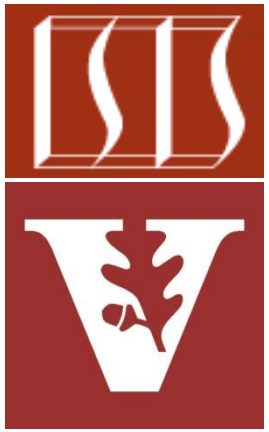
The AsyncTask Framework: Example Application



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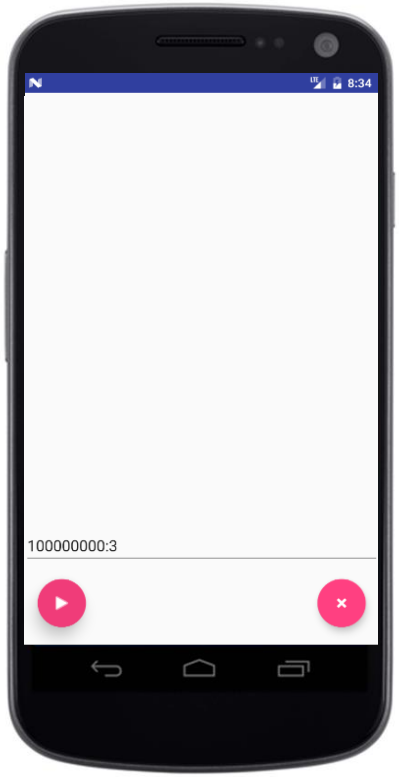
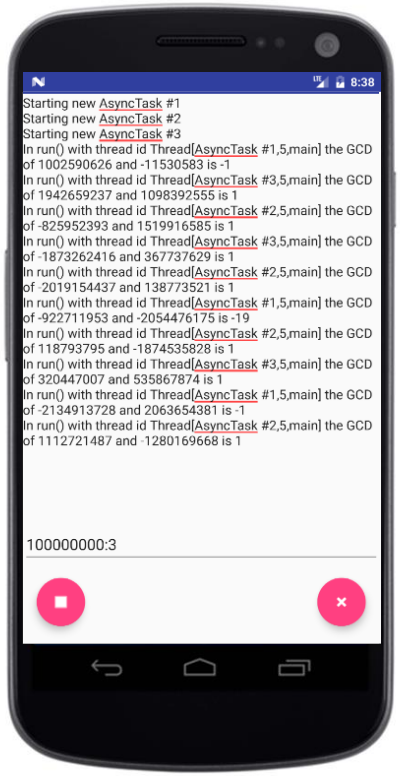
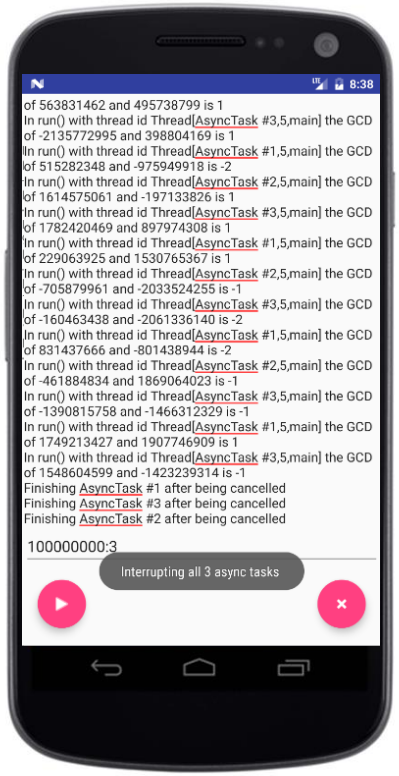
Learning Objectives in this Part of the Lesson

- Recognize the capabilities provided by the Android AsyncTask framework
- Know which methods are provided by AsyncTask class
- Understand what black-box & white-box framework are… & how AsyncTask implements both types of frameworks
- Learn how the AsyncTaskInterrupted program works





