Java Thread:
Passing Parameters to a Thread

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Learning Objectives in this Part of the Lesson

- Understand how Java threads support concurrency
- Learn how our case study app works
- Know alternative ways of giving code to a thread
- Learn how to pass parameters to a Java thread
Passing Parameters to a Java Thread
The run() methods defined in Java Thread & Runnable take no parameters.

This raises the question of how to pass parameters to a Java thread!
Passing Parameters to a Java Thread

- Parameters passed to run() can be supplied via one of two other means
Passing Parameters to a Java Thread

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- As parameters to a class constructor

```java
public class GCDRunnable extends Random implements Runnable {
```

Passing Parameters to a Java Thread

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• As parameters to a class constructor

```java
public class GCDRunnable extends Random implements Runnable {
    private final MainActivity mActivity;
    ...
```

Define field(s) to store parameters passed to a runnable or thread object
• Parameters passed to run() can be supplied via one of two other means, e.g.
  • As parameters to a class constructor

```java
public class GCDRunnable extends Random implements Runnable {
    private final MainActivity mActivity;

    public GCDRunnable(MainActivity mainActivity) {
        mActivity = mainActivity;
    }

    // ... (rest of the class)
}
```

Add the parameter(s) to the constructor signature & store them in the field(s)
• Parameters passed to run() can be supplied via one of two other means, e.g.
  • As parameters to a class constructor

```java
public class GCDRunnable extends Random implements Runnable {
    private final MainActivity mActivity;

    public GCDRunnable(MainActivity mainActivity) {
        mActivity = mainActivity;
    }

    public void run() {
        final String threadString = 
            " with thread id " + Thread.currentThread();
        mActivity.println("Entering run()" + threadString);
        ...
    }
}
```

Use the field(s) within the thread’s run() hook method to customize its behavior
Passing Parameters to a Java Thread

- Parameters passed to run() can be supplied via one of two other means, e.g.
- As parameters to a class constructor

```java
public class GCDRunnable extends Random implements Runnable {
    private final MainActivity mActivity;

    public GCDRunnable(MainActivity mainActivity) {
        mActivity = mainActivity;
    }

    public void run() {
        final String threadString = " with thread id " + Thread.currentThread();
        mActivity.println("Entering run()" + threadString);
        ...
    }
}
```

```java
public class MainActivity ... { ...
    public void runRunnable(View v) { ...
        new Thread(new GCDRunnable(this));
    ...
}
```

Pass the parameter(s) when the runnable or thread is created
Passing Parameters to a Java Thread

- Parameters passed to run() can be supplied via one of two other means, e.g.
  - As parameters to a class constructor
  - As parameters to "setter" methods

```java
public class GCDThread extends Thread {

```
Parameters passed to run() can be supplied via one of two other means, e.g.
- As parameters to a class constructor
- As parameters to “setter” methods

```java
public class GCDThread extends Thread {
    private MainActivity mActivity;
    private Random mRandom;
    ...
```

Define field(s) to store parameters passed to a runnable or thread object
Passing Parameters to a Java Thread

- Parameters passed to run() can be supplied via one of two other means, e.g.
  - As parameters to a class constructor
  - As parameters to “setter” methods

```java
public class GCDThread extends Thread {
    private MainActivity mActivity; private Random mRandom;

    public GCDThread setActivity(MainActivity activity) {
        mActivity = activity; return this;
    }

    public GCDThread setRandom(Random random) {
        mRandom = random; return this;
    }

    ...
}
```

*Define setter methods that update field(s)*
Passing Parameters to a Java Thread

- Parameters passed to `run()` can be supplied via one of two other means, e.g.
  - As parameters to a class constructor
  - As parameters to “setter” methods

```java
public class GCDThread extends Thread {
    private MainActivity mActivity; private Random mRandom;

    public GCDThread setActivity(MainActivity activity) {
        mActivity = activity; return this;
    }

    public GCDThread setRandom(Random random) {
        mRandom = random; return this;
    }
    ...

    Note use of “fluent interfaces,” which enables “chaining” of method calls
}
```

See [en.wikipedia.org/wiki/Fluent_interface](en.wikipedia.org/wiki/Fluent_interface)
Passing Parameters to a Java Thread

• Parameters passed to run() can be supplied via one of two other means, e.g.
  • As parameters to a class constructor
  • As parameters to “setter” methods

```java
public class GCDThread extends Thread {
    private MainActivity mActivity; private Random mRandom;

    public GCDThread setActivity(MainActivity activity) {
        mActivity = activity; return this;
    }

    public GCDThread setRandom(Random random) {
        mRandom = random; return this;
    }

    public void run() {
        mActivity.println("Entering run()" + threadString);

        int number1 = mRandom.nextInt();
        int number2 = mRandom.nextInt();
    }
}
```

Use the fields within the thread’s run() hook method to customize its behavior.
Parameters passed to run() can be supplied via one of two other means, e.g.

- As parameters to a class constructor
- As parameters to “setter” methods

```java
public class GCDThread extends Thread {
    ...

    public class MainActivity ... { ...
        public void runThread(View v) { ...
            Thread thread =
                new GCDThread()
                    .setActivity(this)
                    .setRandom(new Random());
        ...
```

Use the fluent interface to pass parameter(s) when the runnable or thread is created
End of Java Thread: Passing Parameters to a Thread