Java Executor Implementation Choices

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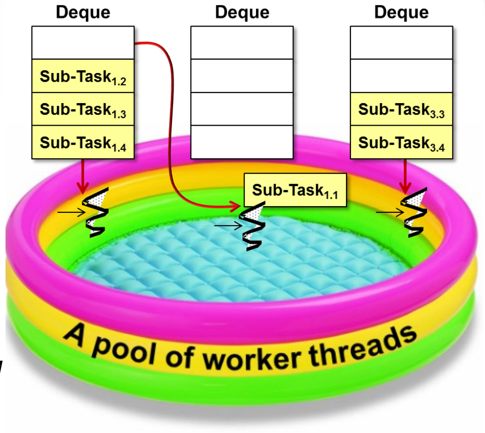
Learning Objectives in this Part of the Lesson

- Recognize the single simple feature provided by the Java Executor interface
- Understand various implementation choices for the Executor interface

Fixed-sized Thread Pool

Cached Thread Pool



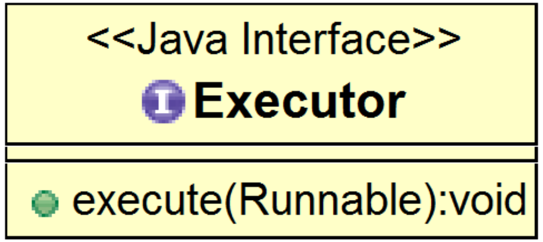
Work-stealing Thread Pool

A Custom Thread Pool

Implementation Choices for the Java Executor Interface

Overview of the Java Executor Interface

- The Executor interface can be implemented via different types of thread pooling mechanisms

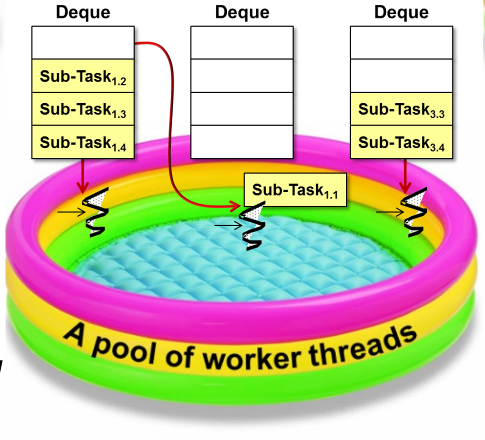


Fixed-sized Thread Pool

A pool of worker threads

Cached Thread Pool

A pool of worker threads

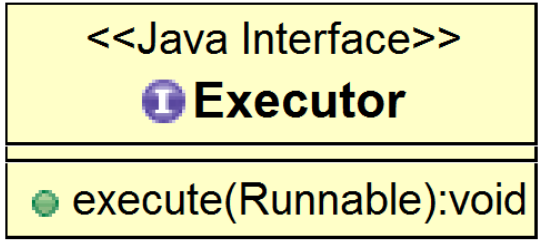


Work-stealing Thread Pool

A Custom Thread Pool

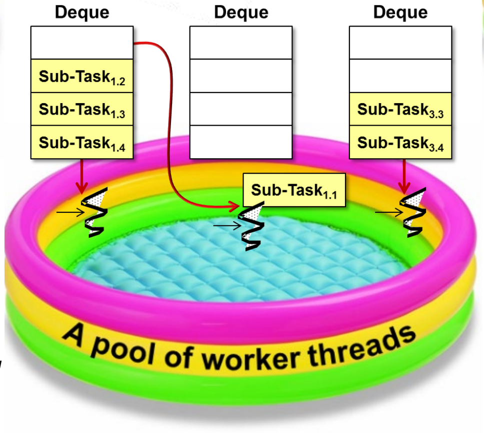
Overview of the Java Executor Interface

- Executor configuration is often performed just once to select the "execution policy" for tasks passed to it



Fixed-sized Thread Pool

Cached Thread Pool

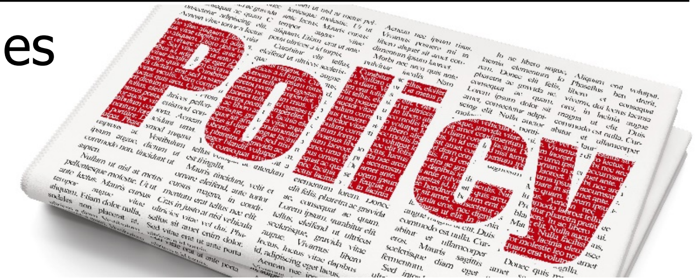


Work-stealing Thread Pool

A Custom Thread Pool

Overview of the Java Executor Interface

- The "execution policy" for a group of tasks defines several properties



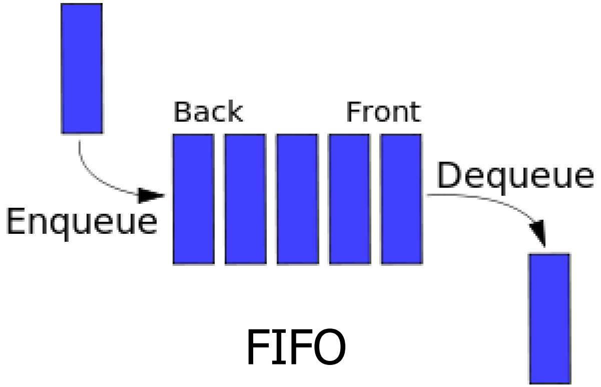
Overview of the Java Executor Interface

- The "execution policy" for a group of tasks defines several properties, e.g.
  - In which thread will a task be executed
    - e.g., a existing thread in the pool, a new thread created/added to the pool, etc.