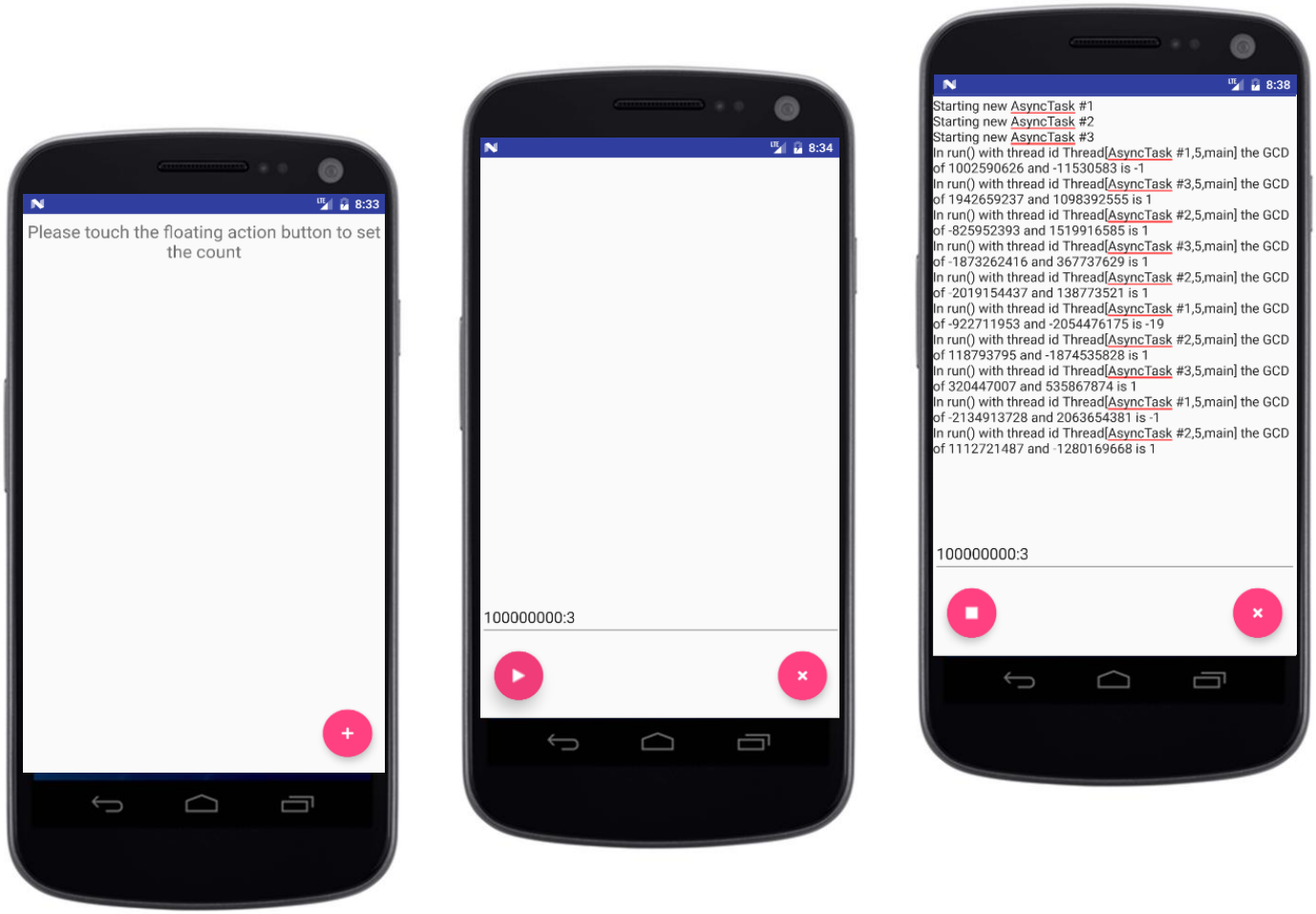


See github.com/douglascraigschmidt/POSA/tree/master/ex/M5/GCD/AsyncTaskInterrupted

Runtime Behavior of the AsyncTaskInterrupted App

Runtime Behavior of the AsyncTaskInterrupted App

- Use AsyncTasks & a ThreadPoolExecutor to compute the greatest common divisor (GCD) of two numbers, which is the largest positive integer that divides two integers without a remainder



