CODE > ANDROID SDK

Create a Music Player on Android: User Controls

by Sue Smith 31 Mar 2014

Difficulty: Beginner Length: Long Languages: English

Android SDK Mobile Development

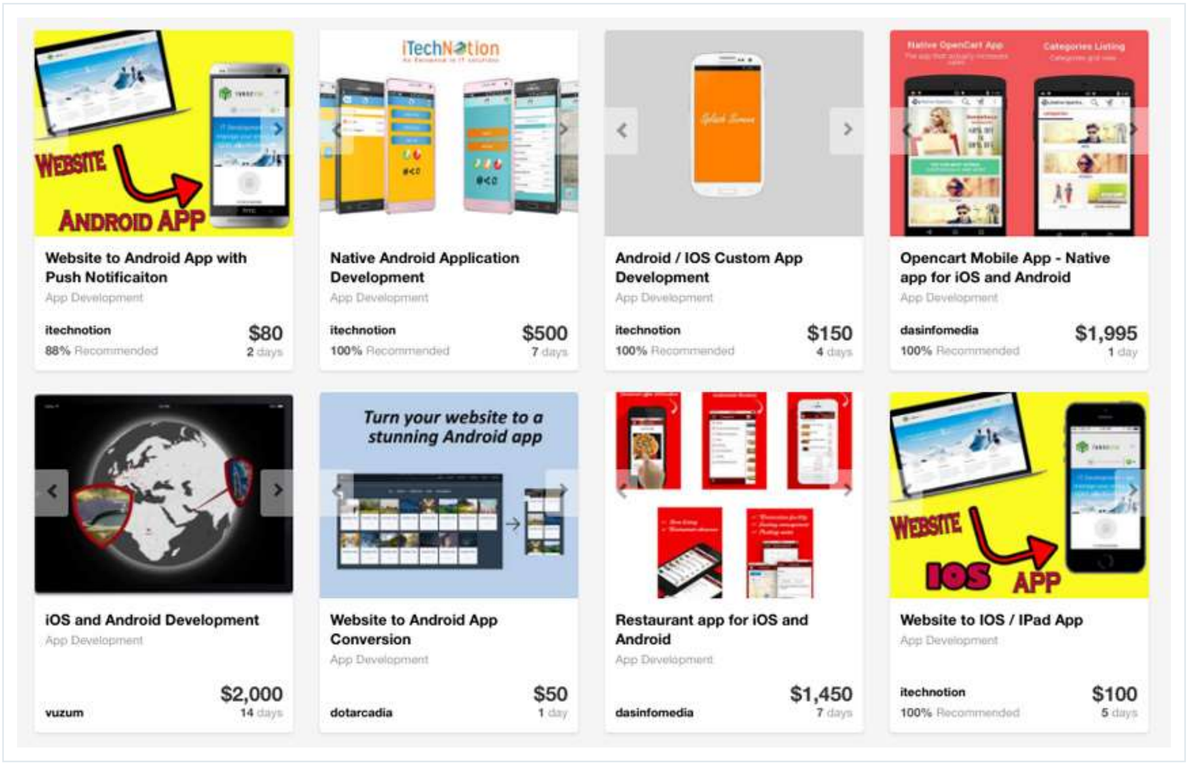
We are building a simple music player app for Android in this series. So far, we have presented a list of the songs on the device and allowed the user to make selections from it, starting playback using the `MediaPlayer` class in a `Service` class. In this final part of the series, we will let the user control playback, including skipping to the next and previous tracks, fast-forwarding, rewinding, playing, pausing, and seeking to particular points in the track. We will also display a notification during playback so that the user can jump back to the music player after using other apps.

Looking for a Shortcut?

This series of tutorials is taking you through the process of building a music player app from scratch. If you want a ready-made solution, try Android Music Player, an advanced music player for Android devices. It lets you browse and play your music by albums, artists, songs, playlists, folders, and album artists, and has a range of other features.

