SCIENCES
SORBONNE
UNIVERSITÉ

How to build a dynamic application?

Renault@lrde.epita.fr

LRDE

Switching between Activities

An application is composed of many activities

- One activity is a user screen

An activity can launch another activity

- ... that has been written by the developper himself/herself
- ... or that is already available on the device
  - one can decide to launch the camera from its own application

Only one activity is visible at time t

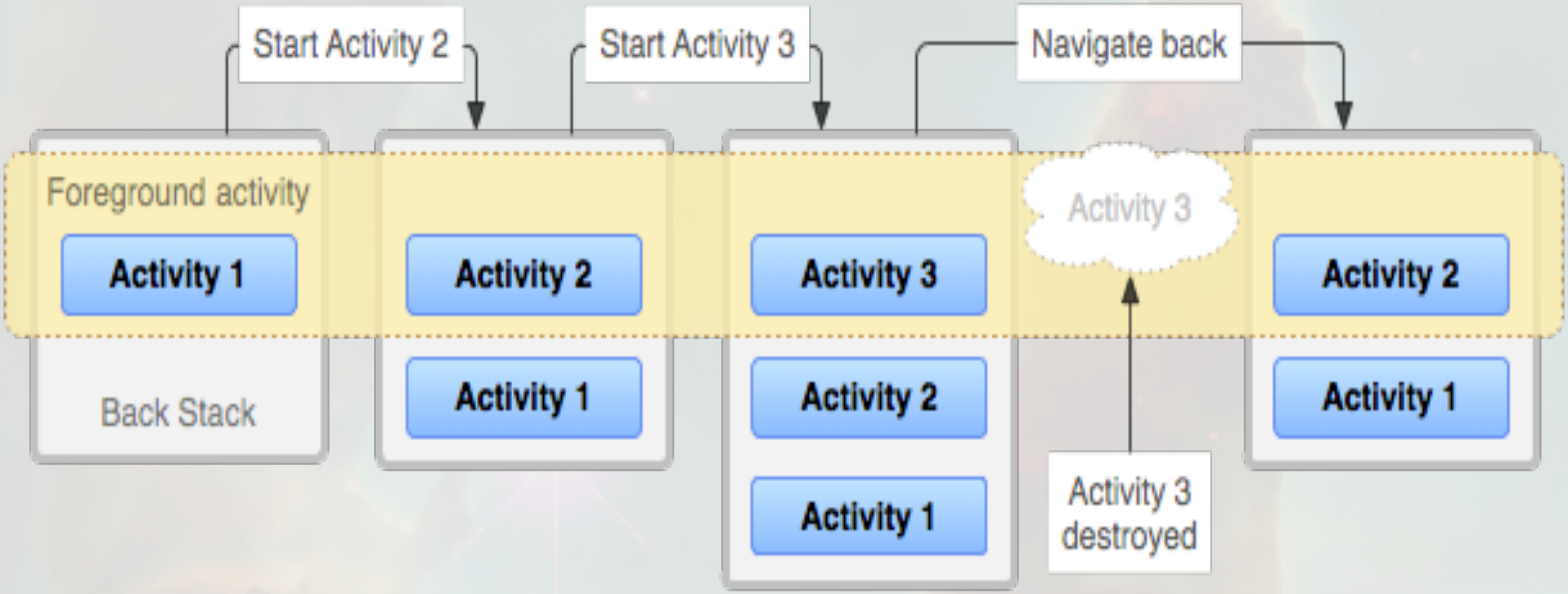
How to switch between activities?

- Intents: an explicit way to communicate
- Backstack: the navigation between activities

The Backstack

The home screen is the main entry point

- it corresponds to an empty backstack
  - **not exactly true, more information later in this lecture**
- A new activity is pushed on the backstack an become visible
- Press the back button to remove the pushed activity