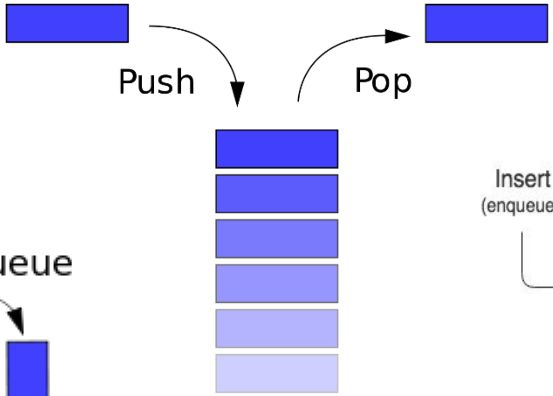
There's even a single threaded implementation of Executor!

Overview of the Java Executor Interface

- The "execution policy" for a group of tasks defines several properties, e.g.
  - In which thread will a task be executed
  - In which order will tasks be executed
    - e.g., FIFO, LIFO, priority order, etc.

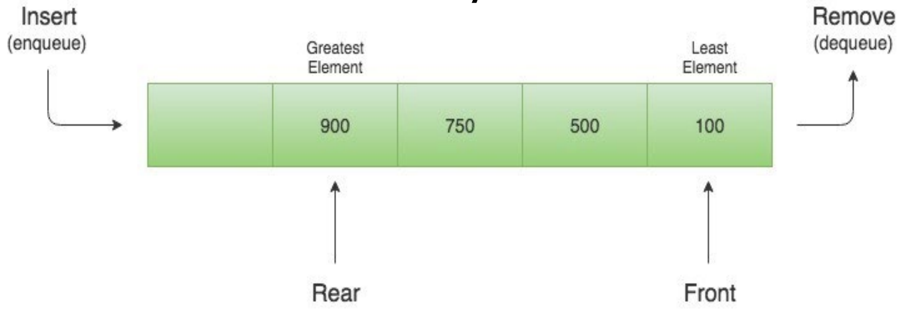


FIFO



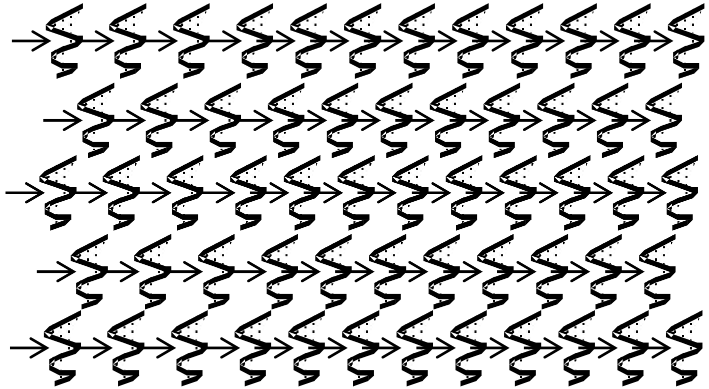
LIFO

Priority order



Overview of the Java Executor Interface

- The "execution policy" for a group of tasks defines several properties, e.g.
  - In which thread will a task be executed
  - In which order will tasks be executed
  - How many tasks can run concurrently
    - e.g., is the maximum # of tasks limited by the # of CPU cores or by some other factor?



Overview of the Java Executor Interface

- The "execution policy" for a group of tasks defines several properties, e.g.
  - In which thread will a task be executed
  - In which order will tasks be executed
  - How many tasks can run concurrently
  - If not all tasks can be executed due to system overload which task(s) should be rejected & how should an app be notified
    - e.g., should execute() fail silently vs. throw RejectedExecutionException

See docs.oracle.com/javase/8/docs/api/java/util/concurrent/RejectedExecutionException.html

Overview of the Java Executor Interface

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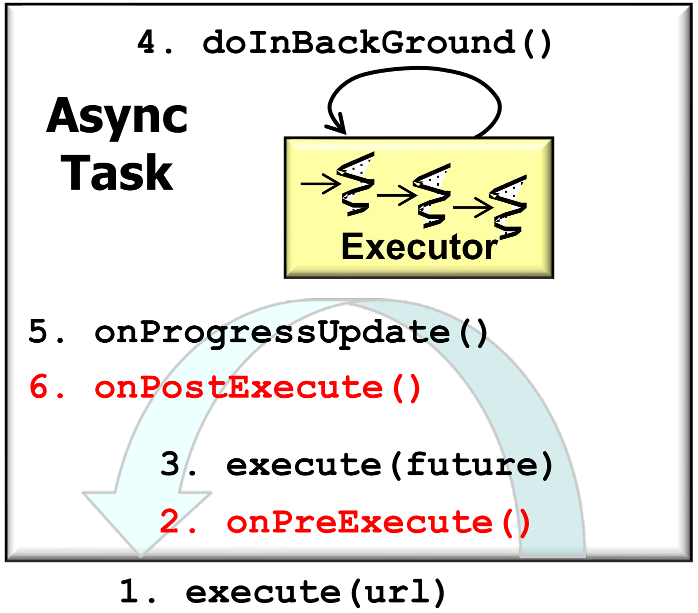
  - In which thread will a task be executed
  - In which order will tasks be executed
  - How many tasks can run concurrently
  - If not all tasks can be executed due to system overload which task(s) should be rejected & how should an app be notified
  - What actions (if any) should be performed before and/or after executing a task
    - e.g., Android AsyncTask’s onPreExecute() & onPostExecute() hook methods



See developer.android.com/reference/android/os/AsyncTask

End of Java Executor Implementation Choices