

Concurrent System Design

Concurrency in Java

Valentín Cassano
`cassanv@mcmaster.ca`

Department of Computing and Software
McMaster University

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Threads

Definition (Thread)

(In this course) a thread refers to both: the implementation and execution of a (FSP) process.

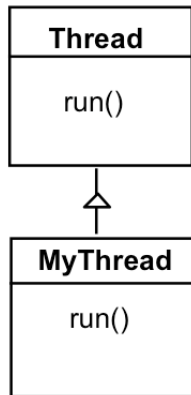
- The Java platform provides support for concurrency as part of its core language.
- The operations to create and initialize *threads*, and subsequently control their execution, are provided by the **Thread** class and the **Runnable** interface.

Question: Why the above?

Since Java does not permit multiple inheritance, it is sometimes more convenient to implement a process as a thread not derived from **Thread** but from the **Runnable** interface.

Threads in Java

A **Thread** class manages a single sequential thread of control. Threads may be created and deleted dynamically.



Example

```
class MyThread extends Thread
{
    ...
    MyThread( ... ) { ... }
    ...
    public void run() { ... }
}
```

```
MyThread myThread = new MyThread( ... );
myThread.start();
```

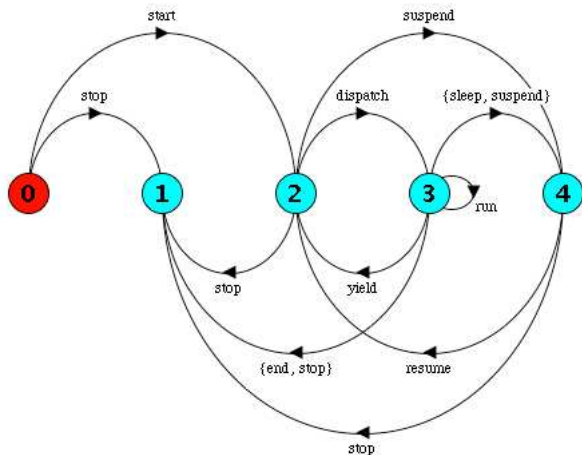
Life cycle of a thread

Methods:

- start
- run
- isAlive
- yield
- sleep

Reference:

- 0 CREATED
- 1 TERMINATED
- 2 RUNNABLE
- 3 RUNNING
- 4 NON_RUNNABLE



Example

Questions/Comments ?

Summary:

- Overview of Java Threads and some of its methods

Bibliography

- J. Magee, J. Kramer. *Concurrency: States, models and Java programs*. 2nd Edition. John Wiley & sons, 2006.
- Java API. <http://java.sun.com/javase/6/docs/api/>.
- Java Tutorials. <http://java.sun.com/docs/book/tutorial/essential/concurrency/index.html>.