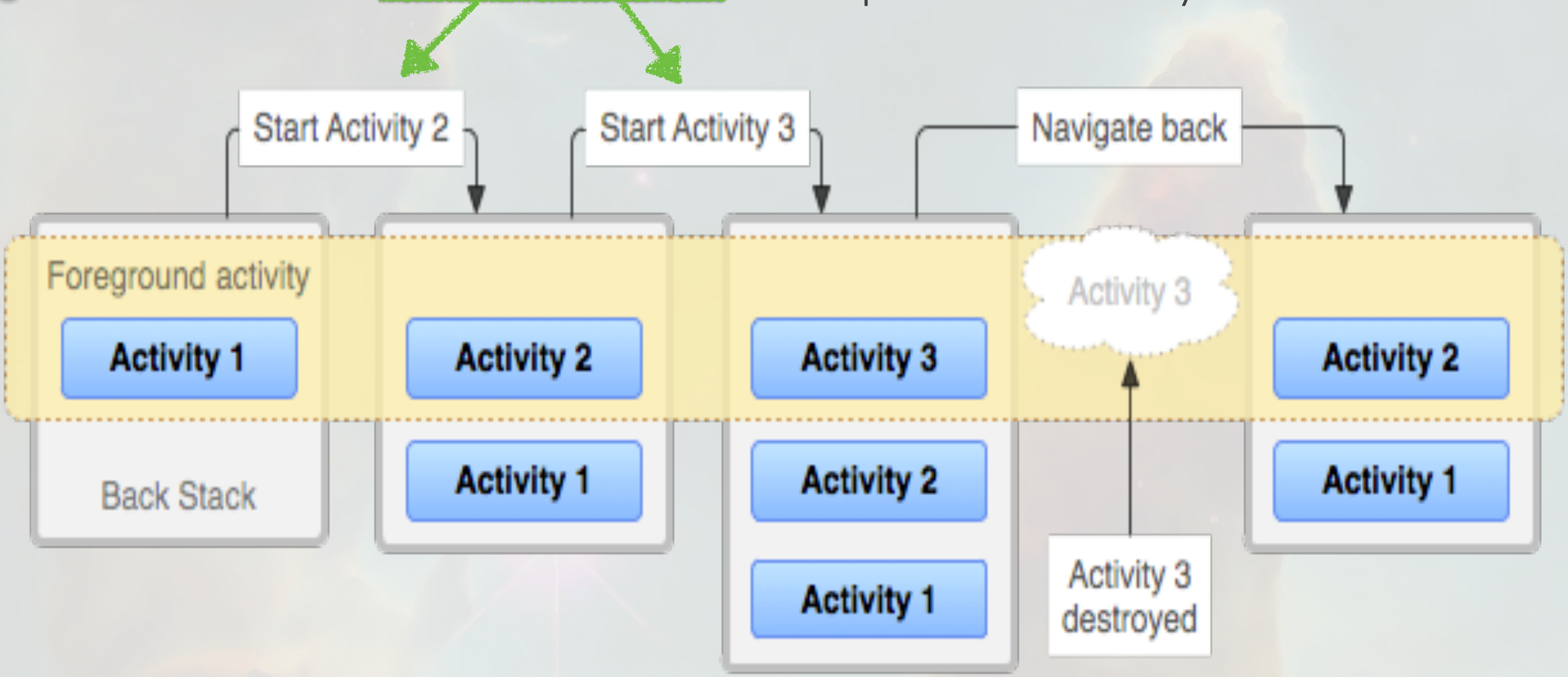


The Backstack

The home screen is the main entry point

- it corresponds to an empty backstack
  - **not exactly true, more information later in this lecture**
- A new activity i backstack an become visible
- Press the back ve the pushed activity