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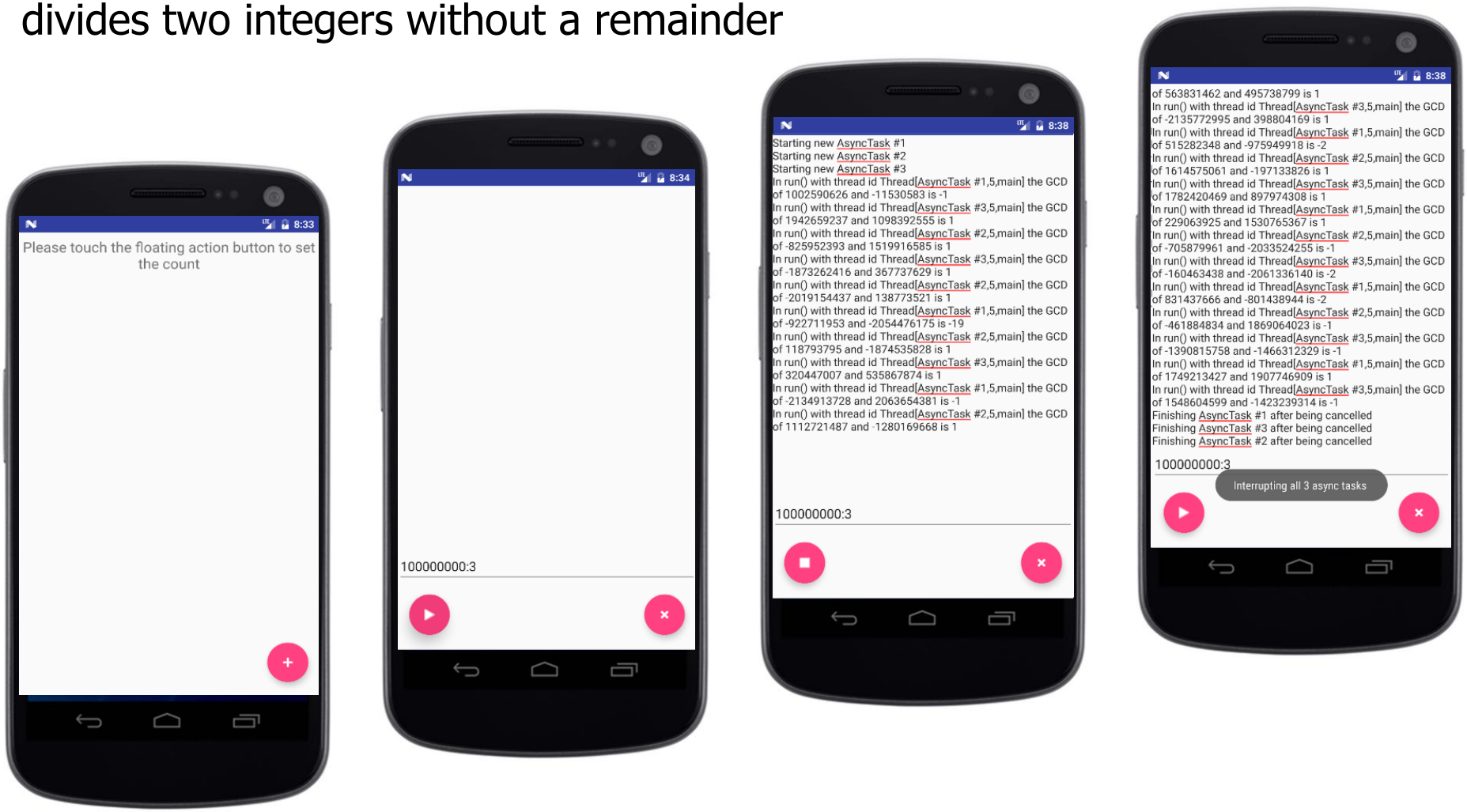

The user can cancel AsyncTask computations at any time

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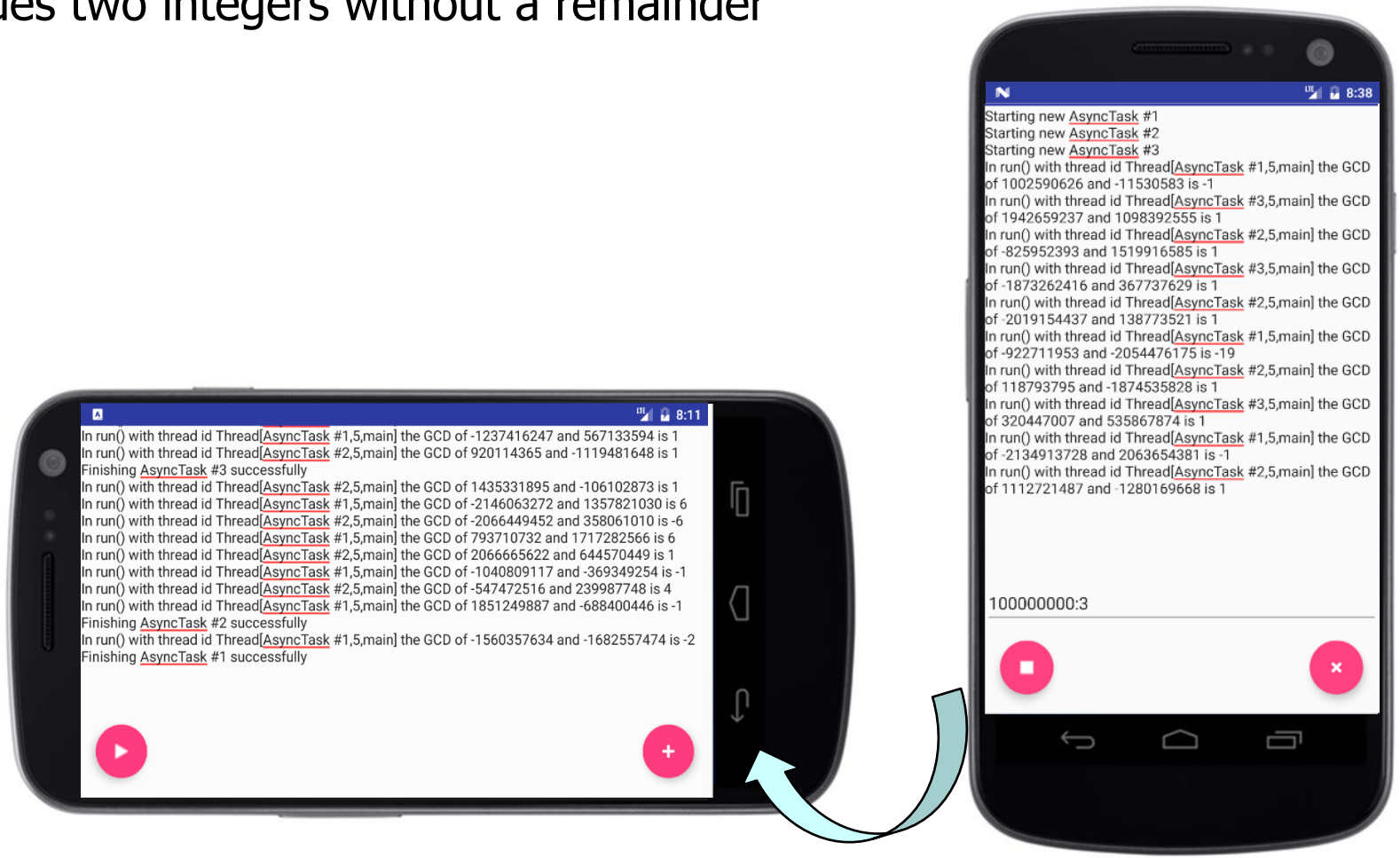

