2025

Mobile App Development Course

Mobile App Development – week 1

WELCOME



- Welcome and introduction to the course
- Introduction to Android
- 3. Industry practices
- 4. Why learn Android/Mobile development
- 5. Introduction to the workplan for week 1 of the course
- 6. Start working on assignments in workplan for week 1 (file Workplan1.pdf)

The team

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Mobile App Development – week 1

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Why take this course?

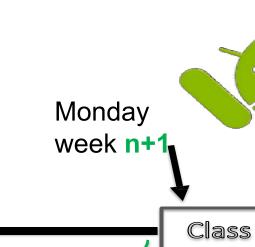
To learn (more) Java and to develop Android apps

- The course is:
 - About programming (Java and introduction to Kotlin)
 - Software development (Git, test, ...)
 - About industry practices
 - Hands-on
 - Android-focused
- The course is NOT
 - An iOS/iPhone course
 - A graphics/UI design course

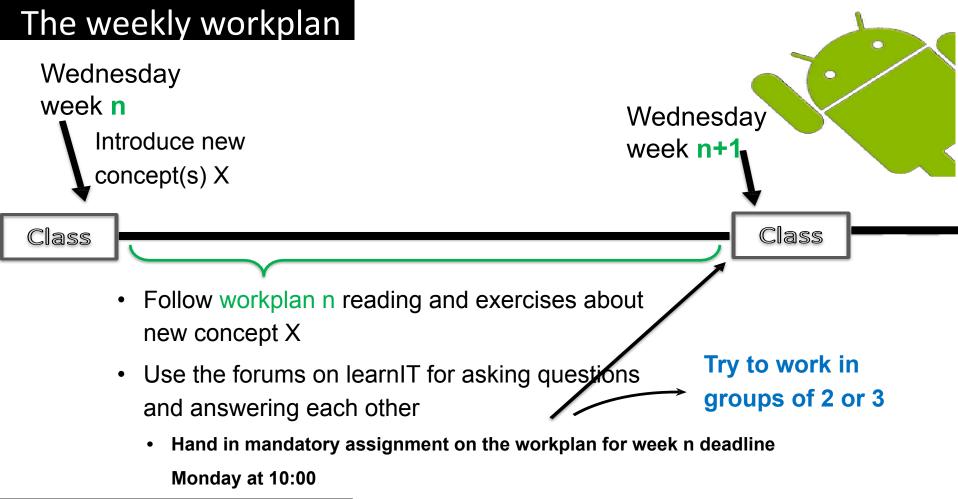


The weekly workplan Monday

Monday
week n
Introduce new
concept(s) X

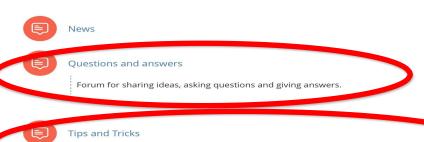


- Follow workplan n reading and exercises about new concept X
- Use the forums on learnIT for asking questions and answering each other



learnIT

Mobile App Development, KSD (Spring 2024)



Please share tips, useful links and any other info that you think could be useful for others





Files for week 1

ShoppingV1

A complete Android Studio project for ShoppingV1

Assignment 1

Examination

10 mandatory assignments to take exam, 8 must be approved



- Oral exam, 30 minutes, standard 7-scale
- Exams are in June

The two apps in this course

Throughout the semester you will gradually develop two Android apps:

- App for making a shopping list You read and modify code we give you
- App to assist you with garbage sorting You create the code (mandatory assignments)



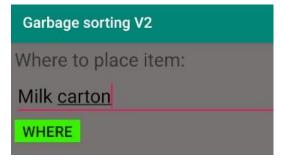
Garbage sorting



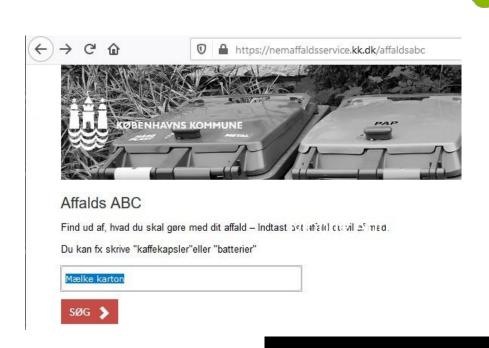


Garbage sorting

Gradually build an app to help you sort your garbage Weekly mandatory assignment



https://nemaffaldsservice.kk.dk/affaldsabc



Developing and testing Android apps





Use version Ladybug Feature Drop

You can download it at the download archive:

https://developer.android.com/studio/archive

Android Studio's emulator of a phone

+ Android phone (may borrow one from ITU)

Remember enabling **developer mode** and enable **USB debugging**.