Android Music Player

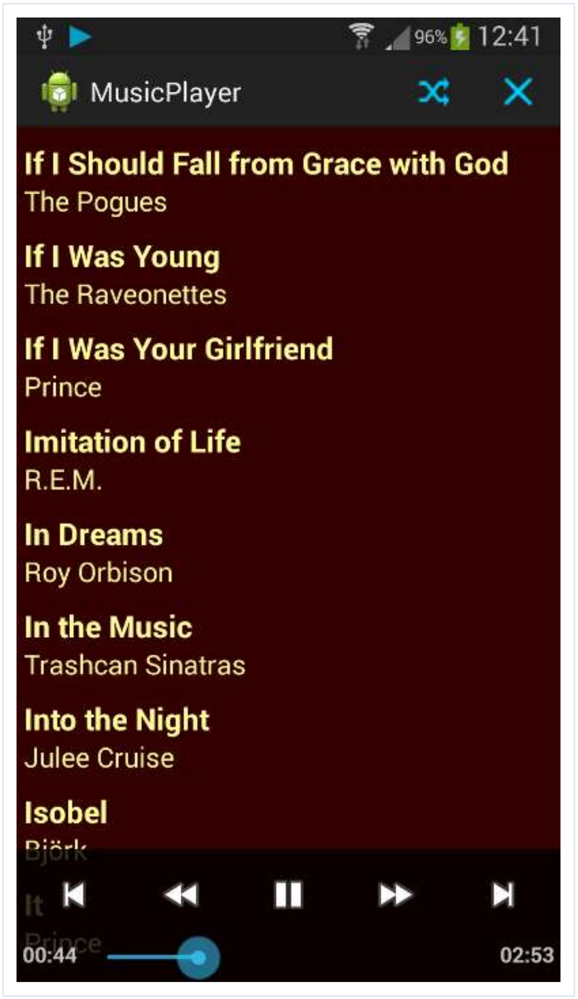
Or if you want something completely customised to your specifications, you can hire an Android developer on Envato Studio to do anything from tweaks and bug fixes to creating a whole app from scratch.



Introduction

The music player control functionality will be implemented using the `MediaController` class, in which a `SeekBar` instance displays the progress of playback as well as letting the user skip to particular locations in a track. We will use the `Notification` and `PendingIntent` classes to display the title of the currently playing track and let the user navigate back to the app.

This is how the app should look when you complete this tutorial:



After this series we will also explore related functionality you may wish to use to enhance the music player app. This will include video playback, streaming media, managing audio focus, and presenting media data in different ways.

1. Create a Controller

Step 1

Open your main `Activity` class and add the following import statement:

```
import android.widget.MediaController.MediaPlayerControl;
```

Extend the opening line of the class declaration as follows, so that we can use the `Activity` class to provide playback control:

```
public class MainActivity extends Activity implements MediaPlayerControl {
```

Hover over the class name and select **Add unimplemented methods**. Eclipse will add various methods for playback control, which we will tailor as we go along.

Step 2

The `MediaController` class presents a standard widget with play/pause, rewind, fast-forward, and skip (previous/next) buttons in it. The widget also contains a seek bar, which updates as the song plays and contains text indicating the duration of the song and the player's current position. So that we can configure the details of the control, we will implement a class to extend it. Add a new class to your project, naming it **MusicController**. In Eclipse, choose **android.widget.MediaController** as the superclass when creating it.

Give the class the following content:

```
public class MusicController extends MediaController {

  public MusicController(Context c){
    super(c);
  }

  public void hide(){}

}
```

You can tailor the `MediaController` class in various ways. All we want to do is stop it from automatically hiding after three seconds by overriding the `hide` method.

Tip: You may need to tweak the theme your app uses in order to ensure that the media controller text is clearly visible.

Step 3

Back in your main `Activity` class, add a new instance variable:

```
private MusicController controller;
```

We will be setting the controller up more than once in the life cycle of the app, so let's do it in a helper method. Add the following code snippet to your `Activity` class:

```
private void setController(){
  //set the controller up
}
```

Inside the method, instantiate the controller:

```
controller = new MusicController(this);
```

You can configure various aspects of the `MediaController` instance. For example, we will need to determine what will happen when the user presses the previous/next buttons. After instantiating the controller set these click listeners:

```
controller.setPrevNextListeners(new View.OnClickListener() {
  @Override
  public void onClick(View v) {
    playNext();
  }
}, new View.OnClickListener() {
  @Override
  public void onClick(View v) {
    playPrev();
  }
});
```

We will implement `playNext` and `playPrev` a bit later, so just ignore the errors for now. Still inside the `setController` method, set the controller to work on media playback in the app, with its anchor view referring to the list we included in the layout:

```
controller.setMediaPlayer(this);
controller.setAnchorView(findViewById(R.id.song_list));
controller.setEnabled(true);
```

Back in `onCreate`, call the method:

```
setController();
```

We will also call it elsewhere in the class later.