The device's runtime configuration can also change at any time without affecting running computations

Implementation of the AsyncTaskInterrupted App

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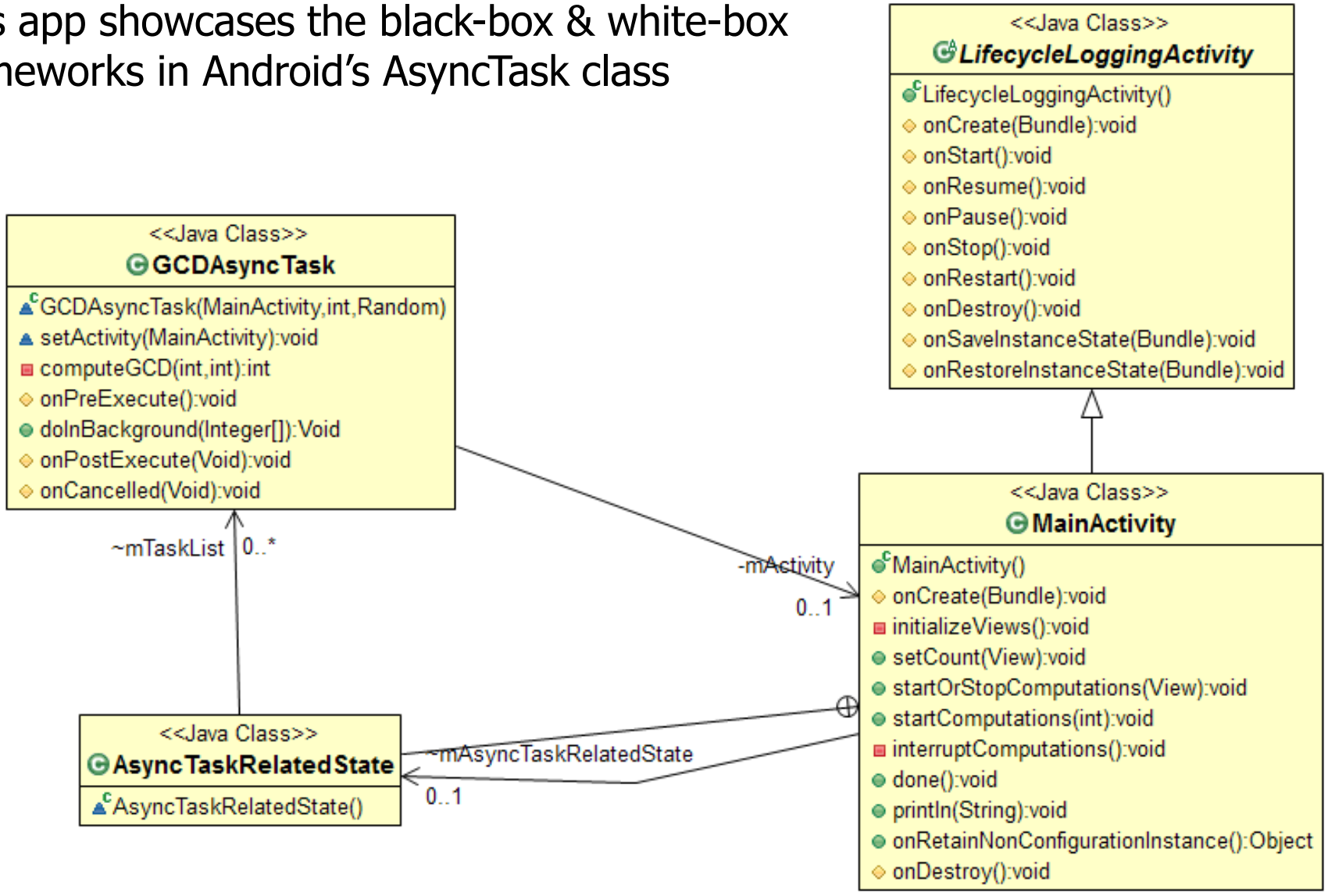
- This app showcases the black-box & white-box frameworks in Android's AsyncTask class



