

# Cache

small

Map (addr, value) cache

big

map (addr, value) ram

Hash Map  
access

$$O\left(\frac{1}{n}\right)$$

update 1

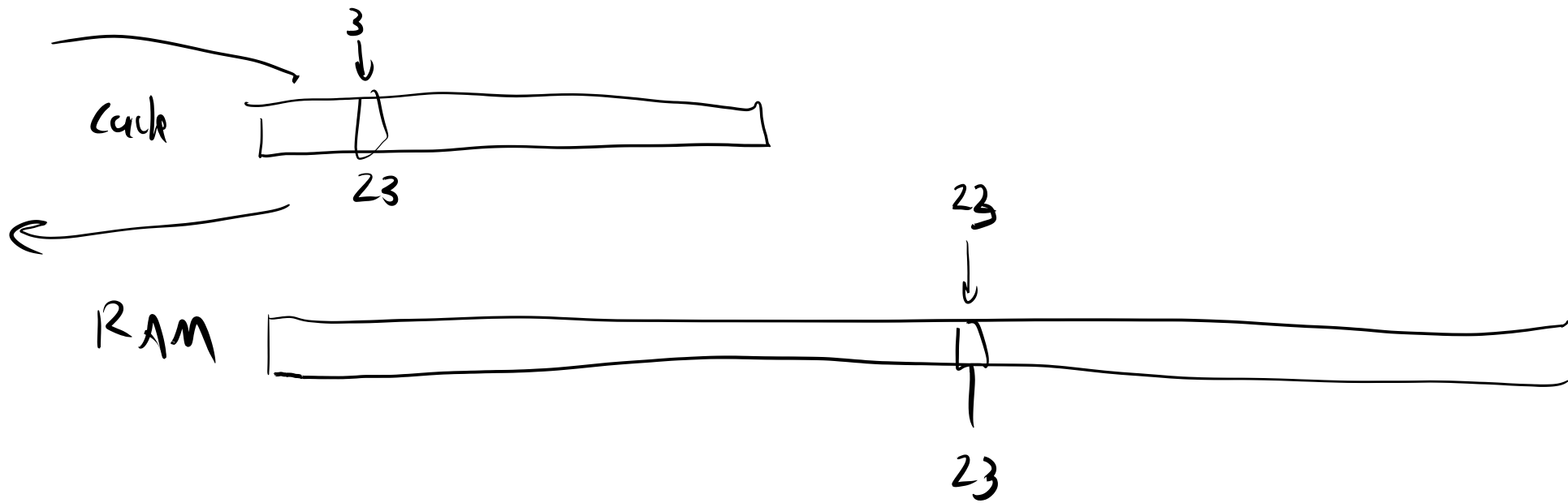
$n^3$

Array

access  $\sqrt{n}$

$$O(1)$$

distance



RAM  
addr  
23 → 3  
Cache  
addr

Map (addr, addr)

# Locality

Observations about human-written code  
accesses memory

1. you go to the same address a lot in quick succession

Temporal Locality

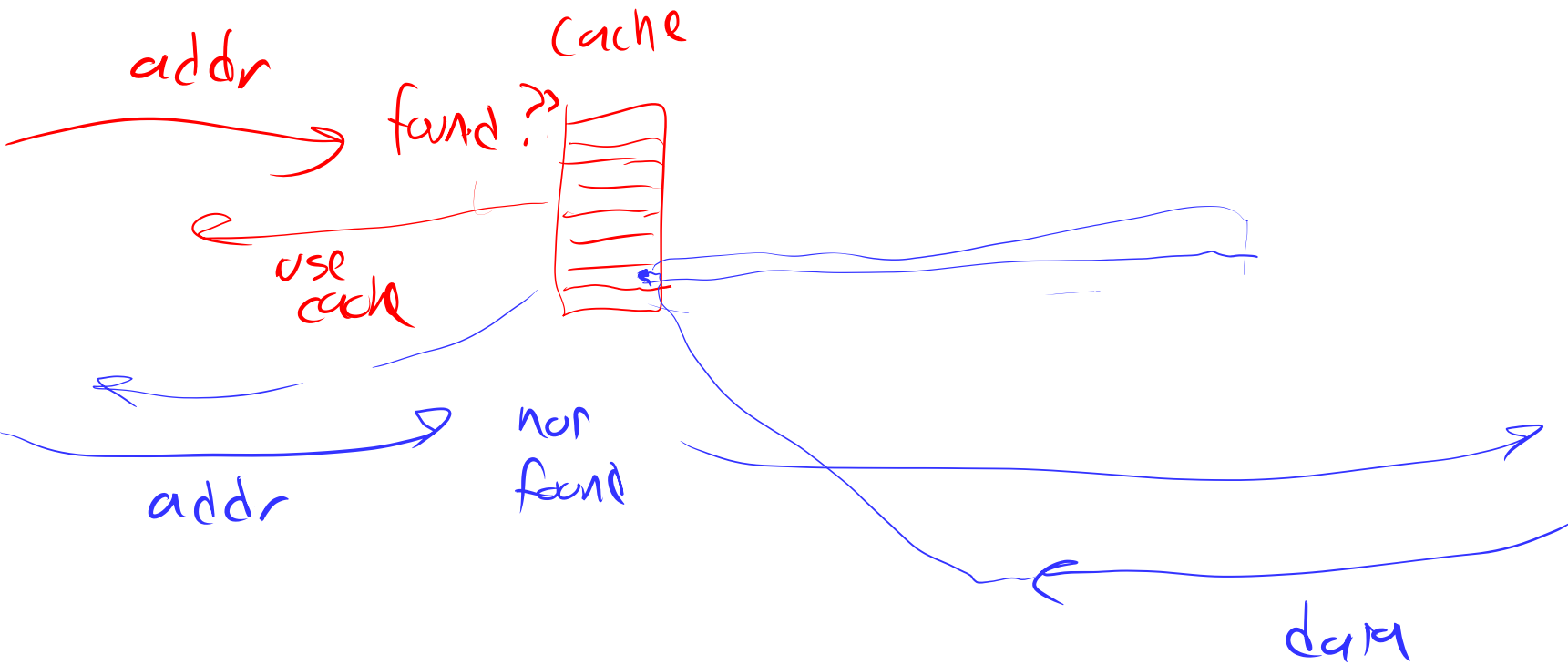
2. you go addresses that are similar often

$|addr_1 - addr_2|$  is small

# Least Recently Used

## LRU

Hit



Miss



cache

64-byte cache block

Set  
of  
cache lines

valid  
bit

