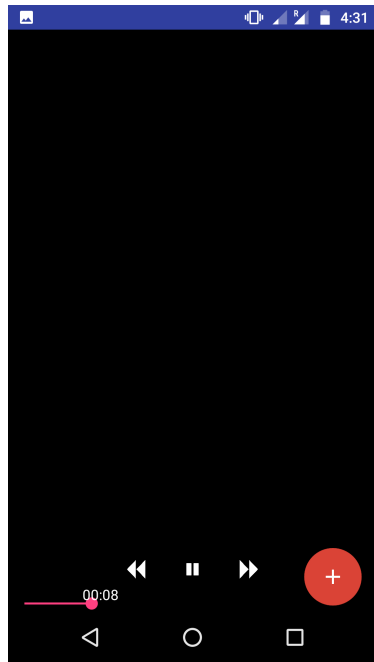


(a) Screen 1

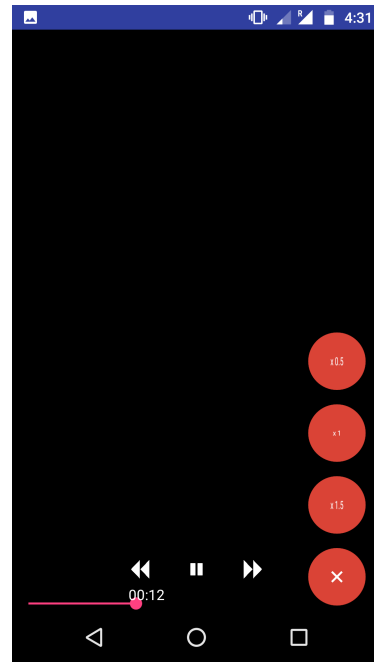


(b) Screen 2

Figure 2



(a) Screen 3



(b) Screen 4

Figure 3