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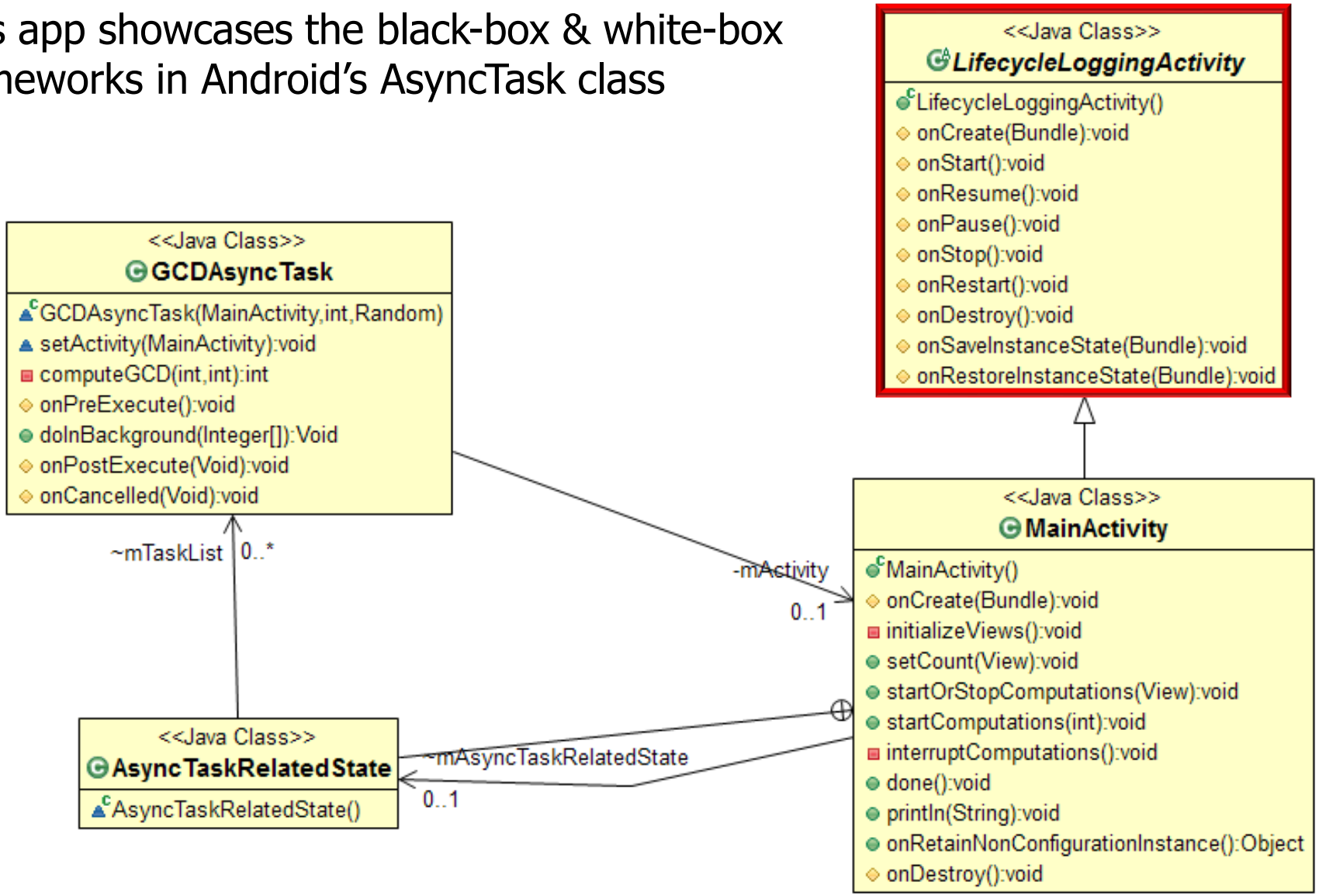