2. Implement Playback Control

Step 1

Remember that the media playback is happening in the `Service` class, but that the user interface comes from the `Activity` class. In the previous tutorial, we bound the `Activity` instance to the `Service` instance, so that we could control playback from the user interface. The methods in our `Activity` class that we added to implement the `MediaPlayerControl` interface will be called when the user attempts to control playback. We will need the `Service` class to act on this control, so open your `Service` class now to add a few more methods to it:

```
public int getPosn(){
  return player.getCurrentPosition();
}

public int getDur(){
  return player.getDuration();
}

public boolean isPng(){
  return player.isPlaying();
}

public void pausePlayer(){
  player.pause();
}

public void seek(int posn){
  player.seekTo(posn);
}

public void go(){
  player.start();
}
```

These methods all apply to standard playback control functions that the user will expect.

Step 2

Now let's add methods to the `Service` class for skipping to the next and previous tracks. Start with the previous function:

```
public void playPrev(){
  songPosn--;
  if(songPosn&lt;0) songPosn=songs.size()-1;
  playSong();
}
```

We decrement the song index variable, check that we haven't gone outside the range of the list, and call the `playSong` method we added. Now add the method to skip to the next track:

```
//skip to next
public void playNext(){
  songPosn++;
  if(songPosn&gt;=songs.size()) songPosn=0;
  playSong();
}
```

This is analogous to the method for playing the previous track at the moment, but we will amend this method later to implement the shuffle functionality.

Step 3

Now switch back to your `Activity` class so that we can make use of these methods. First add the methods we called when we set the controller up:

```
//play next
private void playNext(){
  musicSrv.playNext();

  controller.show(0);
}

//play previous
private void playPrev(){
  musicSrv.playPrev();
  controller.show(0);
}
```

We call the methods we added to the `Service` class. We will be adding more code to these later to take care of particular situations. Now let's turn to the `MediaPlayerControl` interface methods, which will be called by the system during playback and when the user interacts with the controls. These methods should already be in your `Activity` class, so we will just be altering their implementation.

Start with the `canPause` method, setting it to **true**:

```
@Override
public boolean canPause() {
  return true;
}
```

Now do the same for the `canSeekBackward` and `canSeekForward` methods:

```
@Override
public boolean canSeekBackward() {
  return true;
}

@Override
public boolean canSeekForward() {
  return true;
}
```

You can leave the `getAudioSessionId` and `getBufferPercentage` methods as they are. Amend the `getCurrentPosition` method as follows:

```
@Override
public int getCurrentPosition() {
  if(musicSrv!=null &amp;&amp; musicBound &amp;&amp; musicSrv.isPng())
    return musicSrv.getPosn();
  else return 0;
}
```

The conditional tests are to avoid various exceptions that may occur when using the `MediaPlayer` and `MediaController` classes. If you attempt to enhance the app in any way, you will likely find that you need to take such steps since the media playback classes throw lots of exceptions. Notice that we call the `getPosn` method of the `Service` class.