Intents

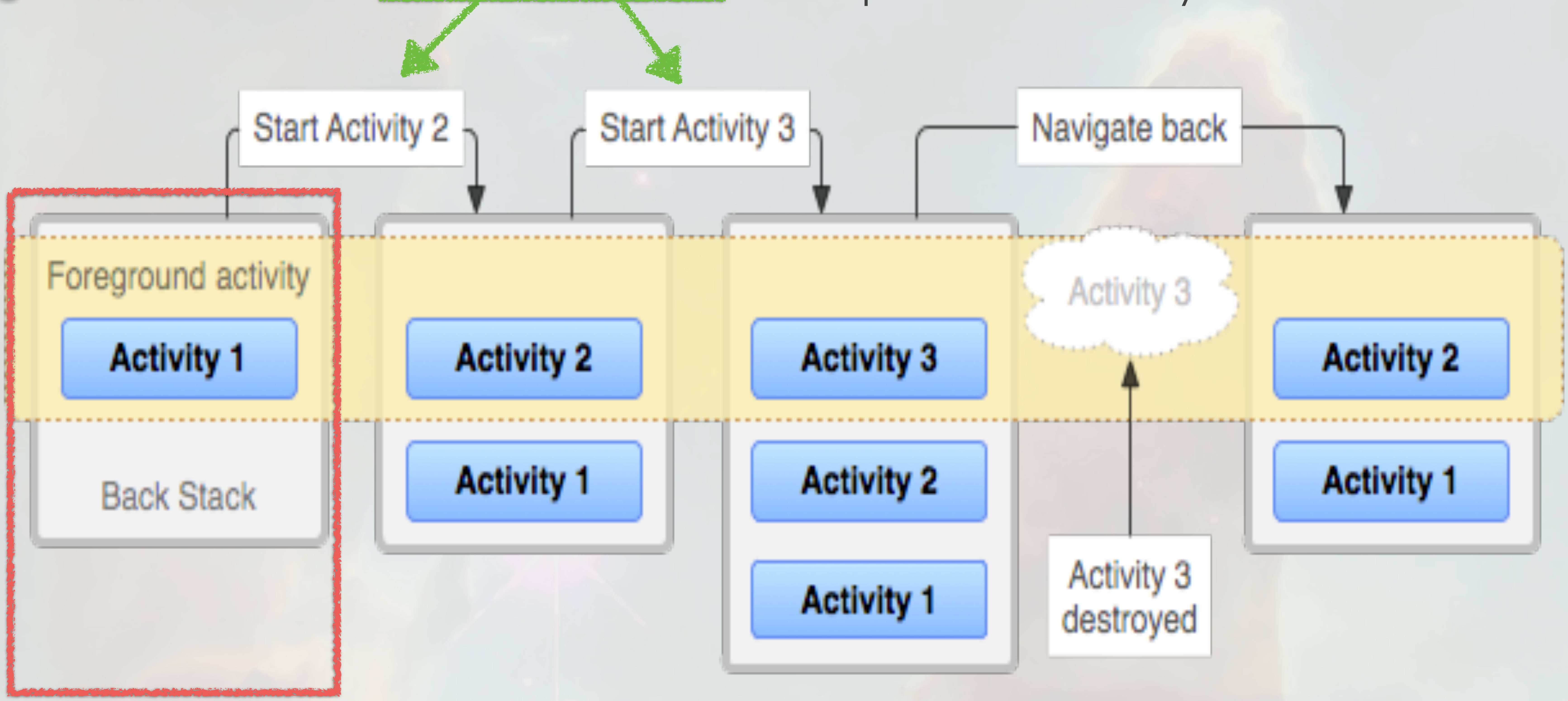


The Backstack

The home screen is the main entry point

- it corresponds to an empty backstack
  - not exactly true, more information later in this lecture
- A new activity i backstack an become visible
- Press the back b e the pushed activity