Mobile App Development: Some history

In 2001 the IT University introduced a course:

Java for Mobile Devices





Mobile App Development: Some history

Before 2007, the market was dominated by Nokia phones.

In 2007 the smart phone race rose to an entirely new level when the first iPhone was released and App Store was introduced, with a huge market as a consequence

The first commercially available Android-based phone (HTC Dream) appeared in October 2008, with Android Market (now Google Play) as an alternative to App Store

In 2010 Windows Phone was announced and marketed, and in 2011 Nokia and Microsoft made an alliance, resulting in Nokia focusing strongly on Windows Phone based smart phones

Despite these efforts, though, iOS and Android effectively control the entire market between the two of them

2024-2025: Android dominant on the world market (>70 % of all smart phones) In Denmark Android and iOS share the market

Source: https://gs.statcounter.com/os-market-share/mobile/worldwide

Discussion

Do you have an Android or iOS device? Did you try both?

Why did you choose that?

What do you think advantages / disadvantages?

What is your favorite app?



Discussion





www.drawninyawn.blogSpot.com

Android

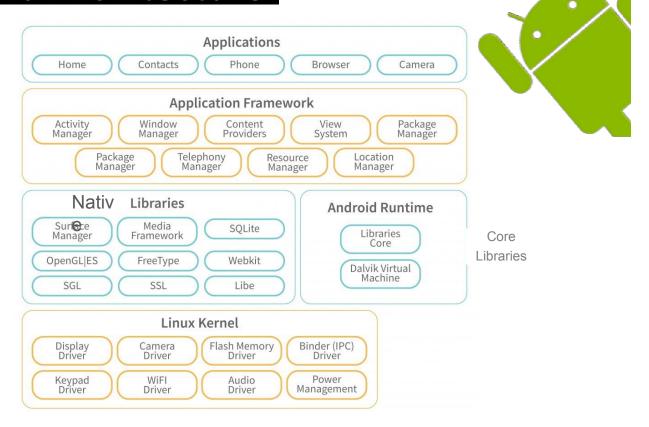
Java programs

- -classes/objects (interfaces, inheritance, patterns, ...)
- Common libraries (classes) for handling
- user interface
- databases
- networking
- location (GPS)
- sensors (camera, ...)

Kotlin

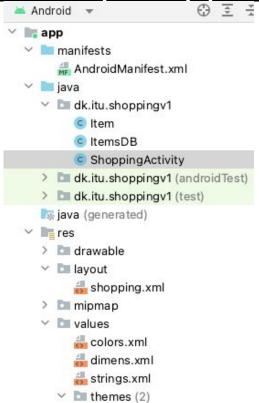


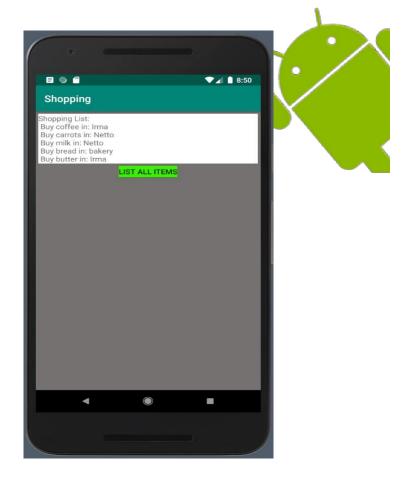
Android Architecture



Taken and adapted from https://www.interviewbit.com/blog/android-architecture/

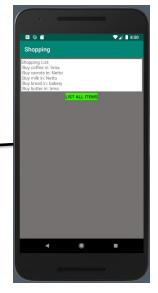
Example app: ShoppingV1

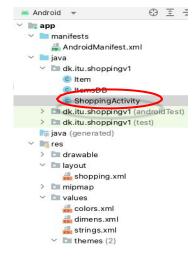




Android development

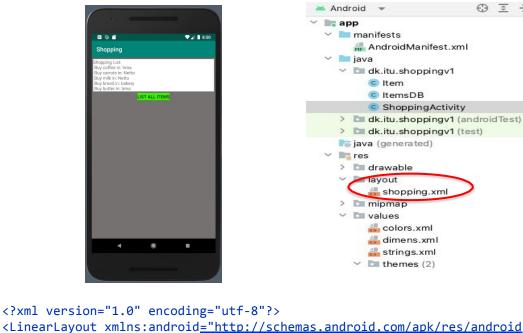
```
public class ShoppingActivity extends AppCompatActivity {
 //Shopping V1
 // Model: Database of items
 private ItemsDB itemsDB;
 @Override
 protected void onCreate(Bundle savedInstanceState) {
   super.onCreate(savedInstanceState);
    setContentView(R.layout.shopping);
    . . .
   TextView items= findViewById(R.id.items);
    Button listItems= findViewById(R.id.list button);
```

