# Agile Development Processes (DIT191 / EDA397)

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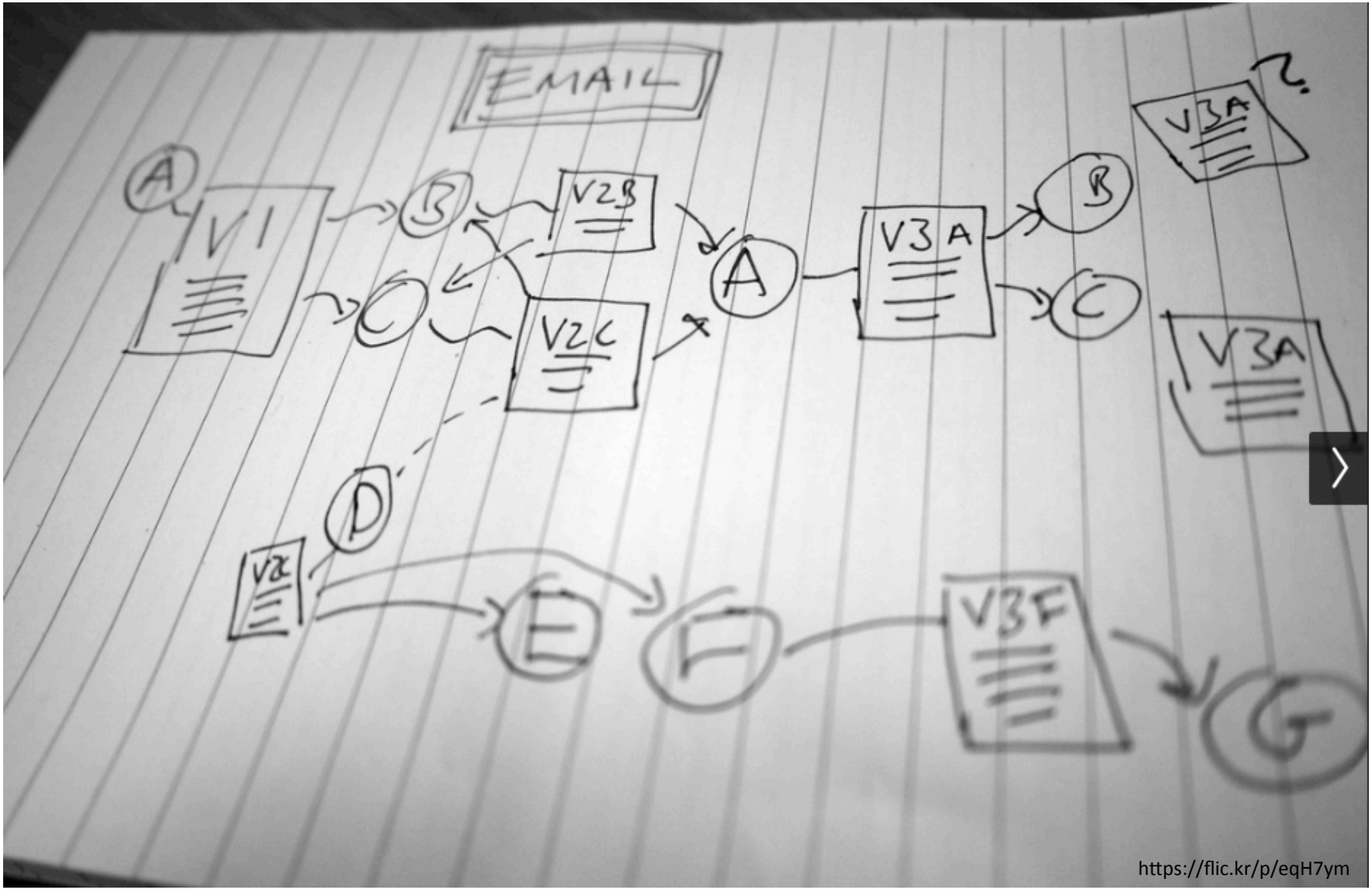
# Agenda today

