Java Multithreading

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Agenda

- What is Java Thread?
- Understanding Hardware
- Thread Lifecycle
- Creating Threads
- Multithreading
- Threadpools
- Concurrency
- Deadlocks

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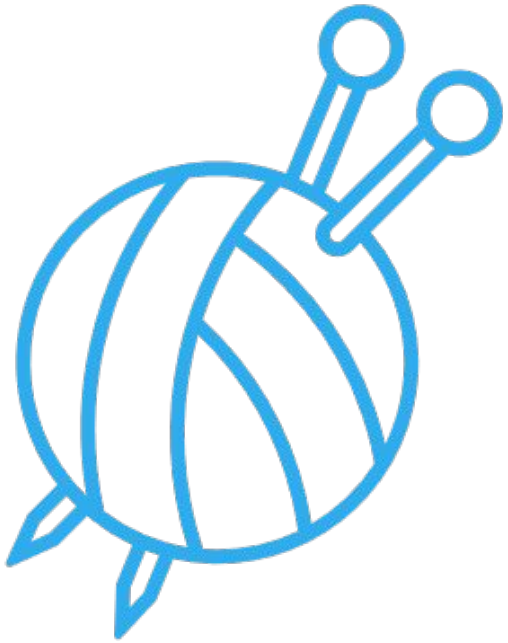
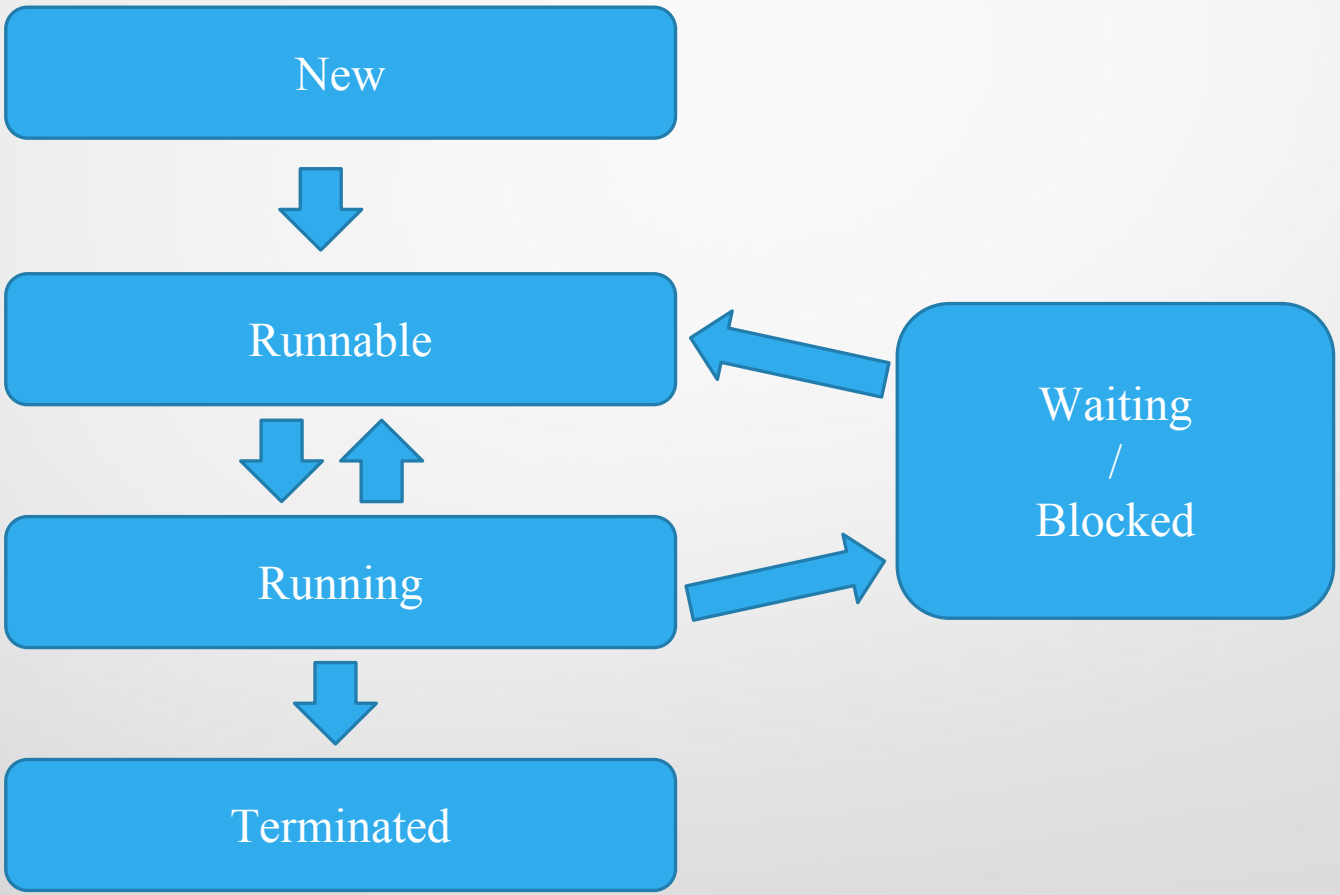


