Deadlock

```
        Thread A:                    Thread B:

    lock1.acquire();             lock2.acquire();
    lock2.acquire();             lock1.acquire();

    // do something              // do something

    lock1.release();             lock1.release();
    lock2.release();             lock2.release();
```

Resource Allocation Graph

r3 is **assigned** to t2

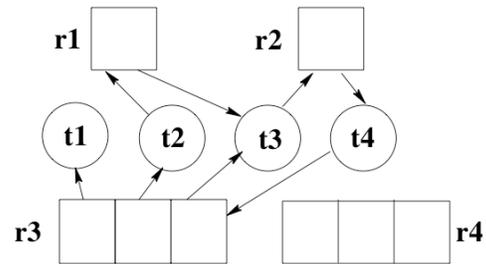t4 is **requesting** r3
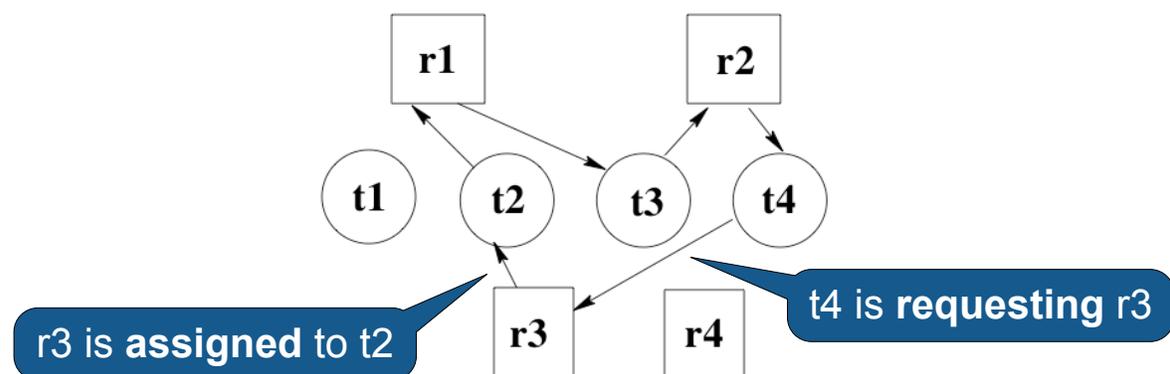
Multiple Copies of Resources
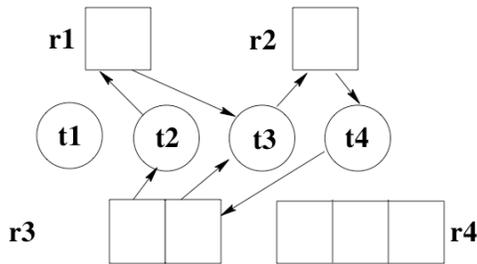
Deadlock!   No deadlock!

Allocation Example (1)

3 threads sharing 12 disks (11 currently used)

	maximum	current	could request
t_1	4	3	1
t_2	8	4	4
t_3	12	4	8

Safe state?

Allocation Example (2)

t₃ requests last disk (now all 12 used)

	maximum	current	could request
t₁	4	3	1
t₂	8	4	4
t₃	12	**5**	**7**

Safe state?

Deadlock Avoidance with RAG

t3 **might request** r2

r3 is **assigned** to t2

t4 is **requesting** r3