- Version control systems
- Android

# Version Control

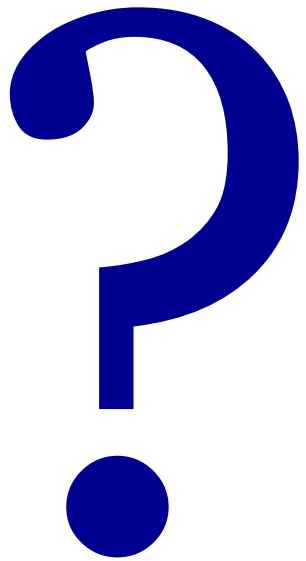


# Version Control

- Part of Software Configuration Management
  - Used to manage changes to the source code
  - tracks revisions, with timestamps and users
  - allows control (rollback, branching, etc)
  - many allow concurrent work (sane)
  - “Essential” for multi-developer projects

# Important Concepts

- Repository / Working Copy
- Change (List)
- Commit
- Trunk / HEAD
- Conflict / Merge
- History

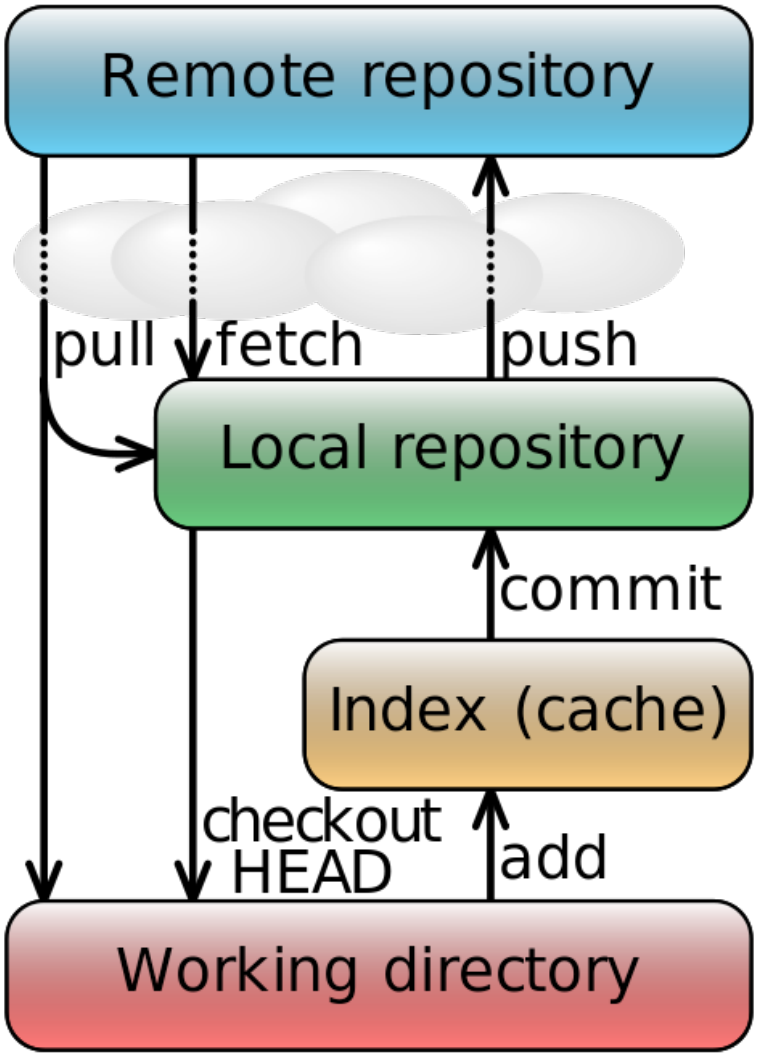


- Why is version control so important?
- Why is configuration management so important?
- What is the difference between the two?