What is Java Thread?

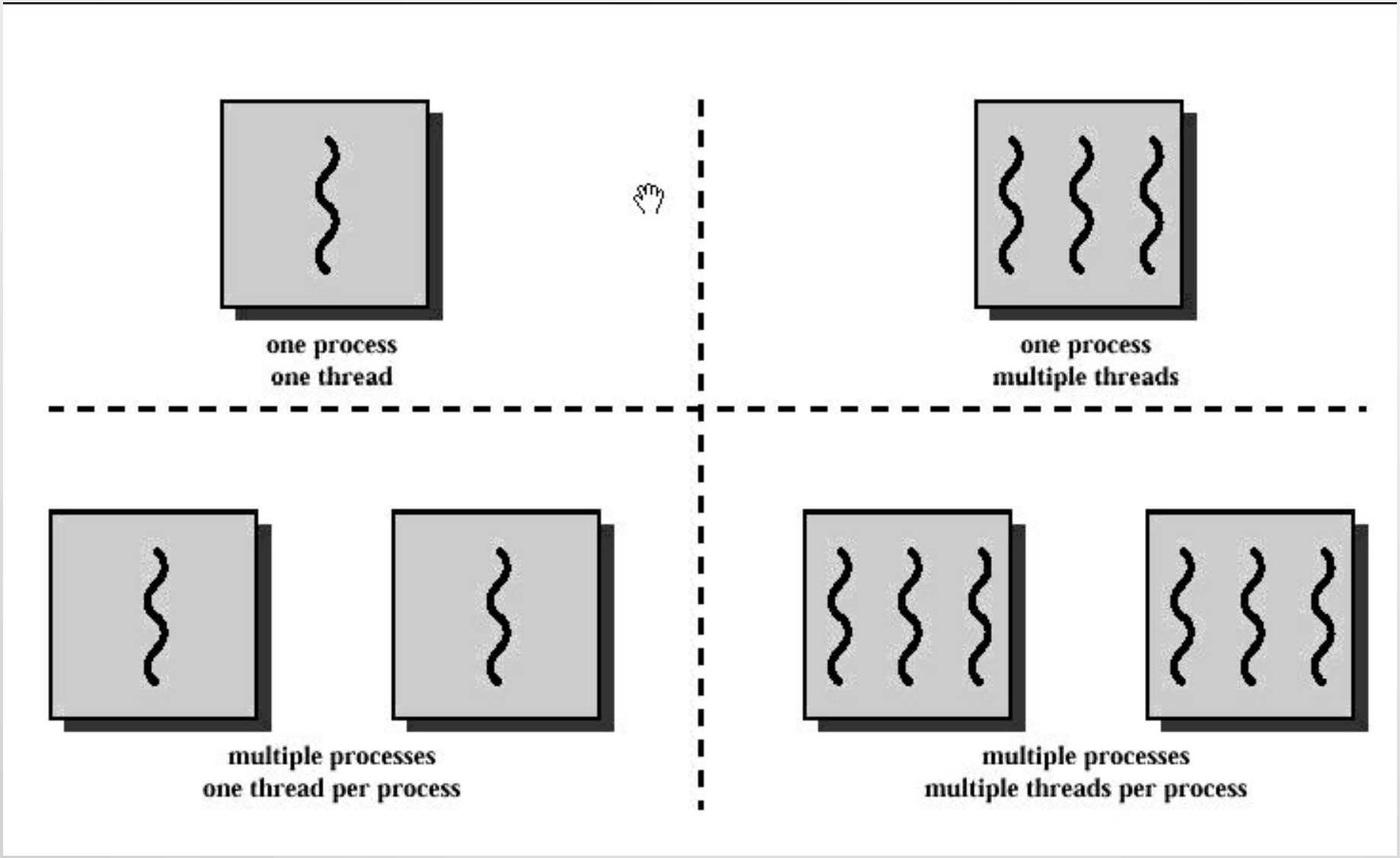
intel
Core™ i5

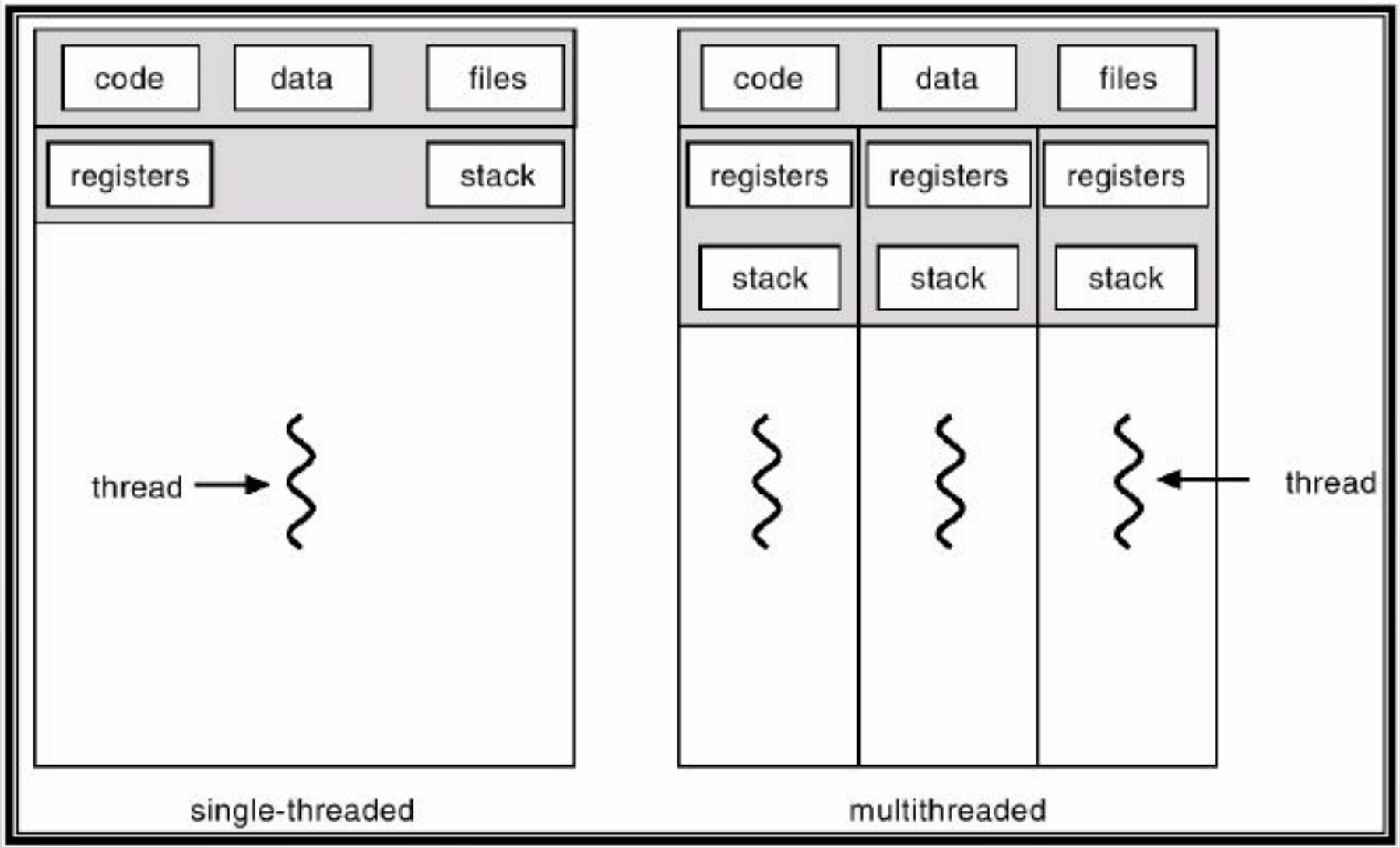
Thread Lifecycles



Let’s create a thread

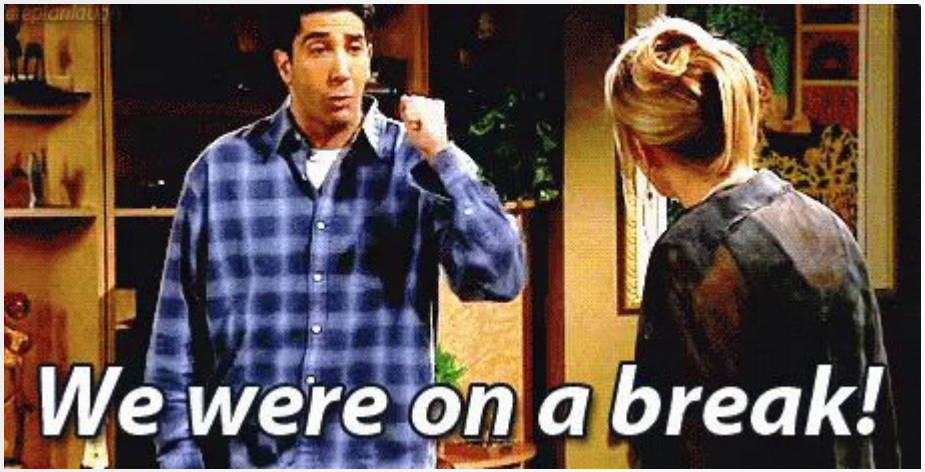