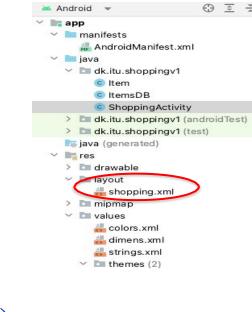




Android development

```
public class ShoppingActivity extends AppCompatActivity {
 //Shopping V1
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 private ItemsDB itemsDB;
 @Override
 protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.shopping);
    TextView items= findViewById(R.id.items);
    Button listItems= findViewById(R.id.list button);
```





</LinearLayout>

<!-- TextView to show all items --> <TextView android:id="@+id/items" android:layout width="match parent" android:layout height="wrap content" android:textSize="@dimen/text size" android:layout marginBottom="5dp"/>

android:layout width="match parent"

android:layout height="match parent" android:orientation="vertical">

Activities

A Java program

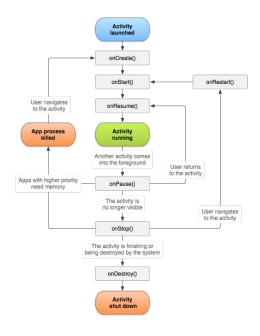
```
public class ShoppingActivity extends AppCompatActivity {
  //Shopping V1
  // Model: Database of items
  private ItemsDB itemsDB:
  @Override
  protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.shopping);
    itemsDB= new ItemsDB();
    itemsDB.fillItemsDB();
     TextView items= findViewById(R.id.items);
    items.setText("Shopping List:"+itemsDB.listItems());
```



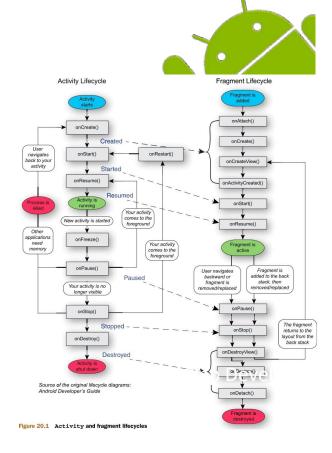
executed
every time
an app is
(re) started



The Activity lifecycle



Activities have a complex lifecycle...

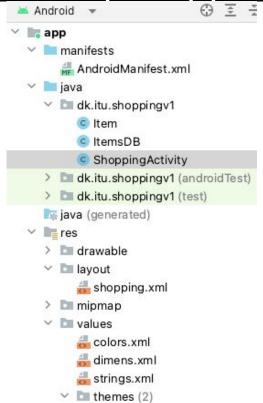


```
<LinearLayout
   xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout width="match parent"
   android:layout height="match parent"
   android:orientation="vertical">
   <!-- TextView to show all items -->
   <TextView
    android:id="@+id/items"
    android:layout width="match parent"
    android:layout height="wrap content"
     . . . " />
   <!-- Button to list all items-->
   <Button
    android:id="@+id/list button"
    android:layout width="wrap content"
    android:layout height="@dimen/button size"
    android: text="@string/list"/>
```



Shopping List: Buy coffee in: Irma Buy carrots in: Netto Buy milk in: Netto Buy bread in: bakery Buy butter in: Irma LIST ALL ITEMS

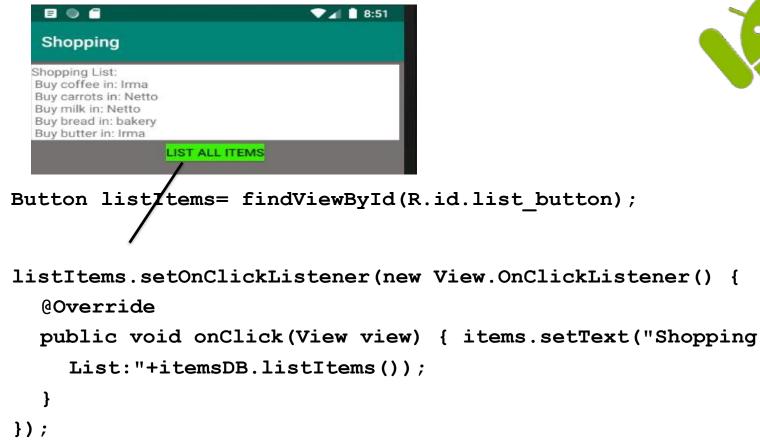
Example app: ShoppingV1



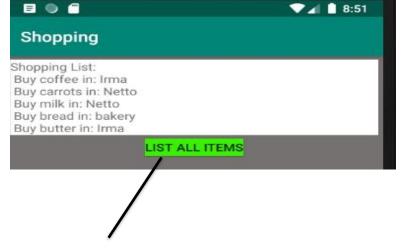




Handling a button in Android



Handling a button in Android





Register a callback method to be invoked when the button is clicked

```
listItems.setOnClickListener(new View.OnClickListener() { @Override
   public void onClick(View view) { items.setText("Shopping
        List:"+itemsDB.listItems());
}
);
```

