Java Threads

15-121

Concurrency

- Concurrency is the process of working on multiple tasks at the same time.
- Operating Systems supports concurrency heavily.
- It is allowing computers to use resources more effectively.

Concurrent Programming

- Two basic units of execution
  - Processes
  - Threads
- There can be multiple processes
- An application can be a combination of multiple processes
- There can only be one thread executing at any given time (in a single core machine)

Threads

- A Thread is a program unit or process that is executed independently of other processes
- Thread can be considered a “light-weight” process.
- Threads help carry out two or more tasks at the same time
- Java virtual machine executes all threads in “parallel”

Threads

- Threads exists within a process
- Each process has at least one thread
- Each process has its own private run-time resources
- Multiple threads within a process can share resources within the process

Using Threads

```
public class MyClass extends Thread {
    public void run( ) {
        // thread action
    }
   …
}
```

- Run method cannot be called by itself
- MyClass M = new MyClass();
- M.start() – starts a new thread and invokes run method

Runnable Interface

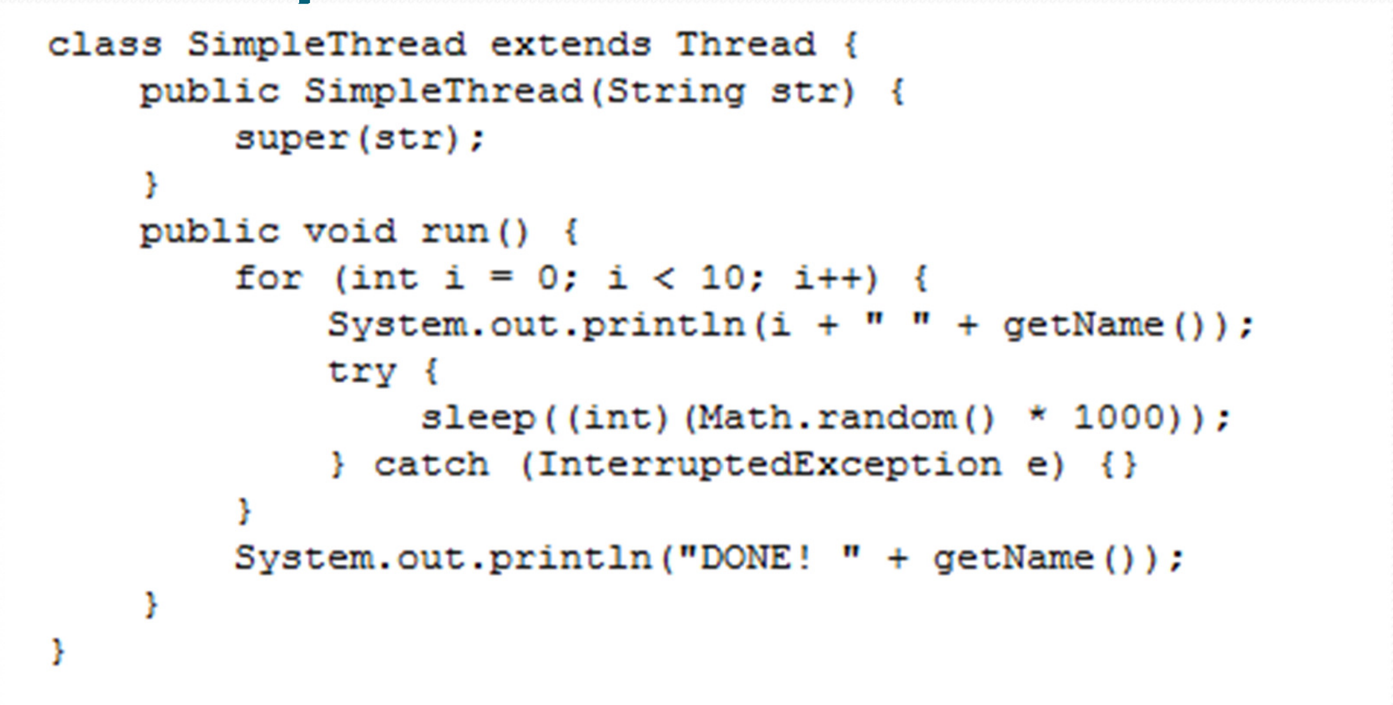
```
public interface Runnable {
   void run();
}

public class MyClass implements Runnable{
   public void run(){
      // thread action
   }
…
}
```

Sleeping Threads

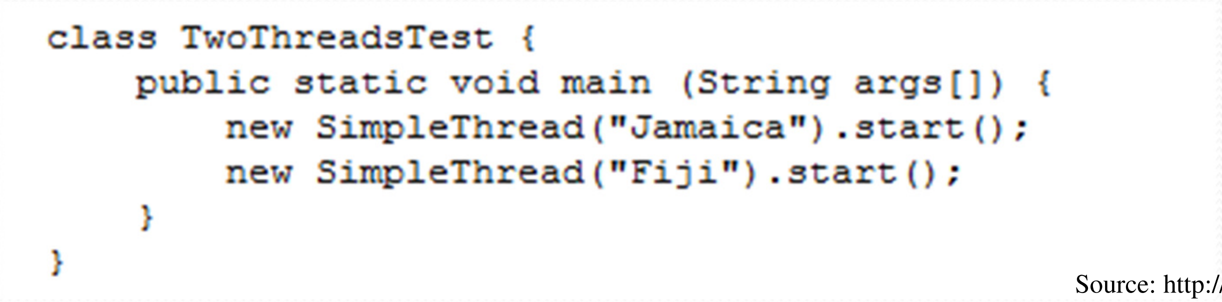
- Thread.sleep(time in miliseconds)
- A great way to pause the current thread

- Read more at
- http://java.sun.com/docs/books/tutorial/essential/concurrency/index.html

example



```
class SimpleThread extends Thread {
    public SimpleThread(String str) {
        super(str);
    }
    public void run() {
        for (int i = 0; i < 10; i++) {
            System.out.println(i + " " + getName());
            try {
                sleep((int)(Math.random() * 1000));
            } catch (InterruptedException e) {}
        }
        System.out.println("DONE! " + getName());
    }
}
```



```
class TwoThreadsTest {
    public static void main (String args[]) {
        new SimpleThread("Jamaica").start();
        new SimpleThread("Fiji").start();
    }
}
```

Source: http://www.cs.nccu.edu.tw