Thread vs Process


one process
one thread
one process
multiple threads
multiple processes
one thread per process
multiple processes
multiple threads per process


code
data
files
registers
stack
thread
single-threaded
code
data
files
registers
registers
registers
stack
stack
stack
thread
multithreaded

Runnable vs Thread

Implement vs Extend



Let’s take a break

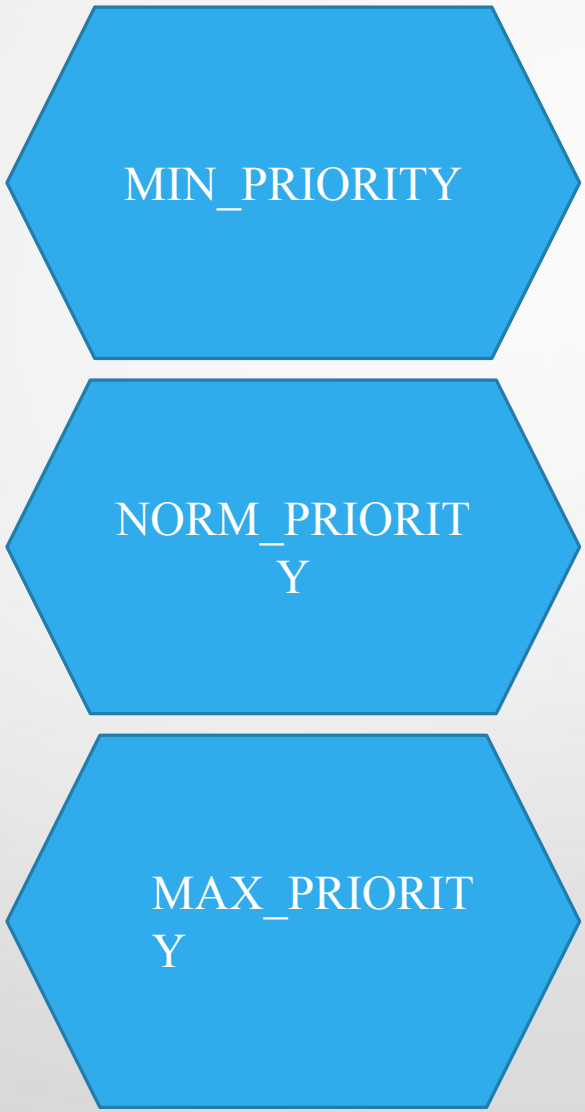
Thread.Sleep()

Thread.Join()