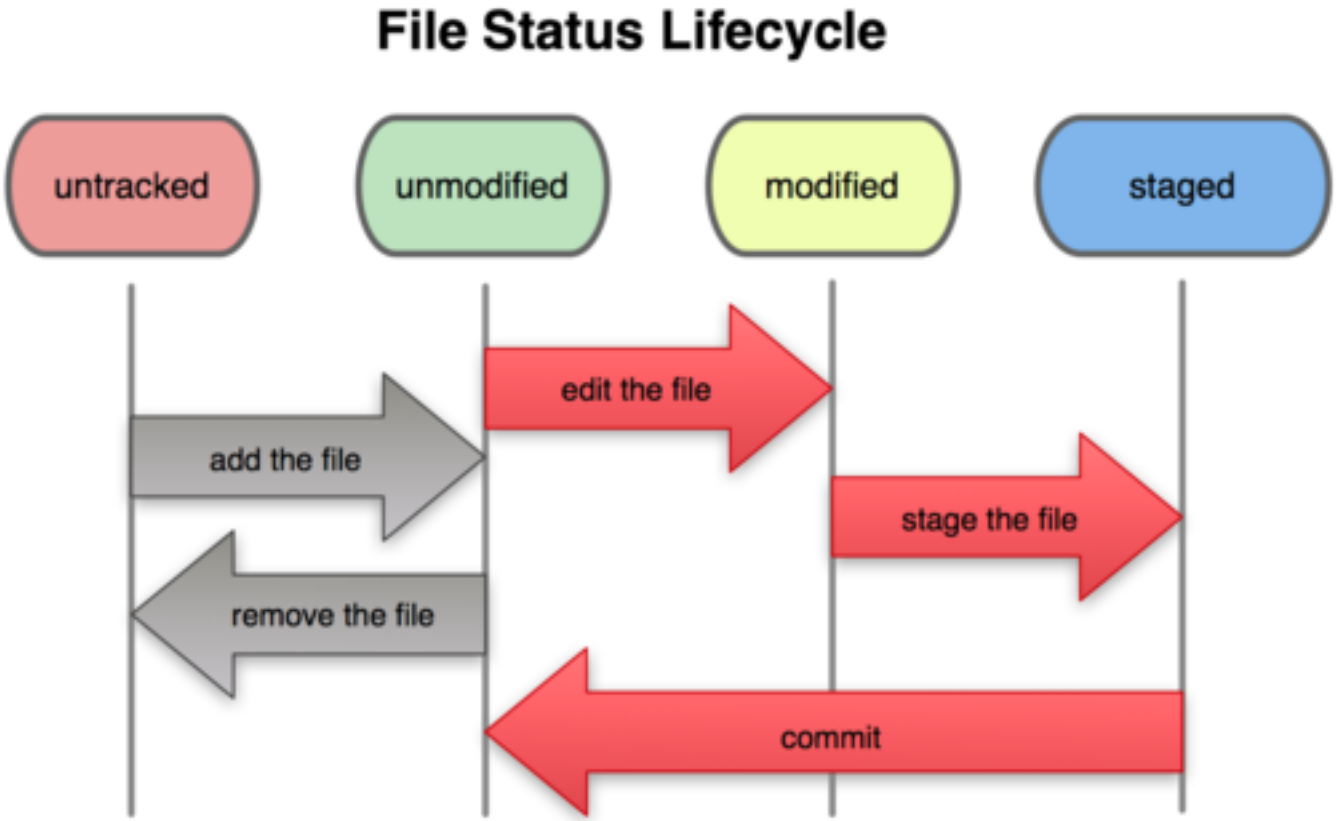
# Git

- Distributed version control
- Developed by Linus for Linux Development
- Distributed
- Strong support for non-linear development
- Efficient for large projects

# Workflow / Concepts



# Workflow / Concepts



# Further reading

- http://readwrite.com/2013/09/30/understanding-github-a-journey-for-beginners-part-1
- https://www.atlassian.com/git/tutorials/comparing-workflows/gitflow-workflow