Amend the `getDuration` method similarly:

```
@Override
public int getDuration() {
  if(musicSrv!=null &amp;&amp; musicBound &amp;&amp; musicSrv.isPng())
    return musicSrv.getDur();
  else return 0;
}
```

Alter the `isPlaying` method by invoking the `isPng` method of our `Service` class:

```
@Override
public boolean isPlaying() {
  if(musicSrv!=null &amp;&amp; musicBound)
    return musicSrv.isPng();
  return false;
}
```

Do the same for the `pause`, `seekTo` and `start` methods:

```
@Override
public void pause() {
  musicSrv.pausePlayer();
}

@Override
public void seekTo(int pos) {
  musicSrv.seek(pos);
}

@Override
public void start() {
  musicSrv.go();
}
```

3. Handle Navigation Back Into the App

Step 1

Remember that we are going to continue playback even when the user navigates away from the app. In order to facilitate this, we will display a notification showing the title of the track being played. Clicking the notification will take the user back into the app. Switch back to your `Service` class and add the following additional imports:

```
import java.util.Random;
import android.app.Notification;
import android.app.PendingIntent;
```

Now move to the `onPrepared` method, in which we currently simply start the playback. After the call to `player.start()`, add the following code:

```
Intent notIntent = new Intent(this, MainActivity.class);
notIntent.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
PendingIntent pendInt = PendingIntent.getActivity(this, 0,
  notIntent, PendingIntent.FLAG_UPDATE_CURRENT);

Notification.Builder builder = new Notification.Builder(this);

builder.setContentIntent(pendInt)
  .setSmallIcon(R.drawable.play)
  .setTicker(songTitle)
  .setOngoing(true)
  .setContentTitle(&quot;Playing&quot;)
  .setContentText(songTitle);
Notification not = builder.build();

startForeground(NOTIFY_ID, not);
```

We will add the missing variables next. The `PendingIntent` class will take the user back to the main `Activity` class when they select the notification. Add variables for the song title and notification ID at the top of the class:

```
private String songTitle=&quot;&quot;;
private static final int NOTIFY_ID=1;
```

Now we need to set the song title, in the `playSong` method, after the line in which we retrieve the song from the list (`Song playSong = songs.get(songPosn);`):

```
songTitle=playSong.getTitle();
```

Since we have called `setForeground` on the notification, we need to make sure we stop it when the `Service` instance is destroyed. Override the following method:

```
@Override
public void onDestroy() {
  stopForeground(true);
}
```

4. Shuffle Playback

Step 1

Remember that we added a shuffle button, so let's implement that now. First add new instance variables to the `Service` class:

```
private boolean shuffle=false;
private Random rand;
```

Instantiate the random number generator in `onCreate`:

```
rand=new Random();
```

Now add a method to set the shuffle flag:

```
public void setShuffle(){
  if(shuffle) shuffle=false;
  else shuffle=true;
}
```

We will simply toggle the shuffle setting on and off. We will check this flag when the user either skips to the next track or when a track ends and the next one begins. Amend the `playNext` method as follows:

```
public void playNext(){
  if(shuffle){
    int newSong = songPosn;
    while(newSong==songPosn){
      newSong=rand.nextInt(songs.size());
    }
    songPosn=newSong;
  }
  else{
    songPosn++;
    if(songPosn&gt;=songs.size()) songPosn=0;
  }
  playSong();
}
```

If the shuffle flag is on, we choose a new song from the list at random, making sure we don't repeat the last song played. You could enhance this functionality by using a queue of songs and preventing any song from being repeated until all songs have been played.

Step 2

Now we can let the user select the shuffle function. Back in your main `Activity` class in the `onOptionsItemSelected` method, amend the section for the shuffle action to call the new method we added to the `Service` class:

```
case R.id.action_shuffle:
  musicSrv.setShuffle();
  break;
```

Now the user will be able to use the menu item to toggle the shuffling functionality.

5. Tidy Up

Step 1

We are almost done, but still need to add a few bits of processing to take care of certain changes, such as the user leaving the app or pausing playback. In your `Activity` class, add a couple more instance variables:

```
private boolean paused=false, playbackPaused=false;
```

We will use these to cope with the user returning to the app after leaving it and interacting with the controls when playback itself is paused. Override `onPause` to set one of these flags:

```
@Override
protected void onPause(){
  super.onPause();
  paused=true;
}
```

Now override `onResume`:

```
@Override
protected void onResume(){
  super.onResume();
  if(paused){
    setController();
    paused=false;
  }
}
```

This will ensure that the controller displays when the user returns to the app. Override `onStop` to hide it:

```
@Override
protected void onStop() {
  controller.hide();
  super.onStop();
}
```