Super class automatically logs lifecycle hook method calls to aid debugging

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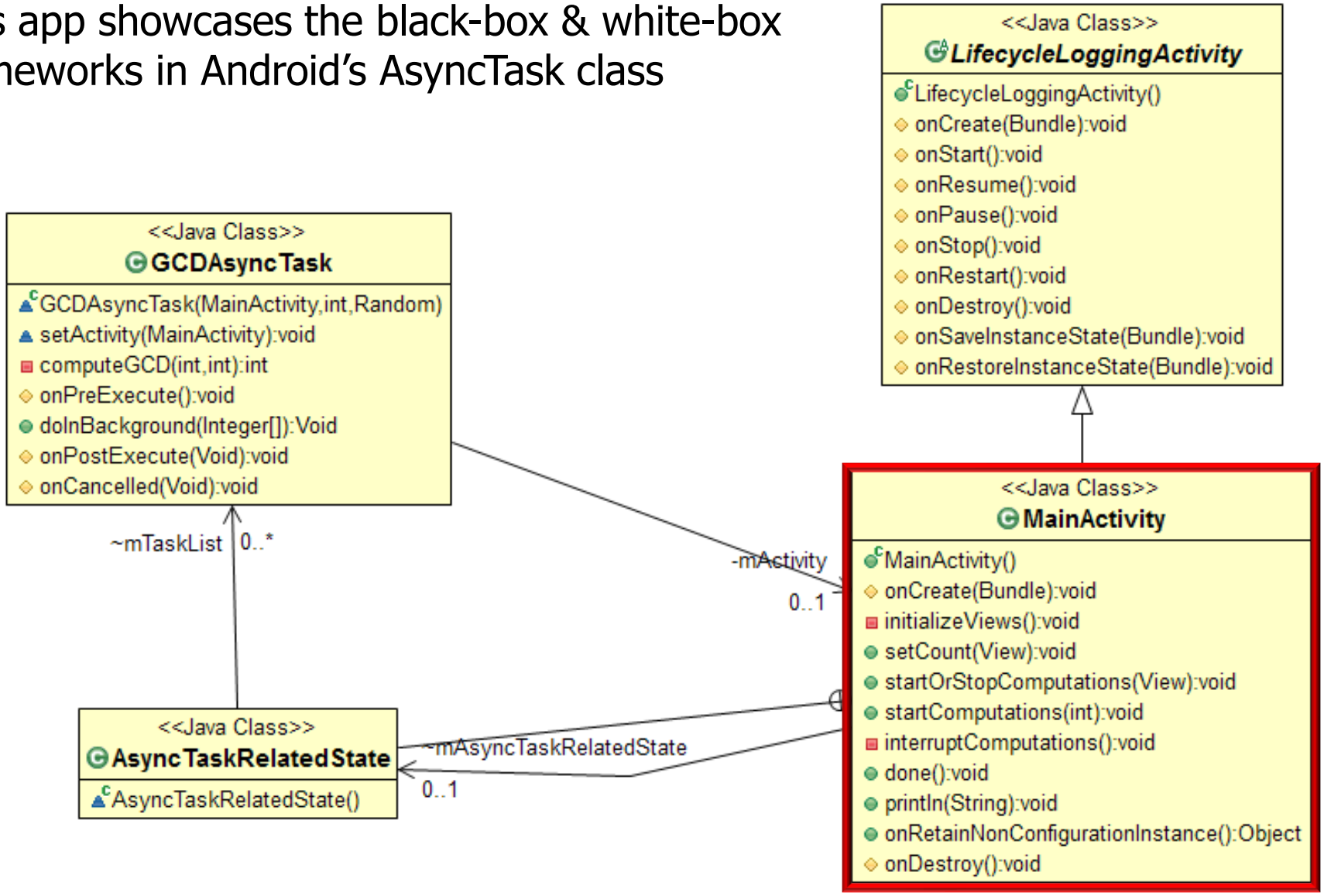

