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11ĐH\_TMĐT

**Bước 1: Tạo Project**

1. Mở Android Studio → New Project → Empty Activity
2. Đặt tên: DownloadManagerLab7
3. Chọn ngôn ngữ Java

**Bước 2: Tạo giao diện (activity\_main.xml)**

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"

android:orientation="vertical"

android:padding="16dp"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent">

<EditText

android:id="@+id/edtUrl"

android:hint="Nhập link cần download"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:inputType="textUri"/>

<Button

android:id="@+id/btnDownload"

android:text="Download"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:layout\_marginTop="12dp"/>

</LinearLayout>

**Bước 3: Tạo Service (DownloadService.java)**

package com.example.downloadmanagerlab7;  
  
import android.app.Service;  
import android.app.NotificationChannel;  
import android.app.NotificationManager;  
import android.app.PendingIntent;  
import android.content.Intent;  
import android.content.Context;  
import android.os.Build;  
import android.os.IBinder;  
import androidx.core.app.NotificationCompat;  
  
import java.io.BufferedInputStream;  
import java.io.FileOutputStream;  
import java.io.InputStream;  
import java.net.HttpURLConnection;  
import java.net.URL;  
  
public class DownloadService extends Service {  
  
 private boolean isDownloading = false;  
 private boolean isPaused = false;  
 private NotificationManager notificationManager;  
 private NotificationCompat.Builder builder;  
 private int progress = 0;  
  
 @Override  
 public void onCreate() {  
 super.onCreate();  
 createNotificationChannel();  
 }  
  
 @Override  
 public int onStartCommand(Intent intent, int flags, int startId) {  
 String url = intent.getStringExtra("url");  
  
 notificationManager = (NotificationManager) getSystemService(Context.*NOTIFICATION\_SERVICE*);  
 builder = createNotificationBuilder();  
  
 // hiển thị Notification foreground  
 startForeground(1, builder.build());  
  
 // bắt đầu tải trong luồng riêng  
 new Thread(() -> downloadFile(url)).start();  
  
 return *START\_STICKY*;  
 }  
  
 // ------------------ DOWNLOAD FILE ------------------  
 private void downloadFile(String fileUrl) {  
 try {  
 URL url = new URL(fileUrl);  
 HttpURLConnection connection = (HttpURLConnection) url.openConnection();  
 connection.connect();  
  
 int fileLength = connection.getContentLength();  
 InputStream input = new BufferedInputStream(url.openStream());  
 FileOutputStream output = openFileOutput("downloaded\_file", *MODE\_PRIVATE*);  
  
 byte[] data = new byte[1024];  
 int count;  
 int total = 0;  
  
 while ((count = input.read(data)) != -1 && !isPaused) {  
 total += count;  
 output.write(data, 0, count);  
 progress = (int) ((total \* 100L) / fileLength);  
 updateNotification(progress);  
 }  
  
 output.flush();  
 output.close();  
 input.close();  
  
 showCompleteNotification();  
  
 } catch (Exception e) {  
 e.printStackTrace();  
 }  
 }  
  
 // ------------------ NOTIFICATION CHANNEL ------------------  
 private void createNotificationChannel() {  
 if (Build.VERSION.*SDK\_INT* >= Build.VERSION\_CODES.*O*) {  
 NotificationChannel channel = new NotificationChannel(  
 "download\_channel",  
 "Download Notification",  
 NotificationManager.*IMPORTANCE\_LOW* );  
 notificationManager = getSystemService(NotificationManager.class);  
 notificationManager.createNotificationChannel(channel);  
 }  
 }  
  
 // ------------------ NOTIFICATION BUILDER ------------------  
 private NotificationCompat.Builder createNotificationBuilder() {  
 // Intent Pause  
 Intent pauseIntent = new Intent(this, DownloadReceiver.class);  
 pauseIntent.setAction("ACTION\_PAUSE");  
 PendingIntent pausePending = PendingIntent.*getBroadcast*(  
 this, 0, pauseIntent, PendingIntent.*FLAG\_UPDATE\_CURRENT* | PendingIntent.*FLAG\_IMMUTABLE*);  
  