Intents

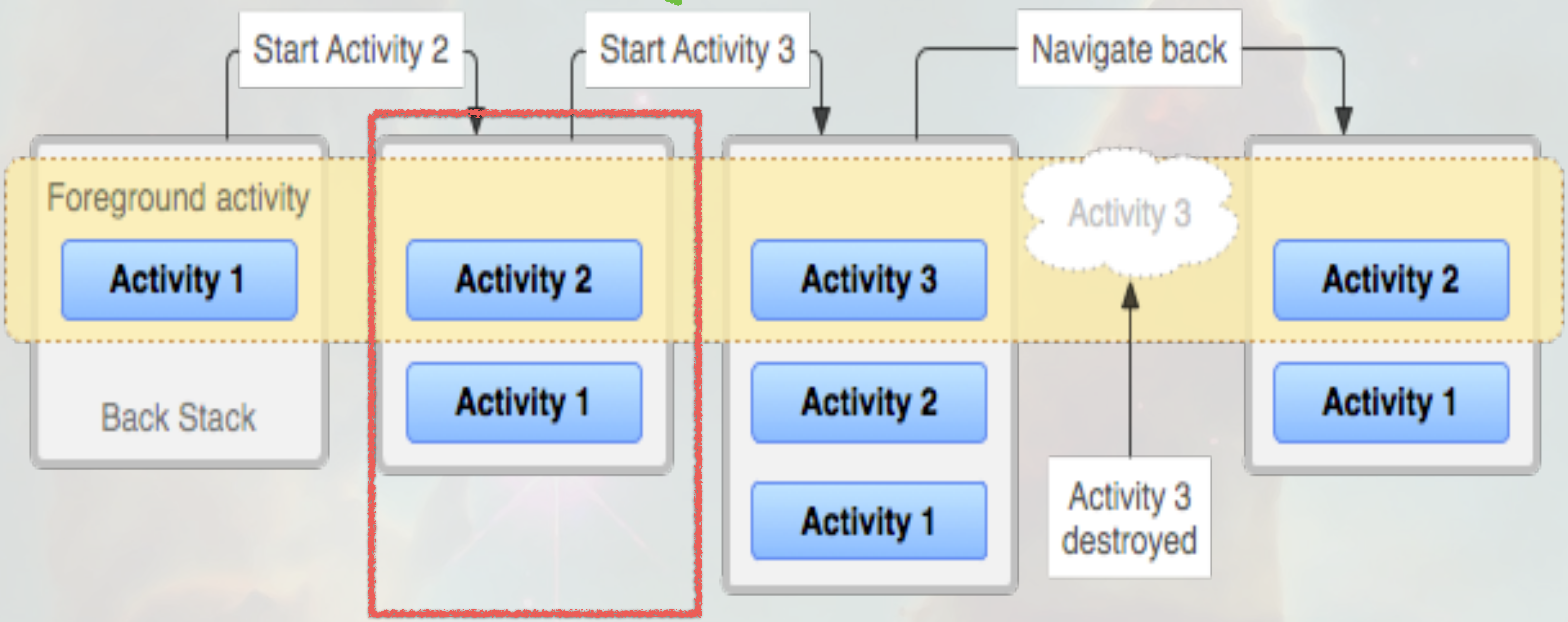


The Backstack

The home screen is the main entry point

- it corresponds to an empty backstack
  - **not exactly true, more information later in this lecture**
- A new activity i backstack an become visible
- Press the back ve the pushed activity