Step 2

If the user interacts with the controls while playback is paused, the `MediaPlayer` object may behave unpredictably. To cope with this, we will set and use the `playbackPaused` flag. First amend the `playNext` and `playPrev` methods:

```
private void playNext(){
  musicSrv.playNext();
  if(playbackPaused){
    setController();
    playbackPaused=false;
  }
  controller.show(0);
}

private void playPrev(){
  musicSrv.playPrev();
  if(playbackPaused){
    setController();
    playbackPaused=false;
  }
  controller.show(0);
}
```

We reset the controller and update the `playbackPaused` flag when playback has been paused. Now make similar changes to the `playSong` method:

```
public void songPicked(View view){
  musicSrv.setSong(Integer.parseInt(view.getTag().toString()));
  musicSrv.playSong();
  if(playbackPaused){
    setController();
    playbackPaused=false;
  }
  controller.show(0);
}
```

Now set `playbackPaused` to **true** in the `pause` method:

```
@Override
public void pause() {
  playbackPaused=true;
  musicSrv.pausePlayer();
}
```

As you work with the `MediaPlayer` and `MediaController` classes, you will find that this type of processing is a necessary requirement to avoid errors. For example, you will sometimes find that the controller's seek bar does not update until the user interacts with it. These resources behave differently on different API levels, so thorough testing and tweaking is essential if you plan on releasing your app to the public. The app we are creating in this series is really only a foundation.

Step 3

Let's take some final steps to make the app behave consistently. Back in the `Service` class, amend the `onError` method:

```
@Override
public boolean onError(MediaPlayer mp, int what, int extra) {
  mp.reset();
  return false;
}
```

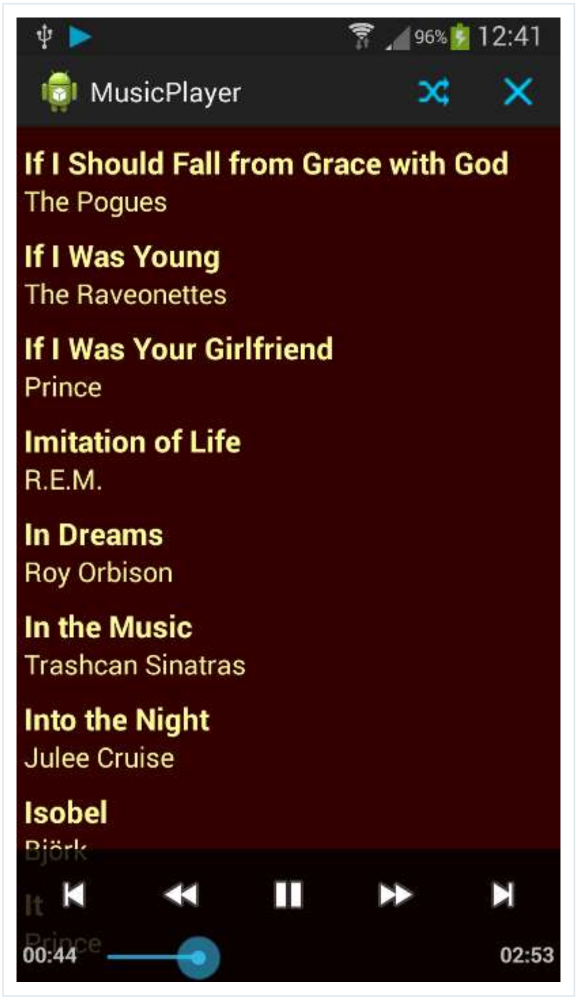
We simply reset the player, but you may of course wish to enhance this approach.