 // Intent Resume  
 Intent resumeIntent = new Intent(this, DownloadReceiver.class);  
 resumeIntent.setAction("ACTION\_RESUME");  
 PendingIntent resumePending = PendingIntent.*getBroadcast*(  
 this, 1, resumeIntent, PendingIntent.*FLAG\_UPDATE\_CURRENT* | PendingIntent.*FLAG\_IMMUTABLE*);  
  
 // Intent Cancel  
 Intent cancelIntent = new Intent(this, DownloadReceiver.class);  
 cancelIntent.setAction("ACTION\_CANCEL");  
 PendingIntent cancelPending = PendingIntent.*getBroadcast*(  
 this, 2, cancelIntent, PendingIntent.*FLAG\_UPDATE\_CURRENT* | PendingIntent.*FLAG\_IMMUTABLE*);  
  
 builder = new NotificationCompat.Builder(this, "download\_channel")  
 .setSmallIcon(android.R.drawable.*stat\_sys\_download*)  
 .setContentTitle("Đang tải xuống")  
 .setContentText("Đang tải: 0%")  
 .setOnlyAlertOnce(true)  
 .setOngoing(true)  
 .addAction(android.R.drawable.*ic\_media\_pause*, "Pause", pausePending)  
 .addAction(android.R.drawable.*ic\_media\_play*, "Resume", resumePending)  
 .addAction(android.R.drawable.*ic\_delete*, "Cancel", cancelPending)  
 .setPriority(NotificationCompat.*PRIORITY\_LOW*);  
  
 return builder;  
 }  
  
 // ------------------ CẬP NHẬT TIẾN TRÌNH ------------------  
 private void updateNotification(int progress) {  
 builder.setProgress(100, progress, false)  
 .setContentText("Đang tải: " + progress + "%");  
 notificationManager.notify(1, builder.build());  
 }  
  
 // ------------------ HOÀN TẤT ------------------  
 private void showCompleteNotification() {  
 builder.setContentText("Tải hoàn tất ")  
 .setProgress(0, 0, false)  
 .setOngoing(false)  
 .setSmallIcon(android.R.drawable.*stat\_sys\_download\_done*);  
 notificationManager.notify(1, builder.build());  
 }  
  
 @Override  
 public IBinder onBind(Intent intent) {  
 return null;  
 }  
}

Bước 4: Thêm Notification tùy chỉnh

**Bước 4.1 – Tạo layout cho Notification**

Trong Android Studio:

1. Mở thư mục res/layout
2. Nhấn chuột phải → New → Layout resource file
3. Đặt tên: notification\_download.xml

<!-- res/layout/notification\_download.xml -->

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"

android:orientation="vertical"

android:padding="8dp"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:background="@android:color/white">

<TextView

android:id="@+id/txtTitle"

android:text="Đang tải xuống..."

android:textStyle="bold"

android:textSize="16sp"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"/>

<ProgressBar

android:id="@+id/progressBar"

style="?android:attr/progressBarStyleHorizontal"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:max="100"

android:progress="0"

android:indeterminate="false"/>

<LinearLayout

android:orientation="horizontal"

android:gravity="center"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:layout\_marginTop="4dp">

<Button

android:id="@+id/btnPause"

android:text="Pause"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"/>

<Button

android:id="@+id/btnResume"

android:text="Resume"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginLeft="8dp"/>

<Button

android:id="@+id/btnCancel"

android:text="Cancel"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginLeft="8dp"/>

</LinearLayout>

</LinearLayout>

**Bước 4.2 – Tạo NotificationChannel trong Service**

private void createNotificationChannel() {

if (Build.VERSION.SDK\_INT >= Build.VERSION\_CODES.O) {

NotificationChannel channel = new NotificationChannel(

"download\_channel",

"Download Notification",

NotificationManager.IMPORTANCE\_LOW

);

notificationManager = getSystemService(NotificationManager.class);

notificationManager.createNotificationChannel(channel);

}

}

**Bước 4.3 – Chuẩn bị các PendingIntent cho các nút**

private NotificationCompat.Builder createNotificationBuilder() {

// Intent Pause

Intent pauseIntent = new Intent(this, DownloadReceiver.class);

pauseIntent.setAction("ACTION\_PAUSE");