Start & cancels AsyncTasks that repeatedly compute GCD of two random #'s

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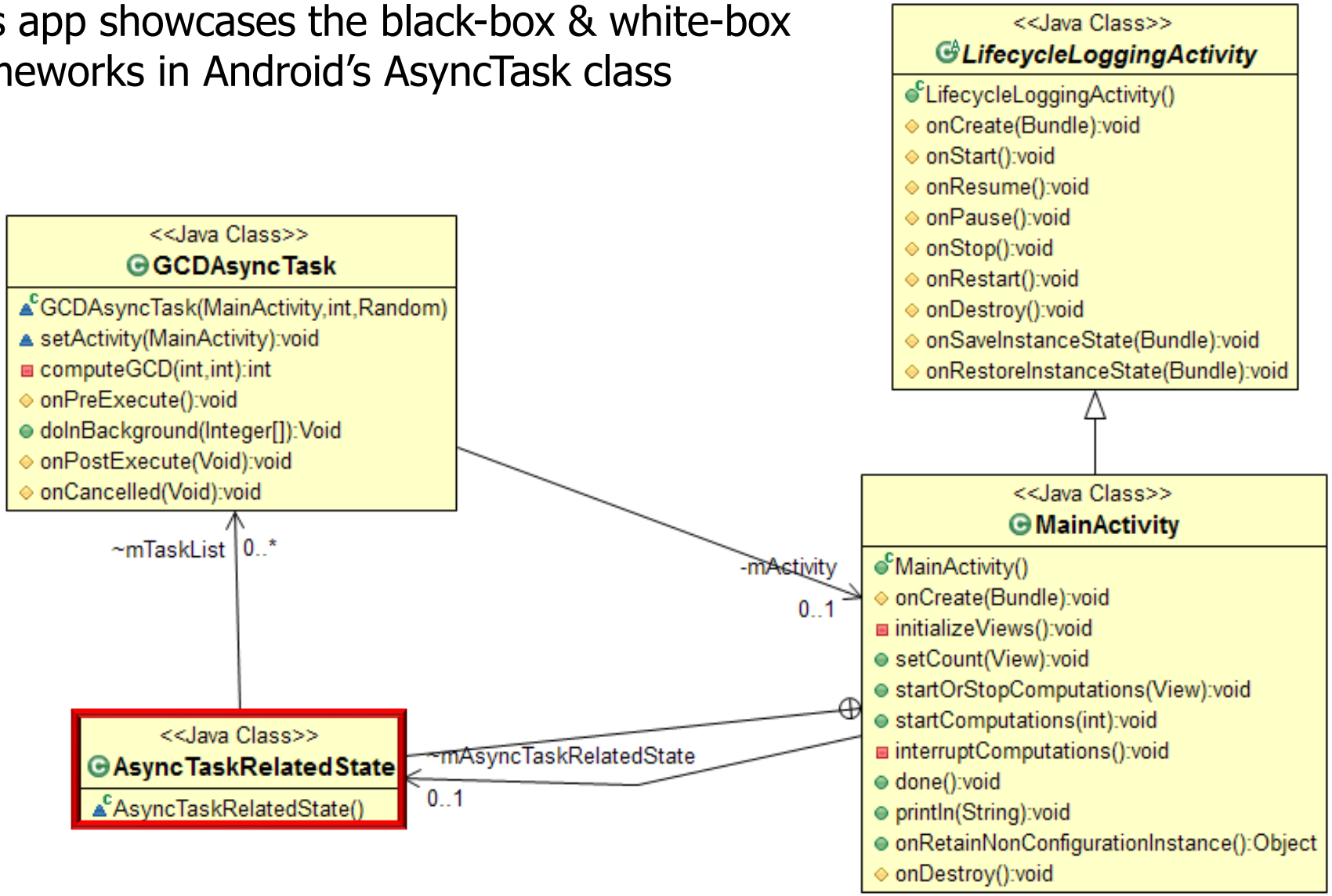

Stores state (including the AsyncTasks & ThreadPoolExecutor) that's passed between instances of the MainActivity after runtime configuration changes

