

CS 475/575

Alarm Manager
Notifications

Alarm Manager

- Fire Intents at predetermined intervals or times
- Do not need app running to work
- Bit more overhead than Timers
- Trigger whatever (broadcast intents, services, notifications, even activities with some work)
- Allow effective resource management

Alarm Manager-Create, Set, Cancel

- Get Reference to AlarmManager service

```
AlarmManager alarmManager = (AlarmManager) getSystemService(Context.ALARM_SERVICE);
```

- Decide type
 - RTC_WAKEUP – wakes and fires pending intent at time specified
 - RTC – same as RTC_WAKEUP **no** wakeup
 - ELAPSED_REALTIME_WAKEUP - wakes and fires pending intent after specific amount of time has elapsed since system boot
 - ELAPSED_REALTIME - same as ELAPSED_REALTIME_WAKEUP **no** wakeup

Alarm Manager-Create, Set, Cancel

- ELAPSED_REALTIME_WAKEUP
- ELAPSED_REALTIME
 - Starts specific time after device boots

```
alarmMgr = (AlarmManager)context.getSystemService(Context.ALARM_SERVICE);  
alarmMgr.set(AlarmManager.ELAPSED_REALTIME_WAKEUP,  
            SystemClock.elapsedRealtime() +  
            60 * 1000, alarmIntent);
```

- RTC_WAKEUP
- RTC
 - Starts specific time from now

```
final int TEN_MINUTES = 600000; //60sec/min*10min*1000msec/sec  
alarmManager.set(AlarmManager.RTC_WAKEUP, TEN_MINUTES, alarmIntent);
```

Alarm Manager-Create, Set, Cancel

Wake up the device to fire a one-time (non-repeating) alarm in one minute

```
private AlarmManager alarmMgr;  
private PendingIntent alarmIntent;  
...  
alarmMgr = (AlarmManager)context.getSystemService(Context.ALARM_SERVICE);  
Intent intent = new Intent(context, AlarmReceiver.class);  
alarmIntent = PendingIntent.getBroadcast(context, 0, intent, 0);  
  
alarmMgr.set(AlarmManager.ELAPSED_REALTIME_WAKEUP,  
            SystemClock.elapsedRealtime() +  
            60 * 1000, alarmIntent);
```

Intents fired for
your app by
another app at a
later time
Execute with same
identity and
permissions as
your app

Cancel alarm

```
// If the alarm has been set, cancel it.  
if (alarmMgr != null) {  
    alarmMgr.cancel(alarmIntent);  
}
```

Alarm Manager-Repeat Alarm

- setRepeating – for precise control over exact alarm interval
- setInExactRepeating – OS schedules multiple inExactRepeating alarms to execute at same time
 - INTERVAL_FIFTEEN_MINUTES, INTERVAL_HALF_HOUR, INTERVAL_HOUR, INTERVAL_HALF_DAY, INTERVAL_DAY
 - If do not require precision, then wake all alarms that are ‘close together’ at same time (verses multiple wakeups around same time)
 - Reduces battery drain

Alarm Manager-Repeat Alarm

- setRepeating

```
final int TEN_MINUTES = 6000000; //60sec/min*10min*1000msec/sec
alarmManager.setRepeating(AlarmManager.RTC_WAKEUP,
    TEN_MINUTES,
    AlarmManager.INTERVAL_DAY,
    alarmIntent);
```

- setInExactRepeating

```
final int TEN_MINUTES = 6000000; //60sec/min*10min*1000msec/sec
alarmManager.setInexactRepeating(AlarmManager.RTC_WAKEUP,
    TEN_MINUTES,
    AlarmManager.INTERVAL_DAY,
    alarmIntent);
```