Intents

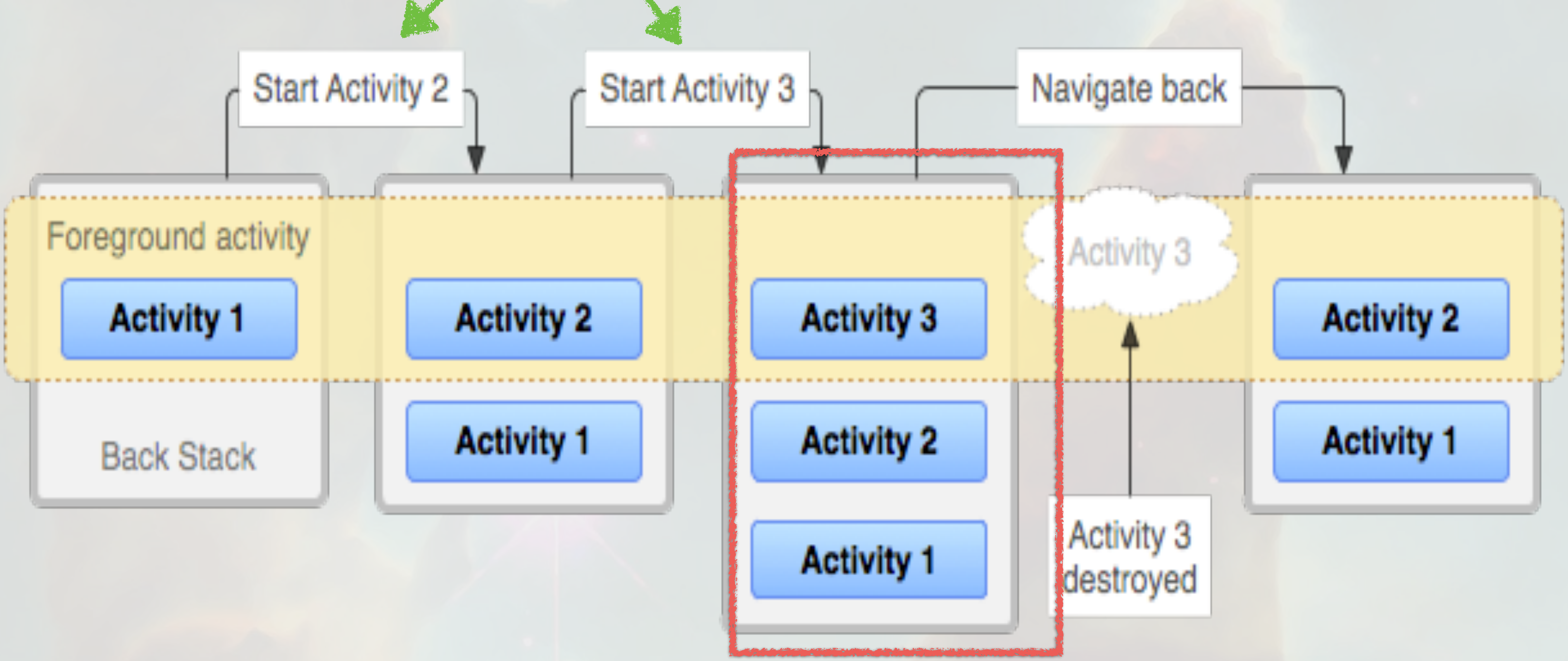


The Backstack

The home screen is the main entry point

- it corresponds to an empty backstack
  - **not exactly true, more information later in this lecture**
- A new activity i backstack an become visible
- Press the back b ve the pushed activity