The `onCompletion` method will fire when a track ends, including cases where the user has chosen a new track or skipped to the next/previous tracks as well as when the track reaches the end of its playback. In the latter case, we want to continue playback by playing the next track. To do this we need to check the state of playback. Amend your `onCompletion` method:

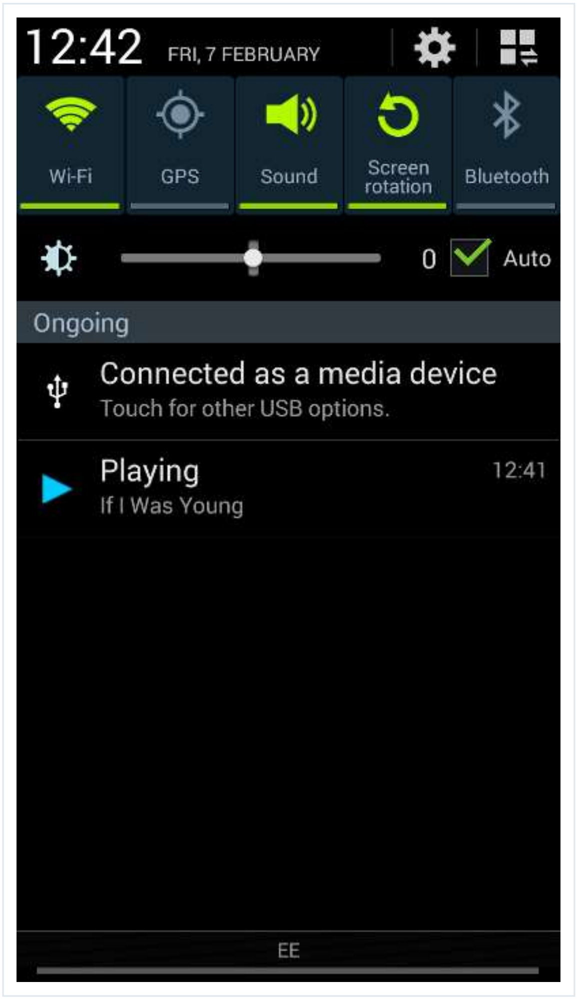
```
@Override
public void onCompletion(MediaPlayer mp) {
  if(player.getCurrentPosition()&gt;0){
    mp.reset();
    playNext();
  }
}
```

We call the `playNext` method if the current track has reached its end.

Tip: To ensure that your app does not interfere with other audio services on the user's device, you should enhance it to handle audio focus gracefully. Make the `Service` class implement the `AudioManager.OnAudioFocusChangeListener` interface. In the `onCreate` method, create an instance of the `AudioManager` class and call `requestAudioFocus` on it. Finally, implement the `onAudioFocusChange` method in your class to control what should happen when the application gains or loses audio focus. See the Audio Focus section in the Developer Guide for more details.
That is the basic app complete! However, you may well need to carry out additional enhancements to make it function reliably across user devices and API levels. The controls should appear whenever you interact with the app.



The notification should allow you to return to the app while playback continues.



Conclusion

We have now completed the basic music player for Android. There are many ways in which you could enhance the app, such as adding support for streaming media, video, audio focus, and providing different methods to interact with the music tracks on the device. We will look at some of these enhancements in future tutorials, outlining how you can add them to the app or to other media playback projects. In the meantime, see if you can extend the app to build additional functionality or to improve reliability on different devices. See the Media Playback section of the Android Developer Guide for more information.

Advertisement

Sue Smith

Technical writer (and sometimes developer) based in Glasgow, UK. Having worked with the Mozilla Foundation and various online publications, I enjoy helping people to learn web and software development topics, regardless of their existing skill level. Particular areas of interest include education technology and open source projects.

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Name

sanju • 3 years ago
Back button and options button not working when music is playing or paused. It works if music was not played at all. What could be the issue?
13 ^ | v • Reply • Share ›

sanju ➦ sanju • 3 years ago
Can you please answer this?
^ | v • Reply • Share ›

Jhandal ➦ sanju • 2 years ago
Sanju did you fixed the back botton issue?
^ | v • Reply • Share ›

Leo ➦ sanju • 3 years ago
could u soloved this problem. I'm still stuck on it ^^
^ | v • Reply • Share ›

Jhandal ➦ Leo • 2 years ago
Leo have you fixed it?
^ | v • Reply • Share ›

Jhandal ➦ Leo • 2 years ago
also stuck on it ....thks
^ | v • Reply • Share ›

Jhandal ➦ Jhandal • 2 years ago
Fixed it...in MainActivity add this method

```
@Override

public void onBackPressed() {

Intent i=new Intent(getBaseContext(),com.example.entry.SplashScreen.class);

i.addFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);

startActivity(i);

super.onBackPressed();

}
```