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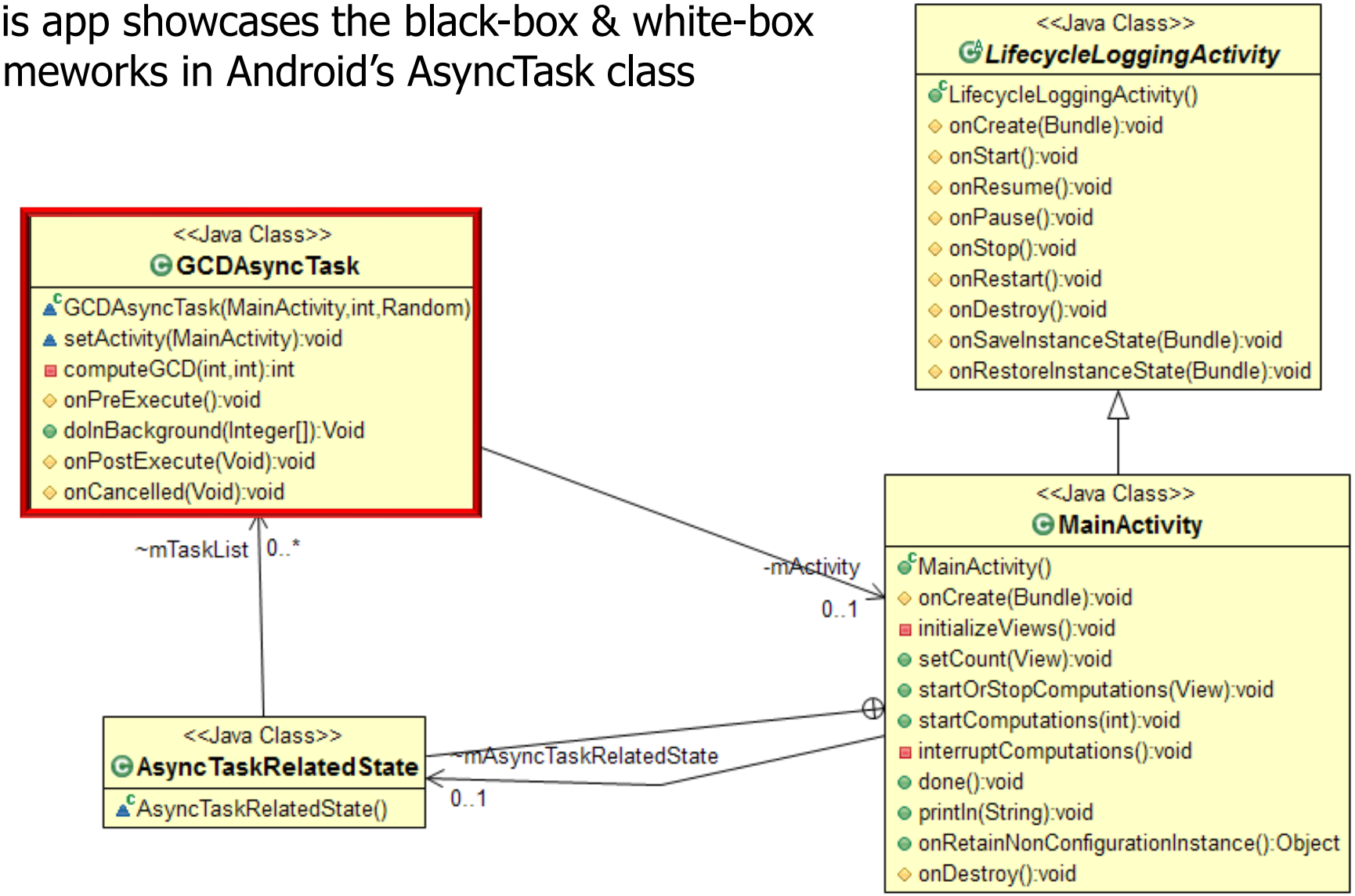

Extends AsyncTask & in a ThreadPoolExecutor thread repeatedly computing the GCD of two numbers in a manner that can be cancelled at any point

Implementation of the AsyncTaskInterrupted App

- We'll now analyze the source code for this app

```
public class GCDAsyncTask
       extends AsyncTask<// Passed to doInBackground()
                         Integer,
                         // Passed to onProgressUpdate()
                         String,
                         // Returned from doInBackground()
                         // and passed to onPostExecute()
                         Boolean> {
    /**
     * Debugging tag used by the Android logger.
     */
    private final String TAG =
        getClass().getSimpleName();

    /**
     * A reference to the MainActivity.
     */
    private WeakReference<MainActivity> mActivity;

    /**
     * Random number generator.
     */
    private final Random mRandom;

    /**
     * Keeps track of the AsyncTask number.
     */
    private int mAsyncTaskNumber;
```

```
public class MainActivity
       extends LifecycleLoggingActivity {
    /**
     * EditText field for entering the desired number of iterations.
     */
    private EditText mCountEditText;

    /**
     * Number of times to iterate if the user doesn't specify
     * otherwise.
     */
    private final static int sDEFAULT_COUNT = 100000000;

    /**
     * Number of threads to put in the ThreadPoolExecutor.
     */
    private final static int sMAX_TASK_COUNT = 2;

    /**
     * Keeps track of whether the edit text is visible for the
     * user to enter a count.
     */
    private boolean mIsEditTextVisible = false;

    /**
     * Reference to the "set" floating action button.
     */
    private FloatingActionButton mSetFab;
```

See github.com/douglascraigschmidt/POSA/tree/master/ex/M5/GCD/AsyncTaskInterrupted

End of the AsyncTask Framework: Example Application