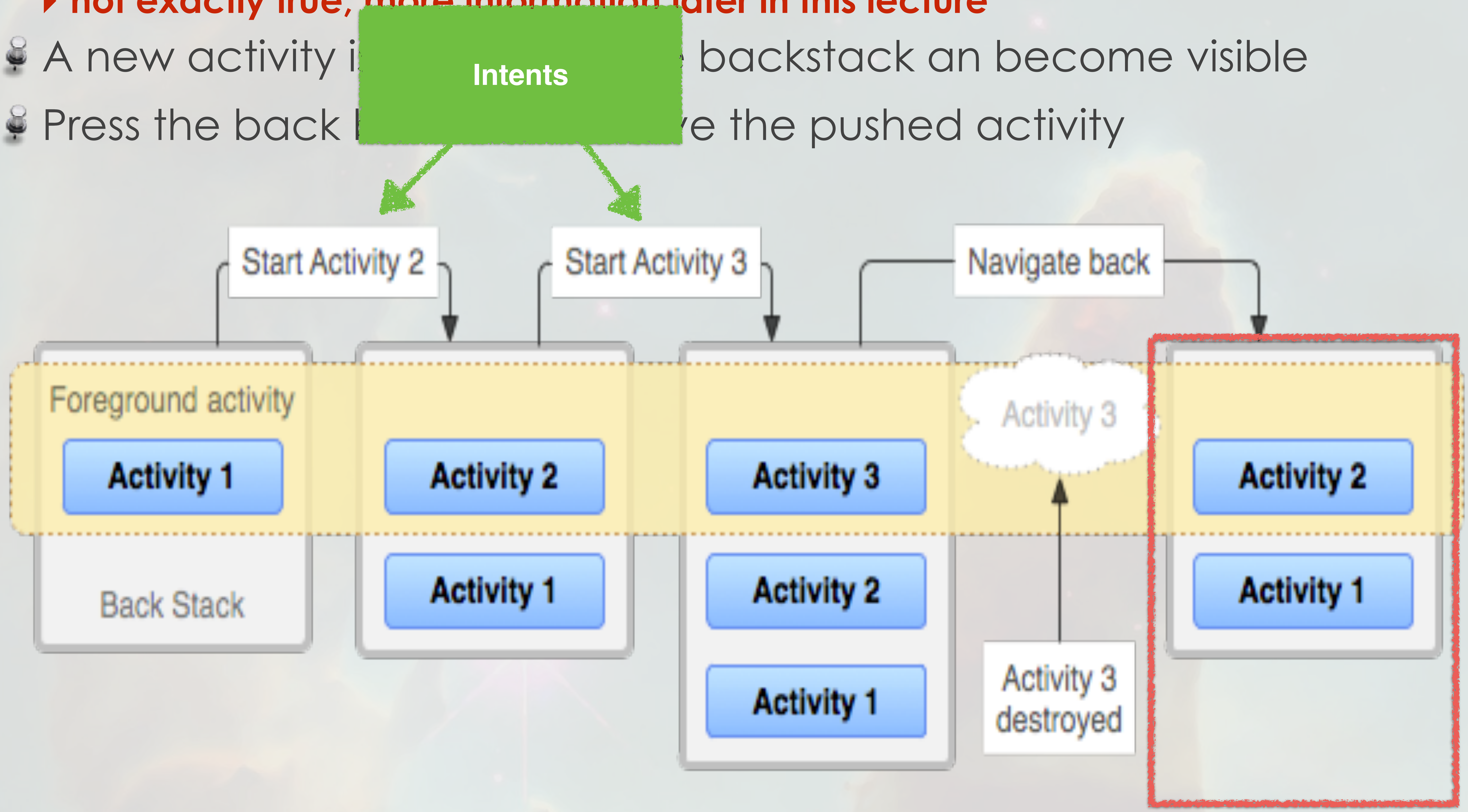
Intents



The Backstack

The home screen is the main entry point

- it corresponds to an empty backstack
  - not exactly true, more information later in this lecture
- A new activity i backstack an become visible
- Press the back ve the pushed activity



E. Renault - Sorbonne Université - CC2018

Intents & Intents Bus

An Intent:

- is an asynchronous message asking for launching another component
- is launched from the activity at the top of the back stack (let's ignore services for now)
- can launch an activity that is not a part of the current activity

The Intent Bus:

- dedicated to the circulation of Intents
- communication with other activities (inner to the application or outer to the application)
- All activities listen this bus
  - **we can restrict this listening only to "interesting" messages**

How to work with Intents?

Start an Activity with arguments

```
Intent intent = new Intent(this, SecondActivity.class);
intent.putExtra("My_Additional_data", 42);
startActivity(intent);
```

Get the value associated to an Intent

```
@Override
protected void onCreate(Bundle savedInstanceState) {
   super.onCreate(savedInstanceState);
   setContentView(R.layout.activity_second);
   Intent intent = getIntent();
   int value = intent.getIntExtra("My_Additional_data", 0);
   // Some stuff with value…
}
```

AndroidManifest.xml & Intents

- An activity can be started by another only if it has been declared in AndroidManifest.xml

```
<activity android:name=".MainActivity"/>
<activity android:name=".SecondActivity"/>
```

Otherwise your program will silently fails

Activities and Intents

- **When an Activity receive an activation intent**
  - it becomes active (visible)
  - it has been pushed on the top of the backstack
  - it can get the arguments for the activity in the onCreate method

- **As soon as the activation intent has been receive, the sender Activity becomes inactive (invisible)**