I need to go back to SplashScreen...still I need to press the backbutton twice ..working on that
1 ^ | v • Reply • Share ›

Erikson Barroso ➦ Jhandal • a year ago
Change the MusicControler.class to

```
public class MusicController extends MediaController {
Context c;
public MusicController(Context c){
super(c);
this.c = c;
}

public void hide(){}

@Override
public boolean dispatchKeyEvent(KeyEvent event) {
int keyCode = event.getKeyCode();
if(keyCode == KeyEvent.KEYCODE_BACK){
((MainActivity)c).onBackPressed();
return true;
}
return super.dispatchKeyEvent(event);
```

see more

Reply • Share ›

qasim Erikson Barroso • 4 months ago

you code is working but i want music services is running position means song is in play form but according to your code when i press back than Activity as well as services are destroyed but i want only Activity will finish

Reply • Share ›

Alok Kumar Erikson Barroso • 9 months ago

not working in my case

Reply • Share ›

Van Tuong Nguyen Erikson Barroso • 10 months ago

I couldn't make it to work after using your code, any one has any suggestion why? :(Thanks in advance!

Reply • Share ›

Yogesh Wani Erikson Barroso • a year ago

hi can you send Source code to me on the mail - waniyogeshru2015@gmail.com , plzzzzzzzzzzzzzzzzzzzz

Reply • Share ›

Naveen Reddy Chedeti • 3 years ago

hello the song progress bar is not updating everytime and also small bug it shows pause mode at the beginning even the song is playing.please help me how to fix these???

7 • Reply • Share ›

Abad Ullah Naveen Reddy Chedeti • 2 years ago

I am also facing the same problem. Naveen have u fix it?

Reply • Share ›

Hashneet Saluja Abad Ullah • 6 months ago

Same problem please share the solution to this

Reply • Share ›

Cláudio Ribeiro • 3 years ago

I just completed this tutorial and it's working just fine except for the fact that whenever the controllers are up (which means that the song is playing or paused) I can't use the menu anymore, nor I can scroll my list of songs. It seems that everything that's on the background is disabled. Any idea on how to fix this issue?

Great tutorial by the way ;)

6 • Reply • Share ›

Sarah Cláudio Ribeiro • 2 years ago

I done the project but when I rum it in the genemotion emulator songs don't appear there, from where the songs should be imported?

Reply • Share ›

Aditya Yadav Sarah • a year ago

Hey, maybe i'm late, but to import songs in Genymotion Emulator, you just need to drag and drop the music files from your PC inside the emulator

Reply • Share ›

Shubham Aggarwal Sarah • 2 years ago

Are you sure that there actually are songs present on the emulator?

Reply • Share ›

jagdeesh Cláudio Ribeiro • 2 years ago

is ur seekbar working fine?? does it update correctly???

Reply • Share ›

reza Cláudio Ribeiro • 3 years ago

I am facing the same problem?Did you get a solution to this?

Reply • Share ›

Eric Cláudio Ribeiro • 3 years ago

Did u get a solution to this? I am facing thesame problem. Thanks

Reply • Share ›

reza ➦ Eric • 3 years ago

when i play a item of list and click on another item,song not play.Are you help me?

Reply • Share ›

Lucky Walia • 3 years ago

why eclipse is showing errors under && and also under "";?

6 • Reply • Share ›

Akshay Mukadam • 3 years ago

how can we play the songs from album,artist etc

3 • Reply • Share ›

JohnFromFrance • 3 years ago

Hi, Very good tutorial, just Awesome !!! I have a question, My MediaController doesn't refresh alone, and like you said, it behave oddly until the user touch it... How can i cope to this "BUG". Thanks a lot

3 • Reply • Share ›

Mevlid • 3 years ago

eclipse shows errors under ">" and all similar parts of the code
what's wrong?

4 • Reply • Share ›

Janaas ➦ Mevlid • 3 years ago

< = <
> = >
& = &
" = "
' = &apos
Use those sysmbols instead of these

4 • Reply • Share ›

sani ➦ Janaas • 3 years ago

i dont understand

Reply • Share ›

Midhun ➦ sani • 2 years ago

I believe that's a problem with this blog. '& g t ' stands for > sign and '& l t' stands for < sign. These are used in html because the < and > signs may be mistaken for html tags.