- https://oerich.wordpress.com/2012/09/12/learning-my-ways-with-git/

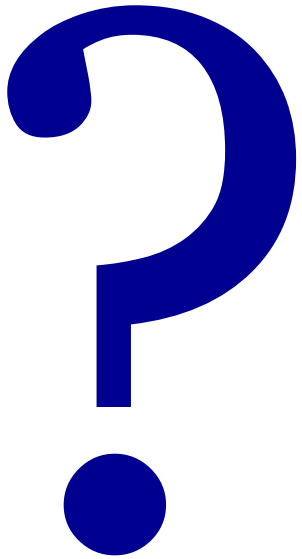
# Android

https://flic.kr/p/jPnPwv

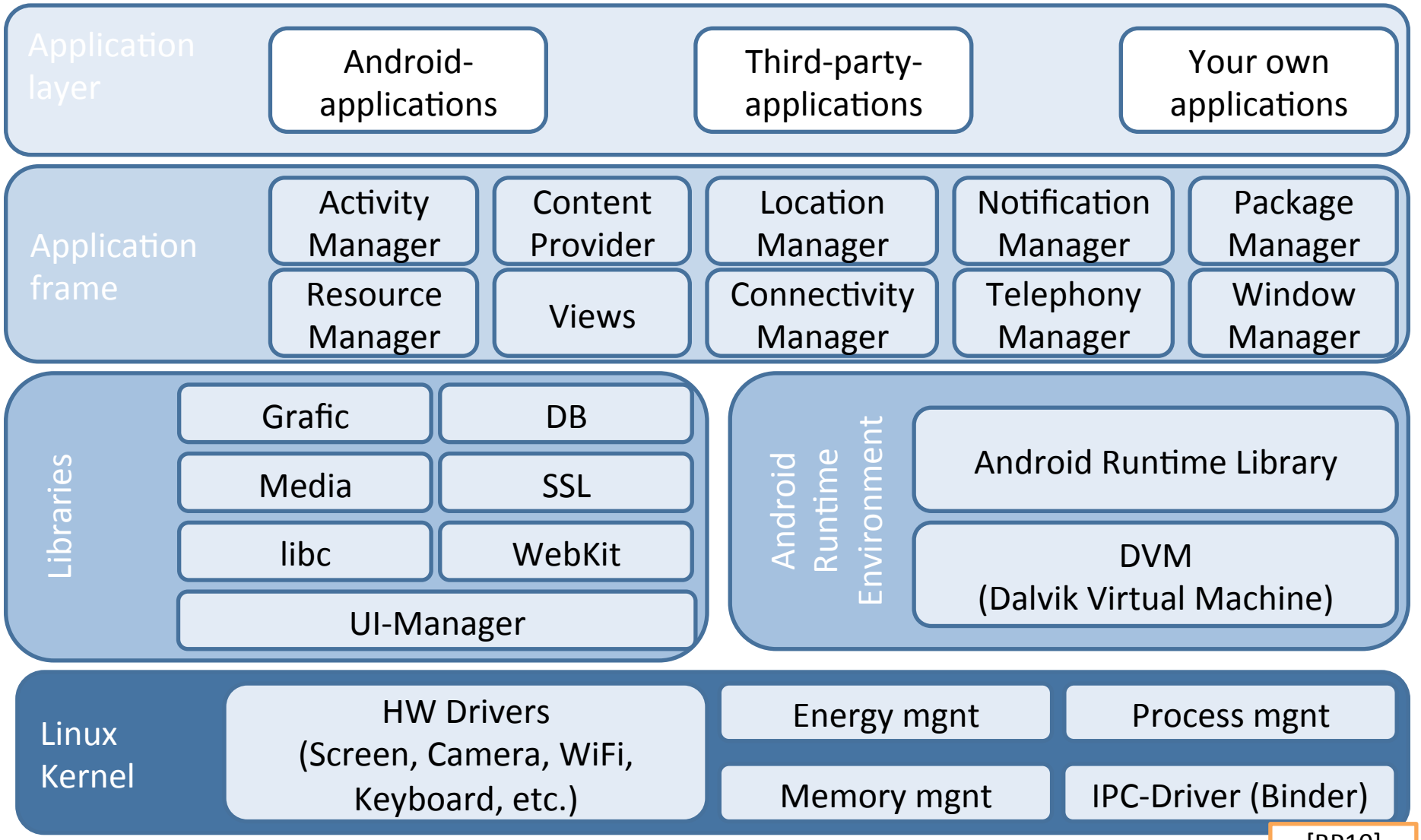
# Android SDK

- From our perspective
  - Java-based API
  - XML-based layout
  - Tools to build/install/simulate

