

Chapter 6 – Background Tasks and Services

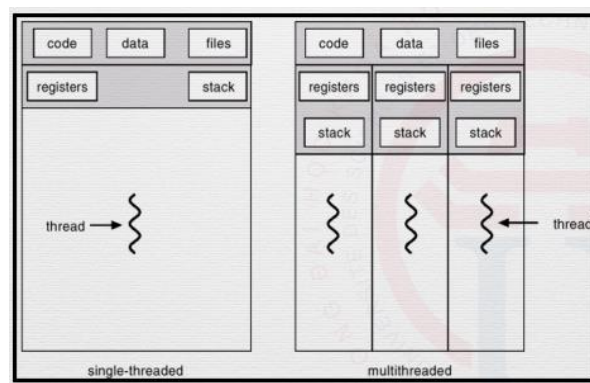
[Group 7]

Chapter Objective

- Have basic knowledge about background tasks and services
- Understand briefly how each one works

Threading

- **Types:** Single-threaded and multithreaded.



- **Why Thread ?**

- + Pros: better CPU utilization, separation of tasks, responsiveness, etc.
- + Cons: complication, synchronization, thread pool, etc.

Android Thread Model

- **Main Thread:** drawing widgets, dispatching user input, widget toolkit is not safe.

Example: calculation such as image processing may cause the app is broken.

- **Worker Thread:** don't manipulate views on worker thread, crash.

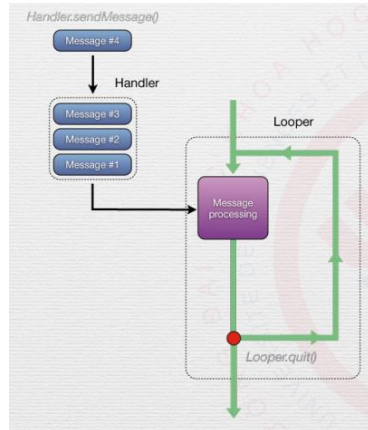
Example: create new worker thread

```
public class WeatherActivity extends Activity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        Thread t = new Thread(new Runnable() {
            @Override
            public void run() {
                // do something heavy in the new thread.
                // don't access UI Views here.
            }
        });
        t.start();
    }
}
```

```
}
}
```

• Handler

+ How it works



+ Main thread:

```
Handler handler = new Handler(Looper.getMainLooper()) {
    @Override
    public void handleMessage(Message msg) {
        // this method is executed on main thread
        // do something with the message
    }
};
```

+ Network (background) thread:

```
Bundle bundle = new Bundle();
bundle.putString("server_response", "some json here");
Message msg = new Message();
msg.setData(bundle);
handler.sendMessage(msg);
```

Background Tasks

AsyncTask: an encapsulation of Handler and Thread, allow the worker thread to report its work process to the UI.

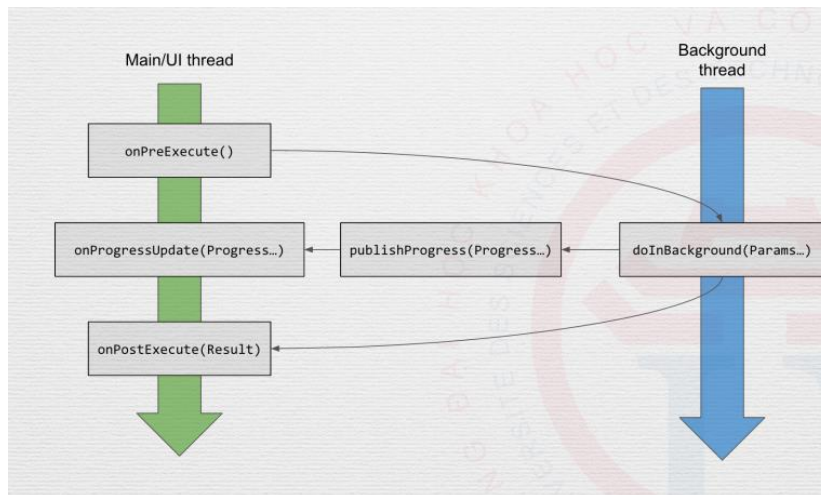
+ AsyncTask: param: 3 generic types:

AsyncTask<Param, Progress, Result>

- Params: param type to pass to the worker thread.
- Progress: type to report progress back.
- Result: result type to be delivered.

+ Overriding methods: [required]: doInBackground()

+ Method:



+ Example param

`AsyncTask<String, Integer, Bitmap>`

- 1st param: String , for the **URL**
- 2nd param: Integer , for updating the **Percentage** during the progress
- 3rd param: Bitmap , for the **Decoded Bitmap** for the image

+ Example methods: download a png file , report download progress, decoded to bitmap data, show on ImageView.