Activities and Intents

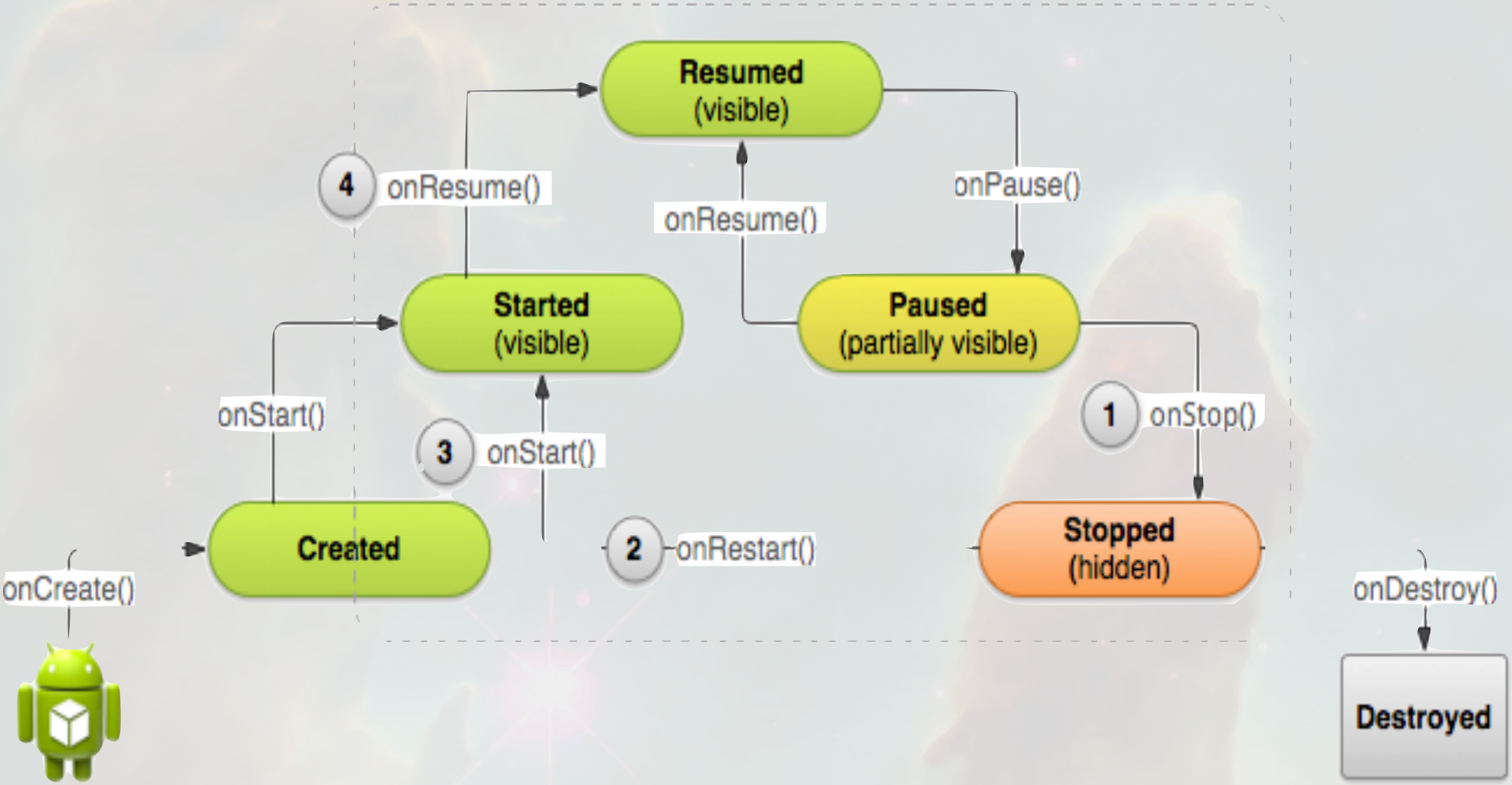
- **When an Activity receive an activation intent**
  - it becomes active (visible)
  - it has been pushed on the top of the backstack
  - it can get the arguments for the activity in the onCreate method

- **As soon as the activation intent has been receive, the sender Activity becomes inactive (invisible)**

Understanding lifecycles in Android is important to understand visibility and backstack management

Activity Lifecycle

6 states , 9 methods



Details of the methods

Methods	Description	Visible	Killable
onCreate	Instanciation + binding evt	no	no
onStart **onRestart**	Initialization Load persistent data Restart Sensors	no	no
onResume	Display UI	yes	no
onPause	Save / Persistence Stop animations ... Stop service (GPS , ...)	no	yes
onStop	Free RAM	no	yes
onDestroy	Delete UI Free Ressources	no	yes

Logs

Dalvik Debug Monitor System (ddms)

- Console in AndroidStudio
- Logs/Displays event according to a specific level
  - log.d: Debug
  - log.v: Verbose
  - log.i: Info
  - log.w: Warning
  - log.e: Errors

Best practice: define a TAG in your activities:

```
private final String TAG = "SecondActivity"
```

And use it for the logger:

```
Log.v(TAG, "Intent contains value:" + value);
```

E. Renault - Sorbonne Université - CC2018

Summary

The role of the backstack

- the activity on the top is the visible (active) one
- press the return button pop the head of the backstack
- the home screen represents an empty (kind of) backstack

Quick overview of Intents

- They can do a lot more than just launching activities (later in this lecture)

Lifecycle of an Activity

- Numerous states with restricted permissions

DDMS: logger for debuging and tracing applications