Pending Intent

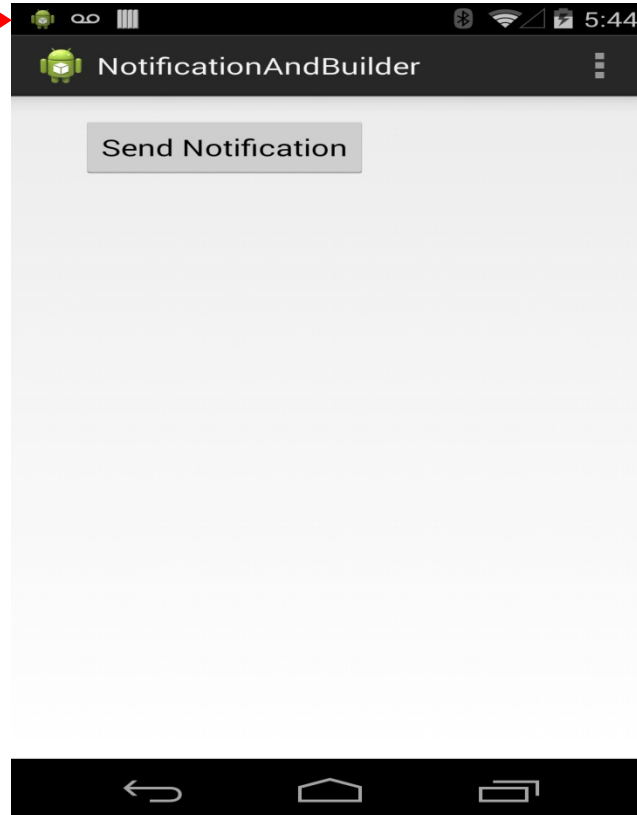
- Intents fired for your app by another app at a later time
- Execute with same identity and permissions as your app

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Notifications

Notifications

Messages and Information
That appear here →



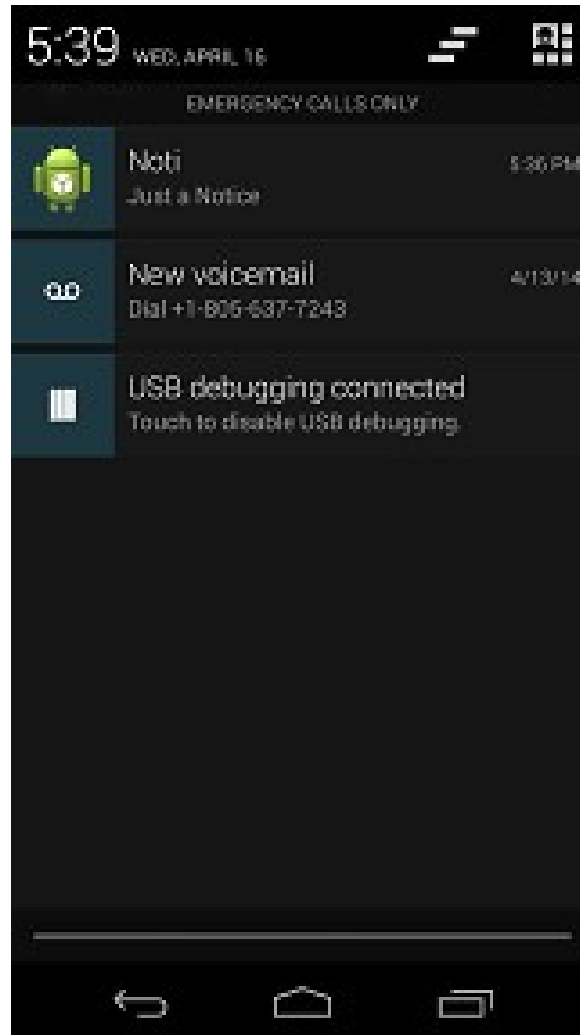
Notifications

Status Bar

Settings, time, date

Notification Tray

Drag down from top



Notifications

- Notices that do not require activity
- Handled by Notification Manager
 - Display a status bar icon
 - Flash Lights/LEDs
 - Vibrate Phone
 - Audible Alerts (Ringtones etc)
 - Display additional info in notification tray
 - Broadcast intents from notification tray

Notifications

- Use Case
 1. Gradle Dependency
 2. Create a channel (if target API ≥ 26)
 3. Build notification
 4. Send notification

Notifications

- Gradle Dependency
- Be sure to include the proper androidx dependency in the build.gradle(app) file

```
dependencies {  
    implementation 'androidx.appcompat:appcompat:1.1.0'
```

Notifications

- Create a channel (if target API ≥ 26)