EditText

In the first version of the Garbage app you are asked to add an EditText to the layout



```
<!-- Text field to enter item -->
<EditText
    android:id="@+id/items"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:textSize="@dimen/text_size"
    android:inputType="text"/>
```

https://developer.android.com/reference/android/widget/EditText and https://developer.android.com/training/keyboard-input/style

Get shopping app

The complete code for Shopping V1 is on learnIT in the Week 1 section.



Android vs. Mobile development

 You will learn the foundation of Mobile App Development with Android as an example.



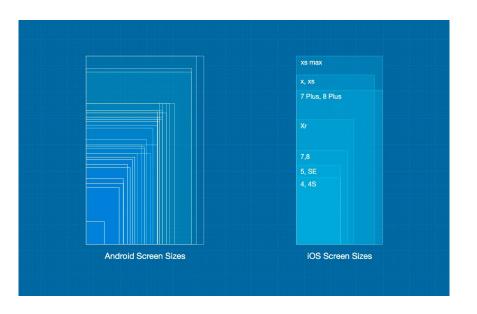
Kotlin & Swift are very close.

 There are four great challenges in Android/Mobile development that other app developers couldn't grasp without learning about them.

The four challenges of Android/Mobile development

- Variable screen sizes
- Device fragmentation
- The Activity lifecycle
- Background work

Variable screen sizes



Android phones come in all sizes and resolutions!

Luckily, Android has always had excellent support for this.

Most layout and drawing is done in "density independent pixels" (dp)

Android defines pixel density buckets:

mdpi, hdpi, xhdpi, xxhdpi, xxxhdpi

Android has an advanced resource lookup system.
Learn it! Use it!

. Why do Android developers never date iOS developers?

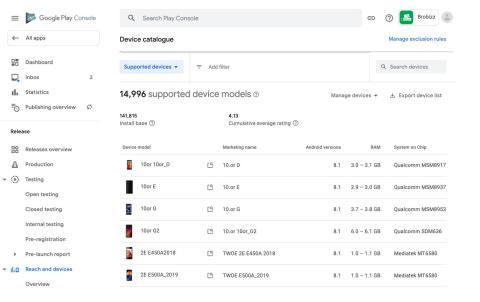
Too many compatibility issues.







Device fragmentation





Test on as many hardware devices as you can!

Be especially careful with hardware interactions

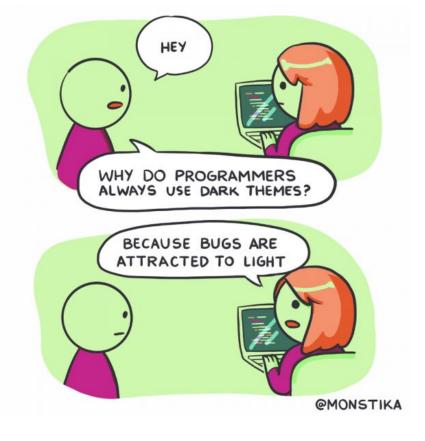
Google Play Developer console gives good stats

Discussion

Which apps do you think use the most battery of your phone, even when it is in the background?

Do you use dark mode or light mode on your phone & on your IDE?







Workplan 1

Redo ShoppingV1 (Read and modify):

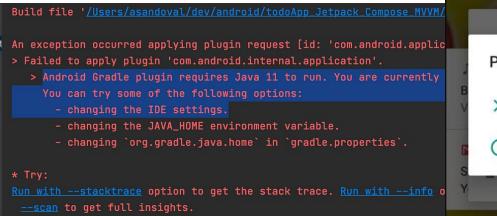
Download, the directory Shopping.zip (from learnIT)

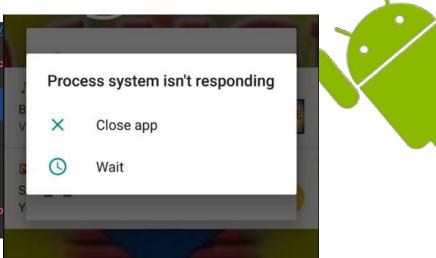
Mandatory assignment (Create):

Set up a basic user interface for the Garbage app. See further instructions in the document "GarbageV1.pdf" You must turn in your solution for GarbageV1 in learnIT before next Monday, 10:00.

You submit by zipping the entire directory (Android project) and hand in (upload) the zip file in learnIT.

Possible Errors









. Why did the Android developer break up with their phone? It just wasn't responding.

Use of Al