- Two options for today:
  - Let's get started!!!
  - Get some overview first



# Android-Architecture

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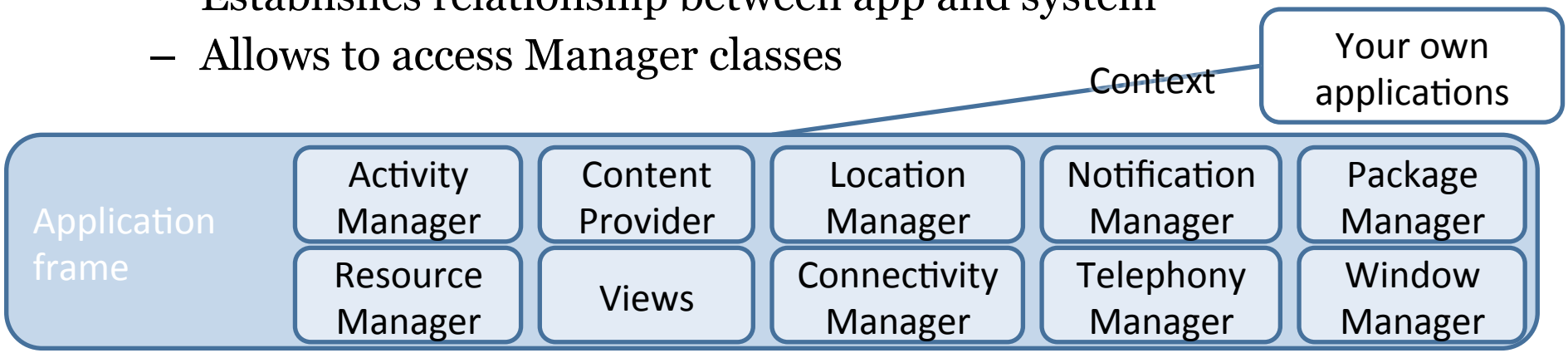
# Architecture of Android App

## Distinguish 4 Types of components

- Activity
  - View / Presentation layer
  - Show and manage UI
- Service
  - Controller / Application layer
  - Allows operations to run in background
  - *Example:*
    - *Musicplayer is controlled through Activities*
    - *Music is played as Service in background*
    - *Even after the UI is closed*
- Content Provider
  - Model / Persistence layer
  - Manage data and persistence layer
  - Can provide data to a specific app or even to many apps
- Broadcast Receiver
  - Receives system messages
  - Allows App to react on changes in state of system
  - Example
    - *Problems with network connection*
    - *Empty battery*

# The **Context** Class

- The class Context represents the application context
  - Establishes relationship between app and system
  - Allows to access Manager classes




- How to use this:
  - Activity and Service classes are derived from abstract class Context
    → access via this.*
  - Broadcast Receiver get Context during initialisation as a parameter
  - Content Provider can access the Context via getContext method

# Connect Components: Intents

- Goal: Connect components of different apps
  - With a standardized mechanism
  - …that does not require changes of source code
  - …that is easy to document

- A component can use another component or replace it

- By using Intents
  - Explicit Intent: Receiving component is known at design time
    1. Intent i = new Intent(this, PositionSender.class);
    2. startActivity(i);
  - Implicit Intent: No receiver specified, components of installed apps are responsible to react
    1. Intent i = new Intent(Intent.ACTION_DIAL, Uri.parse(„tel:(031)772 10 80“);
    2. startActivity(i);
  - For your components you can define Intent-Filter in central configuration file

# Examples for implicit Intents

- Call a number
  - Intent i = new Intent(Intent.ACTION_CALL, Uri.parse(„tel: (031)772 10 80“);
  - startActivity(i);
- Show position on map
  - Uri uri = Uri.parse(„geo:52.382201,9.717450?z=19“);
  - // uri = Uri.parse(„geo:0.0?q=Welfengarten%201,%20Hannover“);
  - Intent i = new Intent(Intent.ACTION_VIEW);
  - i.setData(uri);
  - startActivity(i);
- Google Street View
  - Intent i = new Intent(Intent.ACTION_VIEW, Uri.parse(„google.streetview:cbll:0.0?52.382201,9.717450“);
  - startActivity(i);
- Show webpage
  - Intent i = new Intent(Intent.ACTION_VIEW, Uri.parse(„http://oerich.github.io/EDA397/“);
  - startActivity(i);