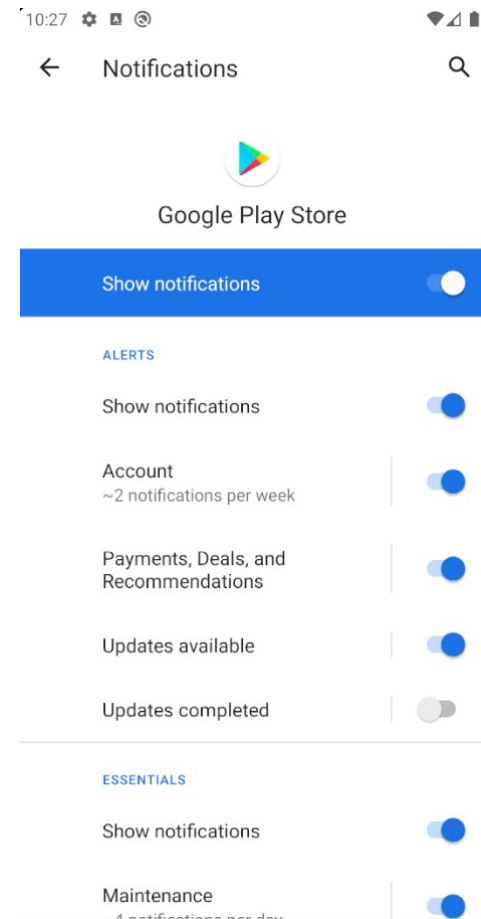
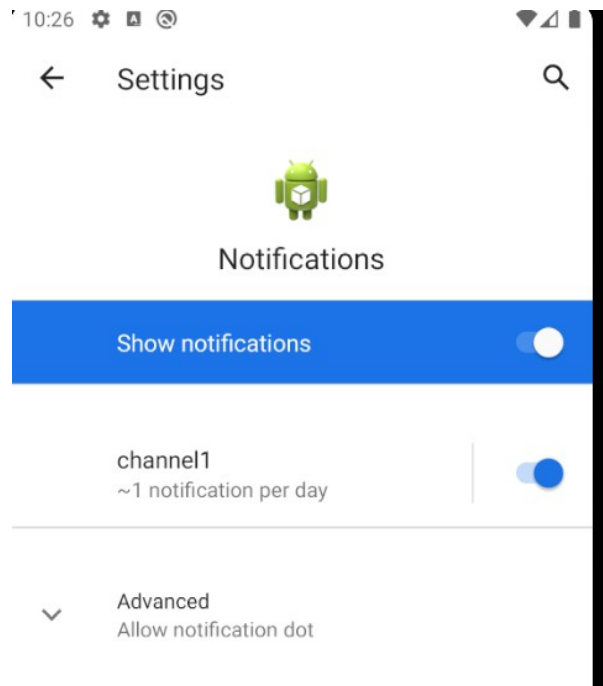
```
private static final String CHANNEL_ID = "KP";
private void createNotificationChannel() {
    // Create the NotificationChannel, but only on API 26+ because
    // the NotificationChannel class is new and not in the support library
    if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
        CharSequence name = "channel1";
        String description = "demo channel";
        int importance = NotificationManager.IMPORTANCE_DEFAULT;
        NotificationChannel channel = new NotificationChannel(CHANNEL_ID, name, importance);
        channel.setDescription(description);
        // Register the channel with the system; you can't change the importance
        // or other notification behaviors after this
        NotificationManager notificationManager = getSystemService(NotificationManager.class);
        notificationManager.createNotificationChannel(channel);
    }
}
```

Notifications- What is a channel?

Allows 'grouping' notifications and selectively enabling/disabling them.

See Settings → Apps & Notifications

Look at the Notifications app, then Google Play Store ('Updates completed' notifications will not be shown)



Notifications

- Build notification
 - CHANNEL_ID comes from channel created last slide

```
NotificationCompat.Builder builder = new NotificationCompat.Builder(context, this, CHANNEL_ID)
    .setSmallIcon(R.drawable.ic_launcher)
    .setContentTitle(getString(R.string.app_name))
    .setContentText("Just a Notice")
    .setPriority(NotificationCompat.PRIORITY_DEFAULT);
```

Notifications

- Send notification

```
NotificationManagerCompat notificationManager = NotificationManagerCompat.from(this);  
notificationManager.notify(MYNOTIFICATION, builder.build());
```

Notifications

- Can show progress
- Retrigger
 - Pass in same ref ID with updated notification fields
- Cancel
 - `notificationManager.cancel(NOTIFICATION_REF);`

Notifications Example

- See 12_Notification project

References

- Create a Notification- Android Developer
- [https://
developer.android.com/training/notify
-user/build-notification.html](https://developer.android.com/training/notify-user/build-notification.html)