Runnable vs Callable

Priority

Types



Daemon Thread

Thread pooling

ThreadGroup

Shutdown Hook

Synchronization

Critical Section

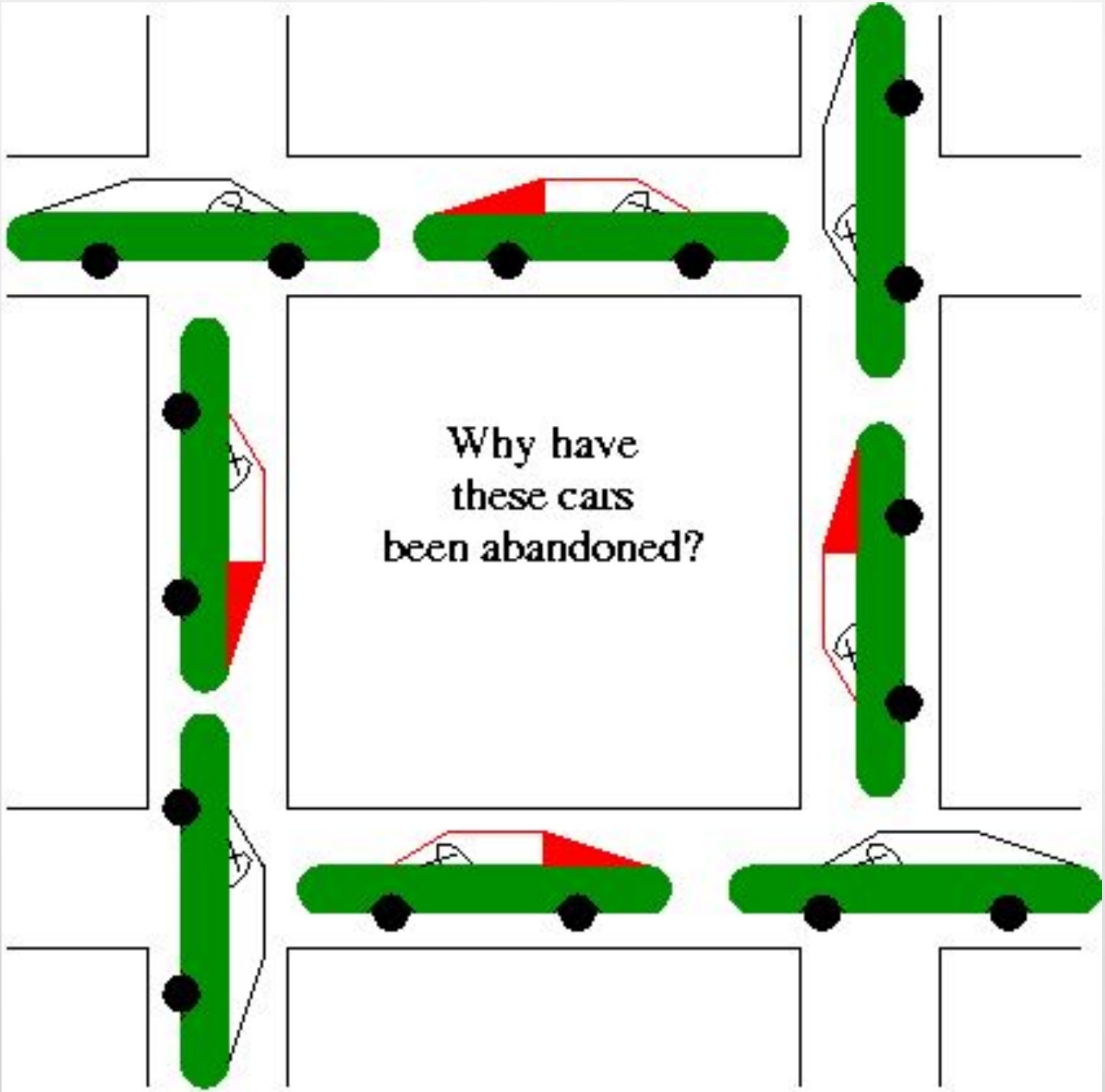
Method / Block

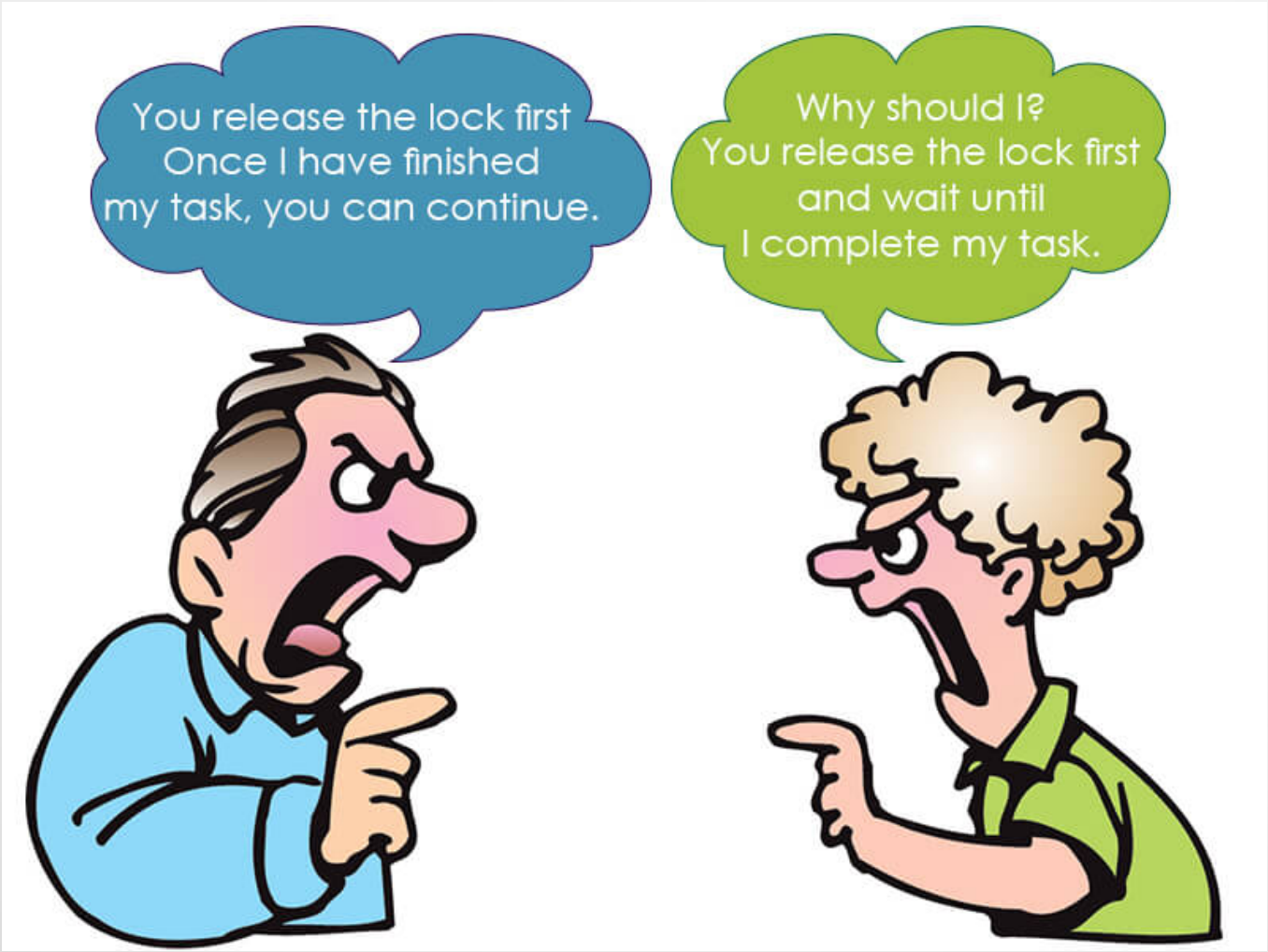
Atomicity

Race Conditions

Atomic Variables

Atomic Reference


Why have
these cars
been abandoned?


You release the lock first
Once I have finished
my task, you can continue.
Why should I?
You release the lock first
and wait until
I complete my task.