DIAL requires user to confirm

# Processes, Threads, Services

- App starts in UI-Thread
  - Various code is executed in UI-Thread
    Example: Hook method onClick()
  - Not suitable for long running tasks
    → Android stopsApps that do not react

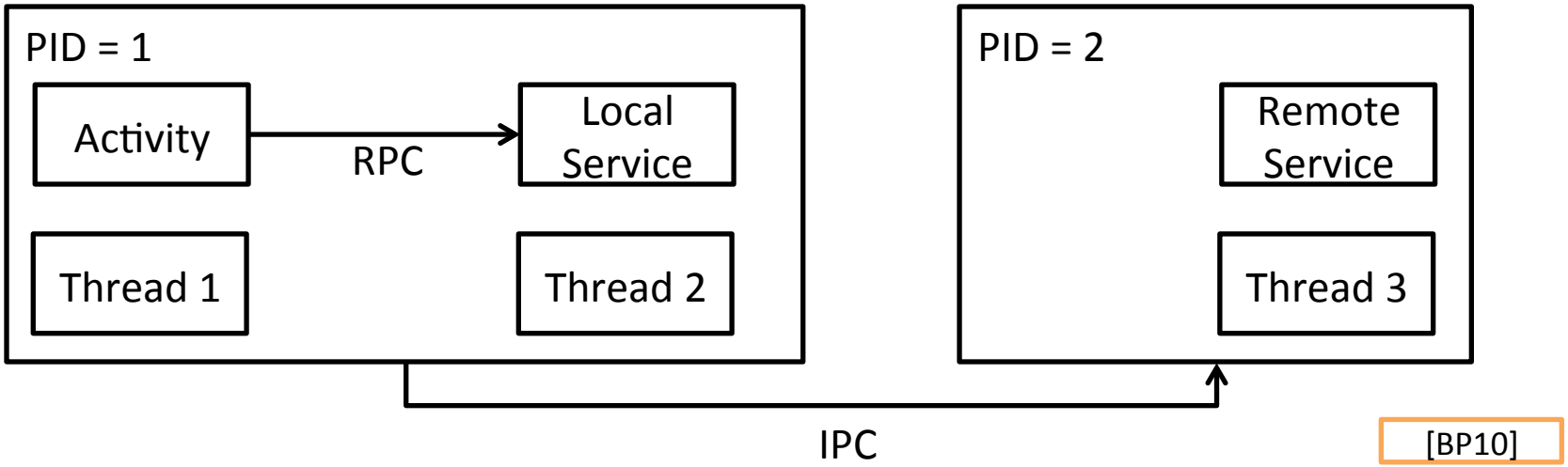
- Process vs. Thread
  - In one Process you can start several Threads
  - When the process terminates, all its Threads end as well
  - Processes are expensive (especially starting them)
  - Consequence 1: First start of app takes long time
  - Consequence 2: Android does not stop process when user quits the App → only when resources run out

- Service
  - Can be run in its own process (Remote Service)
  - Can run in same process as component (Local Service)

# Services

- Do not replace Threads
  - Start a new Thread for long-running tasks!

- Communicate with Services
  - Local: Remote Procedure Calls (RPC) → simple
  - Remote: Inter Process Communication (IPC) → a bit more complex

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# Services: Binder and Handler

- Each Android Service has a Binder
  - Provides the Interface of the Service
- A Service needs a Callback function to return data
  - Android provides a Message-Queue
  - You can insert Messages (Data container) or Runnables via a *Handler*
- Inter Process Communication
  - Messages are formulated in Android Interface Definition Language (AIDL)
  - Operating system needs to interprete messages
  - This allows to call C-libraries

# Further Reading

- https://developer.android.com/training/index.html

Really, you don’t need anything else.