



Primitives Hardware  
 Consensus number  
 Primitive with CR: x cannot be used on:  $x + i$

Mecanismo cerrojo (mutex)

- 2 test-and-set  
 TNS reg Address + Reg ← m [Address]  
 + m [Address] ← d
- 2 Swap  
 XCHG reg Address + temp ← m [Address]  
 + m [Address] ← reg  
 + reg ← temp
- ... Compare & swap  
 feld ← m [reg] or d
- LOCK XADD reg mem + reg ← m [mem]  
 + m [mem] ← op (reg)
- Comparar e intercambiar  
 LOCK CMPXCHG mem reg + temp ← m [mem]  
 + m [mem] ← reg  
 + if temp == eax: m [mem] ← reg
- LL/SC (atmac. condicional)  
 + LL r, x + r ← x  
 + chr ← ebx  
 + SC r, x + m [x] ← r } si SC antes  
 + r ← 1 } m control sujeción  
 + r ← 0 } op. s.

```

-> { (atomic_flag &k)
while (k.test_and_set());
-> U (atomic_flag &k)
↳ k.char(0);

-> { (...):
mov eax, k
xor eax, k
cmp eax, 0
jz loop

-> { (atomic_flag &k)
while (k.test_and_set() == 0);
-> U (atomic_flag &k)
↳ k.char(0);
  
```

R, M, W  
 atomic operations