PendingIntent pausePending = PendingIntent.getBroadcast(this, 0, pauseIntent, PendingIntent.FLAG\_UPDATE\_CURRENT | PendingIntent.FLAG\_IMMUTABLE);

// Intent Resume

Intent resumeIntent = new Intent(this, DownloadReceiver.class);

resumeIntent.setAction("ACTION\_RESUME");

PendingIntent resumePending = PendingIntent.getBroadcast(this, 1, resumeIntent, PendingIntent.FLAG\_UPDATE\_CURRENT | PendingIntent.FLAG\_IMMUTABLE);

// Intent Cancel

Intent cancelIntent = new Intent(this, DownloadReceiver.class);

cancelIntent.setAction("ACTION\_CANCEL");

PendingIntent cancelPending = PendingIntent.getBroadcast(this, 2, cancelIntent, PendingIntent.FLAG\_UPDATE\_CURRENT | PendingIntent.FLAG\_IMMUTABLE);

builder = new NotificationCompat.Builder(this, "download\_channel")

.setSmallIcon(android.R.drawable.stat\_sys\_download)

.setContentTitle("Đang tải xuống")

.setOnlyAlertOnce(true)

.addAction(android.R.drawable.ic\_media\_pause, "Pause", pausePending)

.addAction(android.R.drawable.ic\_media\_play, "Resume", resumePending)

.addAction(android.R.drawable.ic\_delete, "Cancel", cancelPending)

.setPriority(NotificationCompat.PRIORITY\_LOW);

return builder;

}

**Bước 4.4 – Hiển thị Notification Foreground**

@Override

public int onStartCommand(Intent intent, int flags, int startId) {

String url = intent.getStringExtra("url");

notificationManager = (NotificationManager) getSystemService(Context.NOTIFICATION\_SERVICE);

builder = createNotificationBuilder();

startForeground(1, builder.build()); // hiển thị notification

new Thread(() -> downloadFile(url)).start();

return START\_STICKY;

}

**Bước 4.5 – Cập nhật tiến trình (progress bar)**

private void updateNotificationProgress(int progress) {

builder.setProgress(100, progress, false)

.setContentText("Đang tải: " + progress + "%");

notificationManager.notify(1, builder.build());

}

**Bước 4.6 – Khi tải xong**

private void showCompleteNotification() {

builder.setContentText("Tải xong ")

.setProgress(0, 0, false)

.setSmallIcon(android.R.drawable.stat\_sys\_download\_done);

notificationManager.notify(1, builder.build());

}

**Bước 5: Tạo BroadcastReceiver (DownloadReceiver.java)**

package com.example.downloadmanagerlab7;

import android.app.Service;

import android.app.NotificationChannel;

import android.app.NotificationManager;

import android.app.PendingIntent;

import android.content.Intent;

import android.content.Context;

import android.os.Build;

import android.os.IBinder;

import androidx.core.app.NotificationCompat;

import java.io.BufferedInputStream;

import java.io.FileOutputStream;

import java.io.InputStream;

import java.net.HttpURLConnection;

import java.net.URL;

public class DownloadService extends Service {

private boolean isPaused = false;

private boolean isCanceled = false;

private int downloadedBytes = 0;

private String fileName = "downloaded\_file.tmp";

private NotificationManager notificationManager;

private NotificationCompat.Builder builder;

@Override

public void onCreate() {

super.onCreate();

createNotificationChannel();

}

@Override

public int onStartCommand(Intent intent, int flags, int startId) {

String action = intent.getAction();

if (action != null) {

switch (action) {

case "ACTION\_PAUSE":

isPaused = true;

updateNotificationMessage("Tạm dừng tải...");

return START\_STICKY;

case "ACTION\_RESUME":

isPaused = false;

isCanceled = false;

updateNotificationMessage("Tiếp tục tải...");

new Thread(() -> downloadFile(intent.getStringExtra("url"))).start();

return START\_STICKY;

case "ACTION\_CANCEL":

isCanceled = true;

updateNotificationMessage("Đã hủy tải");

stopForeground(true);

stopSelf();

return START\_NOT\_STICKY;