DeadLocks

Inter thread communications

Object.Wait()

Object.Notify()

Object.NotifyAll()

Interrupting a thread

Locks

Object Lock

ReentrantLock

TryLock

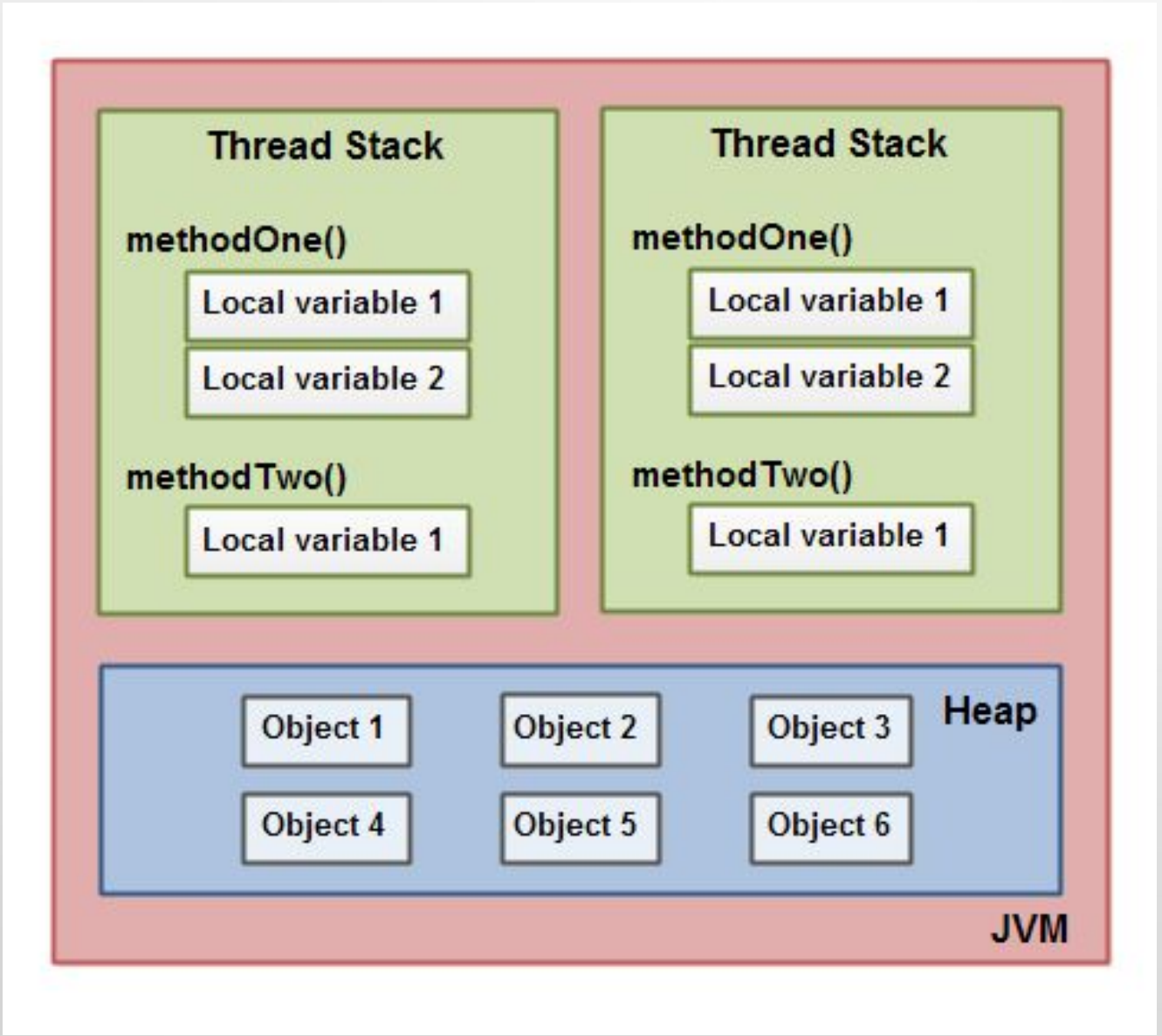
ReentrantReadWriteLock

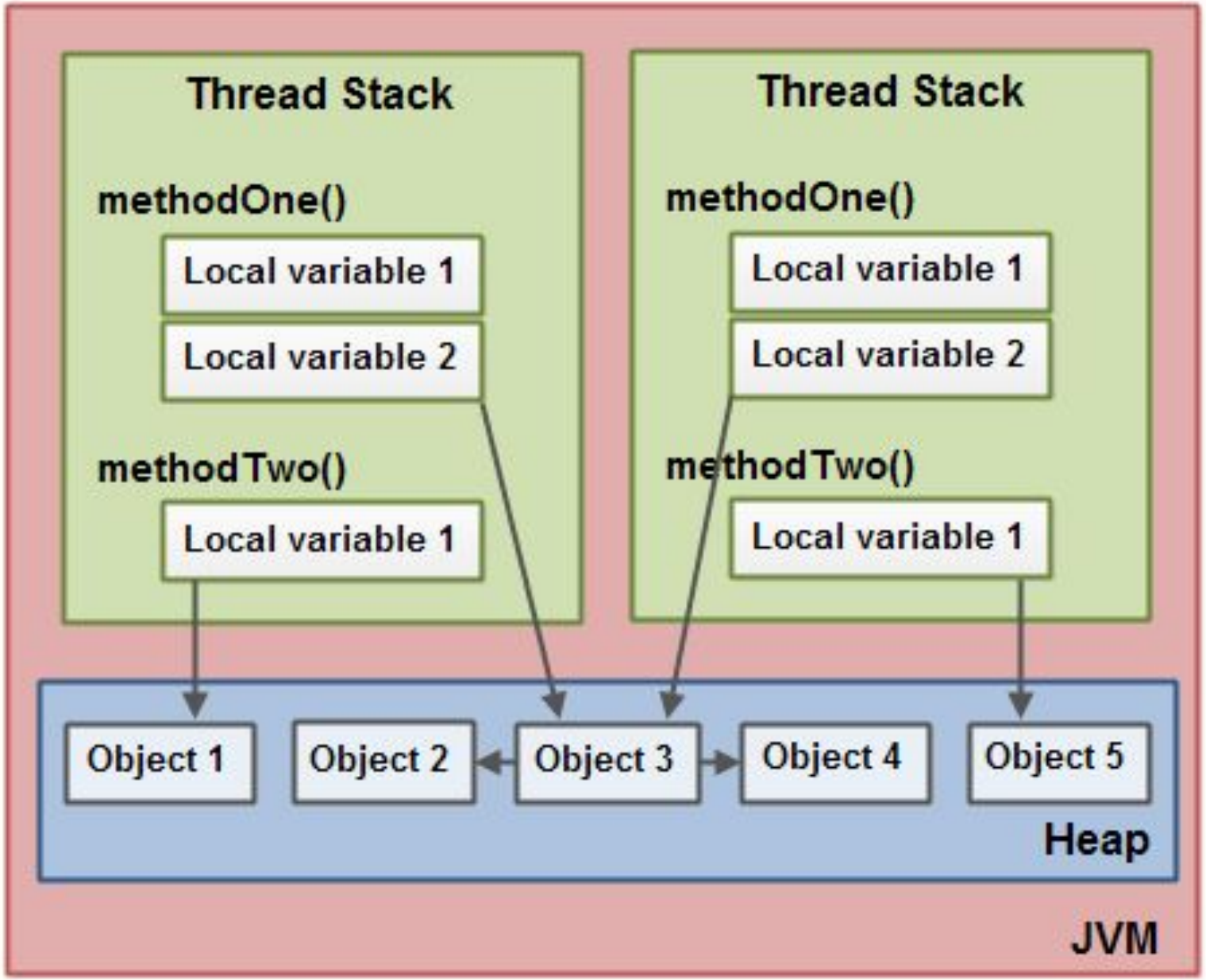
Conditions

Semaphore

Debugging Threads

Memory Model




Thread Stack
methodOne()
Local variable 1
Local variable 2
methodTwo()
Local variable 1
Thread Stack
methodOne()
Local variable 1
Local variable 2
methodTwo()
Local variable 1
Object 1
Object 2
Object 3
Object 4
Object 5
Heap
JVM

Debugging Threads

Fun time

How to start a thread?

1. run();
2. start();
3. init();
4. none of these.
5. resume();

Which method registers a thread in a thread scheduler?

1. **run()**
2. **construct()**
3. **execute()**
4. **submit()**
5. **start()**

Methods available in Thread Class?

1. **start()**
2. **wait()**
3. **notify()**
4. **run()**
5. **terminate()**

Which makes thread leave running state?

1. **yield()**
2. **wait()**
3. **notify()**
4. **notifyAll()**
5. **sleep(1000)**
6. **join()**
7. **Thread.killThread()**

Methods in Runnable

1. **void run()**
2. **public void run()**
3. **public void start()**
4. **void run(int priority)**

wait(), notify(),and notifyAll() methods defined in?

1. **Thread**
2. **Lava.lang**
3. **Runnable**
4. **Callable**
5. **Object**

QA