BACKGROUND TASKS AND SERVICES

THREADING

1. Definiton: A thread is a thread of execution in a program.

- Advantages:
  – CPU utilization
  – Task executed seperately
  – Responsiveness

- Disadvantages:
  – Complication
  – Synchronization
  – Thread pool

2. Android Thread Model:

- Main thread (UI thread): – Drawing widgets
  – Dispatching user inputs
  – Widget toolkit is not thread-safe

Rules: Do not block the UI thread Do not access the Android UI toolkit from outside the UI thread * Worker threads
– Create worker thread

```
    public void onClick(View v) {
    new Thread(new Runnable() {
        public void run() {
            //do something not violate the rule!
                }
            });
        }
    }).start();
}
```

Note: not instantaneous operation should be done in separate threads (main and worker thread seperately)

BACKGROUND TASKS

1.«AsyncTask»
* An encapsulation of Handler and Thread
* Also allow the worker thread to report its work progress to the UI
2.3 Generic Types:
* AsyncTask
* Params: param type to pass to the worker thread
* Progress: type to report progress back
* Result: result type to be delivered
AsyncTask
3. Overiding method

* [optional] onPreExecute(): for preparation
* [required] doInBackground(): do the real work
* [optional] onProgressUpdate(): for updating progress to UI
* [optional] onPostExecute(): for delivering result

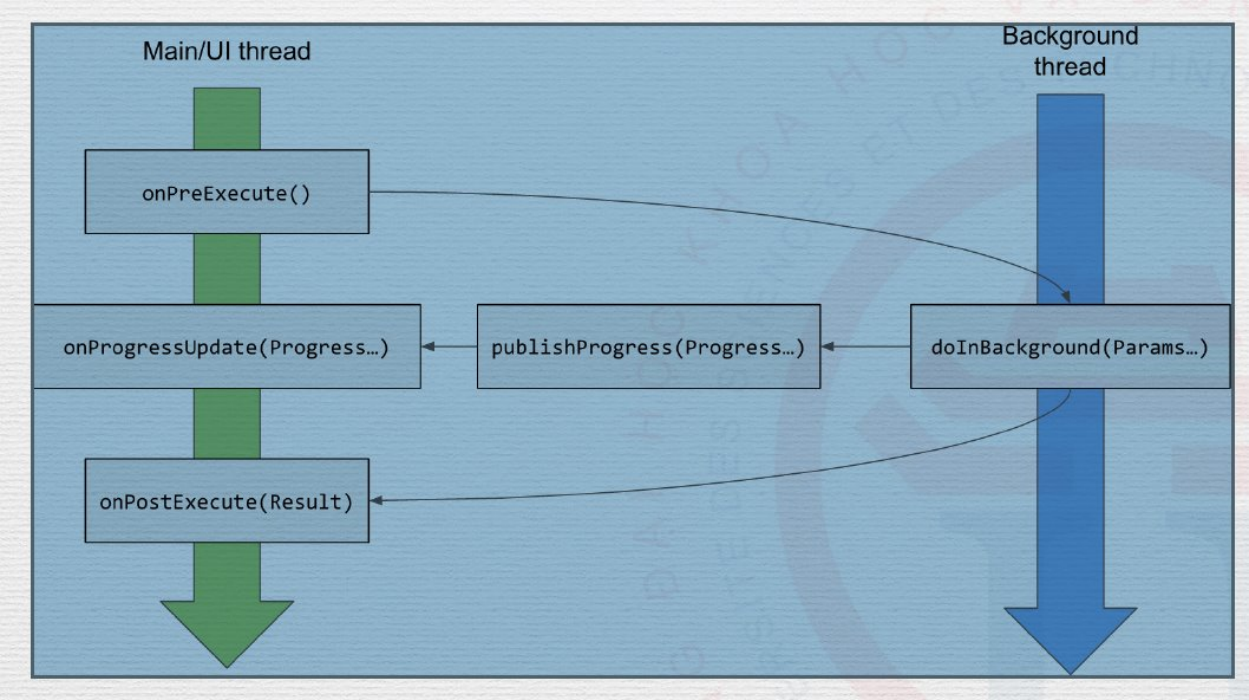

Figure 1: Method

4. Example Code

```
public class WeatherActivity extends Activity {

@Override
public void onCreate(Bundle savedInstanceState) {
  AsyncTask task = new AsyncTask<String, Integer, Bitmap>() {
  @Override
    protected void onPreExecute() {
      // do some preparation here, if needed
    }

  @Override
  protected Bitmap doInBackground(String... params) {
    // This is where the worker thread's code is executed
    // params are passed from the execute() method call
  return null;
  }

  @Override
  protected void onProgressUpdate(Integer... values) {
    // This method is called in the main thread, so it's possible
    // to update UI to reflect the worker thread progress here.
```

```
      // In a network access task, this should update a progress bar
      // to reflect how many percent of data has been retrieved
    }

    @Override
    protected void onPostExecute(Bitmap bitmap) {
      // This method is called in the main thread. After #doInBackground returns
      // the bitmap data, we simply set it to an ImageView using ImageView.setImageBitmap()
    }
  };
  task.execute("http://ict.usth.edu.vn/wp-content/uploads/usth/usthlogo.png");
  }
}
```