}

}

// Bắt đầu tải mới

String url = intent.getStringExtra("url");

notificationManager = (NotificationManager) getSystemService(Context.NOTIFICATION\_SERVICE);

builder = createNotificationBuilder();

startForeground(1, builder.build());

new Thread(() -> downloadFile(url)).start();

return START\_STICKY;

}

// ------------------ DOWNLOAD FILE ------------------

private void downloadFile(String fileUrl) {

try {

URL url = new URL(fileUrl);

HttpURLConnection connection = (HttpURLConnection) url.openConnection();

// Nếu đang resume, gửi Range header để tiếp tục tải

if (downloadedBytes > 0) {

connection.setRequestProperty("Range", "bytes=" + downloadedBytes + "-");

}

connection.connect();

int responseCode = connection.getResponseCode();

if (responseCode != HttpURLConnection.HTTP\_OK && responseCode != 206) {

showErrorNotification("Lỗi kết nối: " + responseCode);

return;

}

int fileLength = connection.getContentLength() + downloadedBytes;

InputStream input = new BufferedInputStream(connection.getInputStream());

FileOutputStream output = openFileOutput(fileName, downloadedBytes > 0 ? MODE\_APPEND : MODE\_PRIVATE);

byte[] data = new byte[4096];

int count;

int total = downloadedBytes;

while ((count = input.read(data)) != -1) {

if (isCanceled) {

input.close();

output.close();

deleteFile(fileName);

stopSelf();

return;

}

if (isPaused) {

output.close();

input.close();

return; // thoát vòng lặp để chờ Resume

}

total += count;

output.write(data, 0, count);

downloadedBytes = total;

int progress = (int) ((total \* 100L) / fileLength);

updateNotification(progress);

}

output.flush();

output.close();

input.close();

showCompleteNotification();

} catch (Exception e) {

e.printStackTrace();

showErrorNotification("Lỗi tải: " + e.getMessage());

}

}

// ------------------ TẠO CHANNEL ------------------

private void createNotificationChannel() {

if (Build.VERSION.SDK\_INT >= Build.VERSION\_CODES.O) {

NotificationChannel channel = new NotificationChannel(

"download\_channel",

"Download Notification",

NotificationManager.IMPORTANCE\_LOW

);

notificationManager = getSystemService(NotificationManager.class);

notificationManager.createNotificationChannel(channel);

}

}

// ------------------ TẠO BUILDER ------------------

private NotificationCompat.Builder createNotificationBuilder() {

// Intent Pause

Intent pauseIntent = new Intent(this, DownloadReceiver.class);

pauseIntent.setAction("ACTION\_PAUSE");

PendingIntent pausePending = PendingIntent.getBroadcast(

this, 0, pauseIntent, PendingIntent.FLAG\_UPDATE\_CURRENT | PendingIntent.FLAG\_IMMUTABLE);

// Intent Resume

Intent resumeIntent = new Intent(this, DownloadReceiver.class);

resumeIntent.setAction("ACTION\_RESUME");

PendingIntent resumePending = PendingIntent.getBroadcast(

this, 1, resumeIntent, PendingIntent.FLAG\_UPDATE\_CURRENT | PendingIntent.FLAG\_IMMUTABLE);

// Intent Cancel

Intent cancelIntent = new Intent(this, DownloadReceiver.class);

cancelIntent.setAction("ACTION\_CANCEL");

PendingIntent cancelPending = PendingIntent.getBroadcast(

this, 2, cancelIntent, PendingIntent.FLAG\_UPDATE\_CURRENT | PendingIntent.FLAG\_IMMUTABLE);

builder = new NotificationCompat.Builder(this, "download\_channel")

.setSmallIcon(android.R.drawable.stat\_sys\_download)

.setContentTitle("Đang tải xuống")

.setContentText("Đang tải: 0%")

.setOnlyAlertOnce(true)

.setOngoing(true)

.addAction(android.R.drawable.ic\_media\_pause, "Pause", pausePending)

.addAction(android.R.drawable.ic\_media\_play, "Resume", resumePending)

.addAction(android.R.drawable.ic\_delete, "Cancel", cancelPending)

.setPriority(NotificationCompat.PRIORITY\_LOW);

return builder;

}

// ------------------ CẬP NHẬT TIẾN TRÌNH ------------------

private void updateNotification(int progress) {

builder.setProgress(100, progress, false)

