**Thread**

An independent line of execution.

Thread means two different things:

An instance of class java.lang.Thread

A thread of execution.

An instance of class Thread is just an object.

Like any other object in Java, it has variables & methods and lives & dies on a heap.

A thread of execution is an individual lightweight process that has it’s own call stack.

In java, there is one thread per call stack – or one call stack per thread.

The main() method, that starts the execution of a java program runs in one thread called the main thread.

Can define and instantiate a thread in 2 ways:

Extend the java.lang.Thread class

Implement the Runnable interface.

Thread States

A thread can be only in one of the five states.

* New
* Runnable
* Running
* Waiting/Blocked/Sleeping
* Dead

Once the thread has been started, it can never be started again.

Thread Class Methods

Run, start, currentThread, getName, getPriority, setPriority, join, sleep, yeild

**Deadlock**

Deadlock occurs when two threads are blocked, with each waiting for the other's lock. Neither can run until the other gives up its lock, so they'll sit there forever.

Deadlocks can occur in Java because the synchronized keyword causes the executing thread to block while waiting for the lock, or monitor, associated with the specified object.

A potential synchronization deadlock

public static Object cacheLock = new Object();

public static Object tableLock = new Object();

...

public void oneMethod() {

synchronized (cacheLock) {

synchronized (tableLock) {

doSomething();

}

}

}

public void anotherMethod() {

synchronized (tableLock) {

synchronized (cacheLock) {

doSomethingElse();

}

}

}

Database level deadlock.

A transaction can attempt to lock a table in exclusive mode when it starts to prevent other transactions from getting shared locks on a table.

Detection

When a transaction waits more than a specific amount of time to obtain a lock

Avoid

You might want the waiting transaction to abort, or time out, after a reasonable amount of time, called a *lock wait timeout*.

Using both row-level locking and the TRANSACTION\_READ\_COMMITTED isolation level makes it likely that you will avoid deadlocks