

5. Data Race

```
$ objdump -d t1 > t1.disasm.txt # (note on %rip addressing)
```

```
...
a4a:  8b 05 dc 15 20 00      mov    0x2015dc(%rip),%eax    # 20202c <counter>
a50:  83 c0 01              add    $0x1,%eax
a53:  89 05 d3 15 20 00      mov    %eax,0x2015d3(%rip)   # 20202c <counter>
...
```

Textbook example:

```
mov 0x8049a1c, %eax
add $0x1, %eax
mov %eax, 0x8049a1c
```

OS	Thread 1	Thread 2	(after instruction)		
			PC	eax	counter
	<i>before critical section</i>		100	0	50
	mov 8049a1c,%eax		105	50	50
	add \$0x1,%eax		108	51	50
	interrupt				
	<i>save T1</i>				
	<i>restore T2</i>		100	0	50
		mov 8049a1c,%eax	105	50	50
		add \$0x1,%eax	108	51	50
		mov %eax,8049a1c	113	51	51
	interrupt				
	<i>save T2</i>				
	<i>restore T1</i>		108	51	51
	mov %eax,8049a1c		113	51	51

Figure 26.7: The Problem: Up Close and Personal

Need mutual exclusion or atomic operations