The author wrote it like that to display it on this web page . But somehow it gets displayed as such.
More info : http://www.w3schools.com/HT...

1 • Reply • Share ›

pface2 ➦ sani • 2 years ago

this will clarify things http://stackoverflow.com/qu...

Reply • Share ›

pface2 ➦ Mevlid • 2 years ago

http://stackoverflow.com/qu...

Reply • Share ›

nikhil ➦ Mevlid • 3 years ago

replace " >" with > sign

Reply • Share ›

Yogesh Wani ➦ nikhil • a year ago

hi can you send Source code to me on the mail - waniyogeshru2015@gmail.com , plzzzzzzzzzzzzzz

Reply • Share ›

Nikhil ➦ Mevlid • 3 years ago
replace &gt; with > sign
^ | v • Reply • Share ›

Windy ➦ Mevlid • 3 years ago
it mean greater than: >
^ | v • Reply • Share ›

Tay1 Le Gawd • 3 years ago
im going to lose my mind
i keep getting a "....Cannot be resolved or is not a field" error after R.***.****** line such as R.Id.action_shuffle
i dont know what is wrong at this point
2 ^ | v • Reply • Share ›

Yogesh Wani ➦ Tay1 Le Gawd • a year ago
create new project and copy all that same code
^ | v • Reply • Share ›

Dimal Chandrasiri ➦ Tay1 Le Gawd • 3 years ago
You have a corrupted R file. Clean the project and rebuild the project! check if you have not done a typo in any of the layout files or xml files!
^ | v • Reply • Share ›

SACHIN KUMAR SINGH ➦ Dimal Chandrasiri • 2 years ago
Hello Dimal,

I tried several times cleanining the Project and rebuilding it. But I still stuck at this error. I also imported R (import android.R;). What should I do?
^ | v • Reply • Share ›

Bapi ➦ SACHIN KUMAR SINGH • 8 months ago
Hey Sachin, I think there is some problem with you xml once check them.Generally this error arises when there is problem with your xml
^ | v • Reply • Share ›

Eric • 3 years ago
When music is playing, the Back button cease working. Any help? Thanks
2 ^ | v • Reply • Share ›

Võ Hoàng Hiệp • 3 years ago
I got all of it.
But I have some wrong.
Before this tutorial, everything is ok. Playback is OK.
But after this tutorial, I Run as Project to my phone, It's the same picture below.

In AndroidManifest.xml :
<uses-permission android:name="android.permission.WAKE_LOCK"/>
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
<uses-permission android:name="android.permission.READ_EXTERNAL_STORAGE"/>

PLZ help me....

2 ^ | v • Reply • Share ›

José Alfredo Mendoza ➦ Võ Hoàng Hiệp • 2 years ago
Did you solve it? I have the same problem!! >.<
^ | v • Reply • Share ›

Sri • a year ago
Awesome explanation!!! Worked Fine with no errors!

Just a small question, my device is running on lollipop 5.1.1 The app doesn't display shuffle and repeat buttons and it doesnt run on higher API levels (21 and above). Any help available?
1 ^ | v • Reply • Share ›

Yogesh Wani ➦ Sri • a year ago

Yogesh Wani ↪ Sri • a year ago

hi can you send Source code to me on the mail - waniyogeshru2015@gmail.com , plzzzzzzzzzzzzzzzzzzzzzzzzz

Reply • Share ›

gR33D 99 • 2 years ago

i am not getting the media controller in the app, please help

1 • Reply • Share ›

gR33D 99 • 2 years ago

i didnt get the controller in the final app what am i doing wrong?

1 • Reply • Share ›

Ankur Arora • 2 years ago

I am able to see all the songs in my app but When I click my and song it unfortunately stops.. .. please help meee

1 • Reply • Share ›

jagdeesh • 2 years ago

i have completed the tutorial but the seek bar doesn't get updated sometimes and the button is in paused state when the song is playing ..pls help me out ....

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