.setContentText("Đang tải: " + progress + "%");

notificationManager.notify(1, builder.build());

}

// ------------------ HOÀN TẤT ------------------

private void showCompleteNotification() {

builder.setContentText("Tải hoàn tất ")

.setProgress(0, 0, false)

.setOngoing(false)

.setSmallIcon(android.R.drawable.stat\_sys\_download\_done);

notificationManager.notify(1, builder.build());

}

// ------------------ LỖI ------------------

private void showErrorNotification(String msg) {

builder.setContentText(msg)

.setProgress(0, 0, false)

.setSmallIcon(android.R.drawable.stat\_notify\_error);

notificationManager.notify(1, builder.build());

}

private void updateNotificationMessage(String msg) {

builder.setContentText(msg);

notificationManager.notify(1, builder.build());

}

@Override

public IBinder onBind(Intent intent) {

return null;

}

}

**Bước 6: Cấu hình trong AndroidManifest.xml**

<?xml version="1.0" encoding="utf-8"?>  
<manifest xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:tools="http://schemas.android.com/tools">  
  
 <!-- Quyền truy cập Internet để tải file -->  
 <uses-permission android:name="android.permission.INTERNET" />  
  
 <!-- Quyền hiển thị Notification (bắt buộc từ Android 13 trở lên) -->  
 <uses-permission android:name="android.permission.POST\_NOTIFICATIONS" />  
  
 <application  
 android:allowBackup="true"  
 android:dataExtractionRules="@xml/data\_extraction\_rules"  
 android:fullBackupContent="@xml/backup\_rules"  
 android:icon="@mipmap/ic\_launcher"  
 android:label="@string/app\_name"  
 android:roundIcon="@mipmap/ic\_launcher\_round"  
 android:supportsRtl="true"  
 android:theme="@style/Theme.DownloadManagerLab7">  
  
 <!-- Activity chính -->  
 <activity  
 android:name=".MainActivity"  
 android:exported="true">  
 <intent-filter>  
 <action android:name="android.intent.action.MAIN" />  
 <category android:name="android.intent.category.LAUNCHER" />  
 </intent-filter>  
 </activity>  
  
 <!-- Service chạy nền tải file -->  
 <service  
 android:name=".DownloadService"  
 android:exported="false"  
 android:foregroundServiceType="downloads" />  
  
 <!-- BroadcastReceiver xử lý Pause/Resume/Cancel -->  
 <receiver android:name=".DownloadReceiver" />  
  
 </application>  
  
</manifest>

**Bước 7: Tích hợp trong MainActivity.java**

package com.example.downloadmanagerlab7;  
  
import android.Manifest;  
import android.content.Intent;  
import android.content.pm.PackageManager;  
import android.os.Build;  
import android.os.Bundle;  
import android.widget.Button;  
import android.widget.EditText;  
import android.widget.Toast;  
  
import androidx.appcompat.app.AppCompatActivity;  
  
public class MainActivity extends AppCompatActivity {  
 EditText edtUrl;  
 Button btnDownload;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
  
 // 👉 Xin quyền thông báo (bắt buộc Android 13+)  
 if (Build.VERSION.*SDK\_INT* >= Build.VERSION\_CODES.*TIRAMISU*) {  
 if (checkSelfPermission(Manifest.permission.*POST\_NOTIFICATIONS*)  
 != PackageManager.*PERMISSION\_GRANTED*) {  
 requestPermissions(new String[]{Manifest.permission.*POST\_NOTIFICATIONS*}, 1);  
 }  
 }  
  
 edtUrl = findViewById(R.id.*edtUrl*);  
 btnDownload = findViewById(R.id.*btnDownload*);  
  
 btnDownload.setOnClickListener(v -> {  
 String url = edtUrl.getText().toString().trim();  
  
 if (url.isEmpty()) {  
 Toast.*makeText*(this, "Vui lòng nhập link tải!", Toast.*LENGTH\_SHORT*).show();  
 return;  
 }  
  
 Intent intent = new Intent(this, DownloadService.class);  
 intent.putExtra("url", url);  
 startService(intent);  
 });  
 }  
}

Giao diệnDownload Manager:

