# Quiz 1 Review

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# Quiz 1 logistics

- Time: 1pm-2:30pm on Friday, March 6
- Location: 32-141

- Covered materials: L01-07

- Handouts will be provided
  - Handout 1 – EDSACjr
  - Handout 3 – RISC MIPS
  - Handout – SRRIP
  - Handout – Interleaved Memory

- No calculators

# Pipelining

- Overlaps execution of multiple instructions
- Visualization
  - Instruction flow diagram
  - Resource usage diagram
- Hazard: an instruction cannot execute because
  - Resource is not ready: structural hazard
  - Data value is not ready: data hazard
  - PC is not ready: control hazard

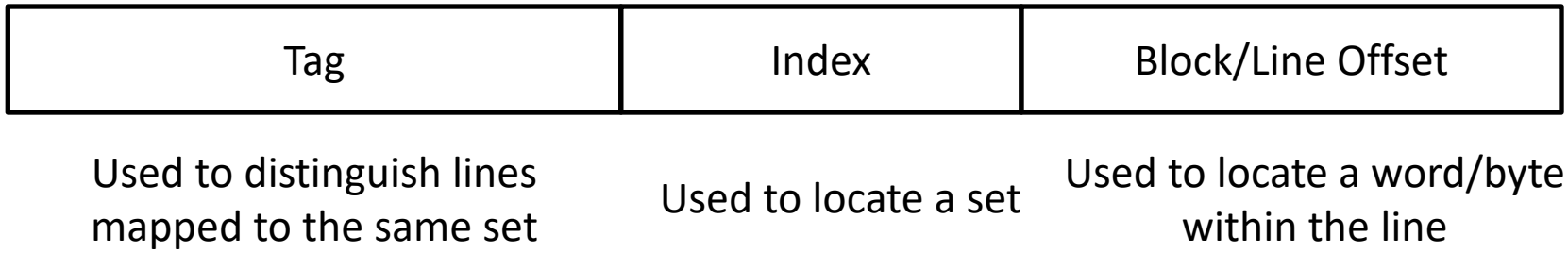
# Strategies to resolve hazards

- Stall
- Bypass
- Speculate
- More to cover in the coming lectures

# Caches

- A small but fast storage that exploits locality
  - Temporal locality
  - Spatial locality
- Performance metrics
  - AMAT = hit time + miss rate * miss penalty
- Design options
  - # of sets, # of ways
  - Block size
  - Replacement policy
  - Inclusivity and exclusivity
  - More to cover in the future lectures

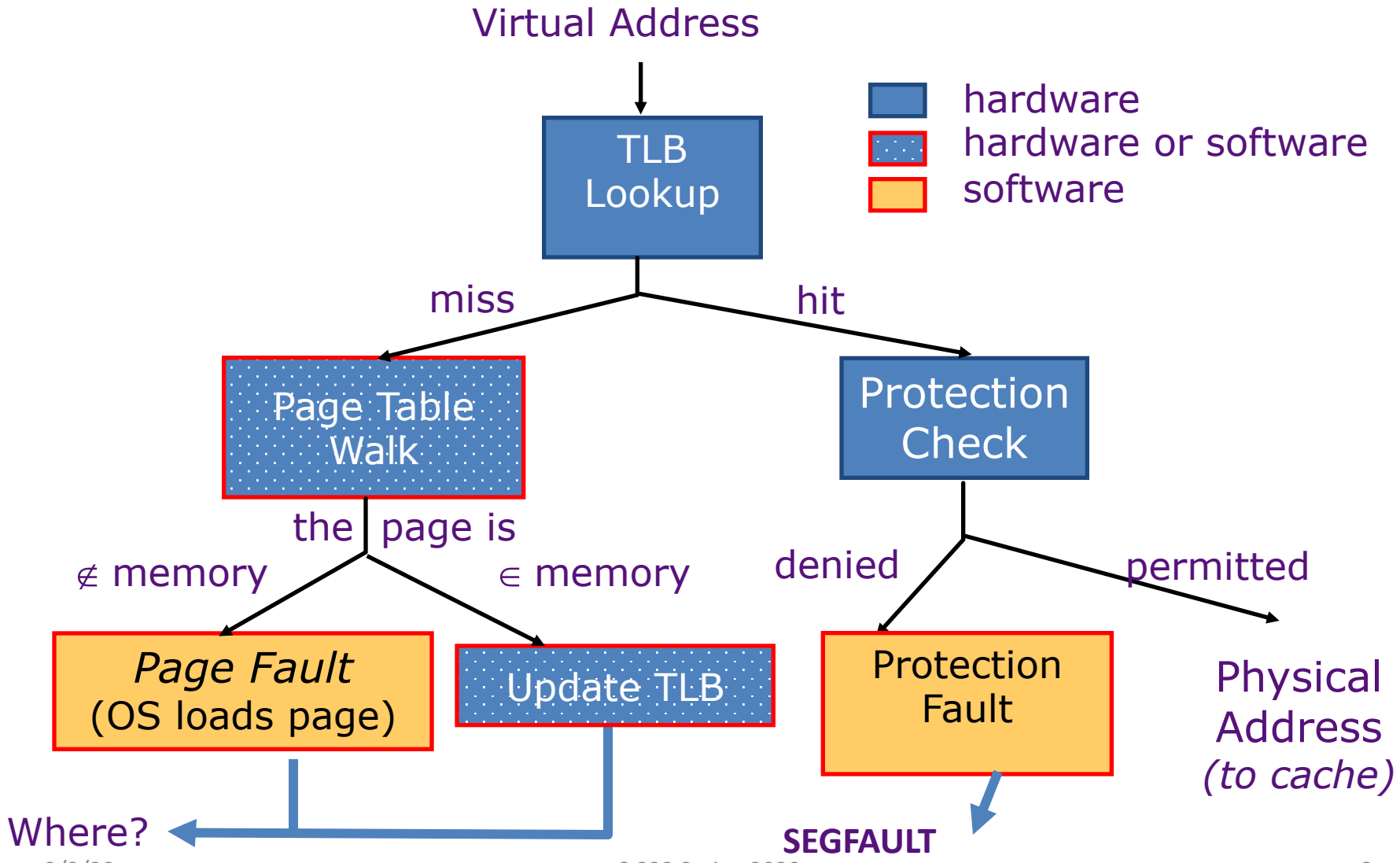
# Interpreting a byte address



# Memory management strategies

- Segmentation
- Paging

# Address translation in paging

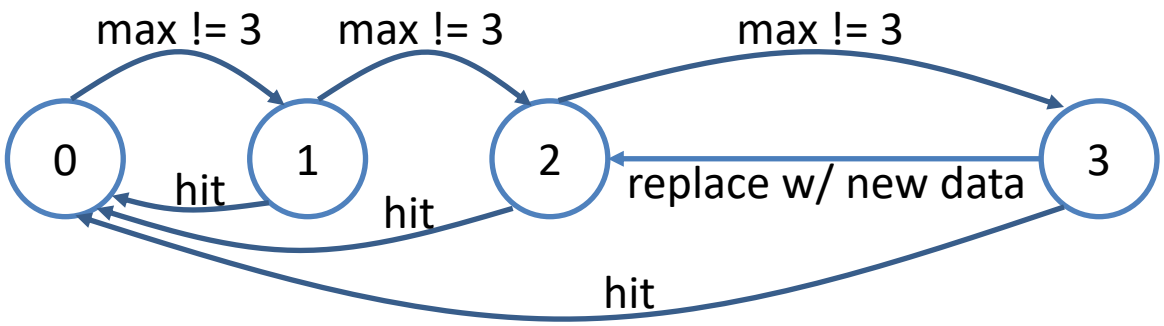


# Self-modifying code

- Simplifies data path design but complicates programming

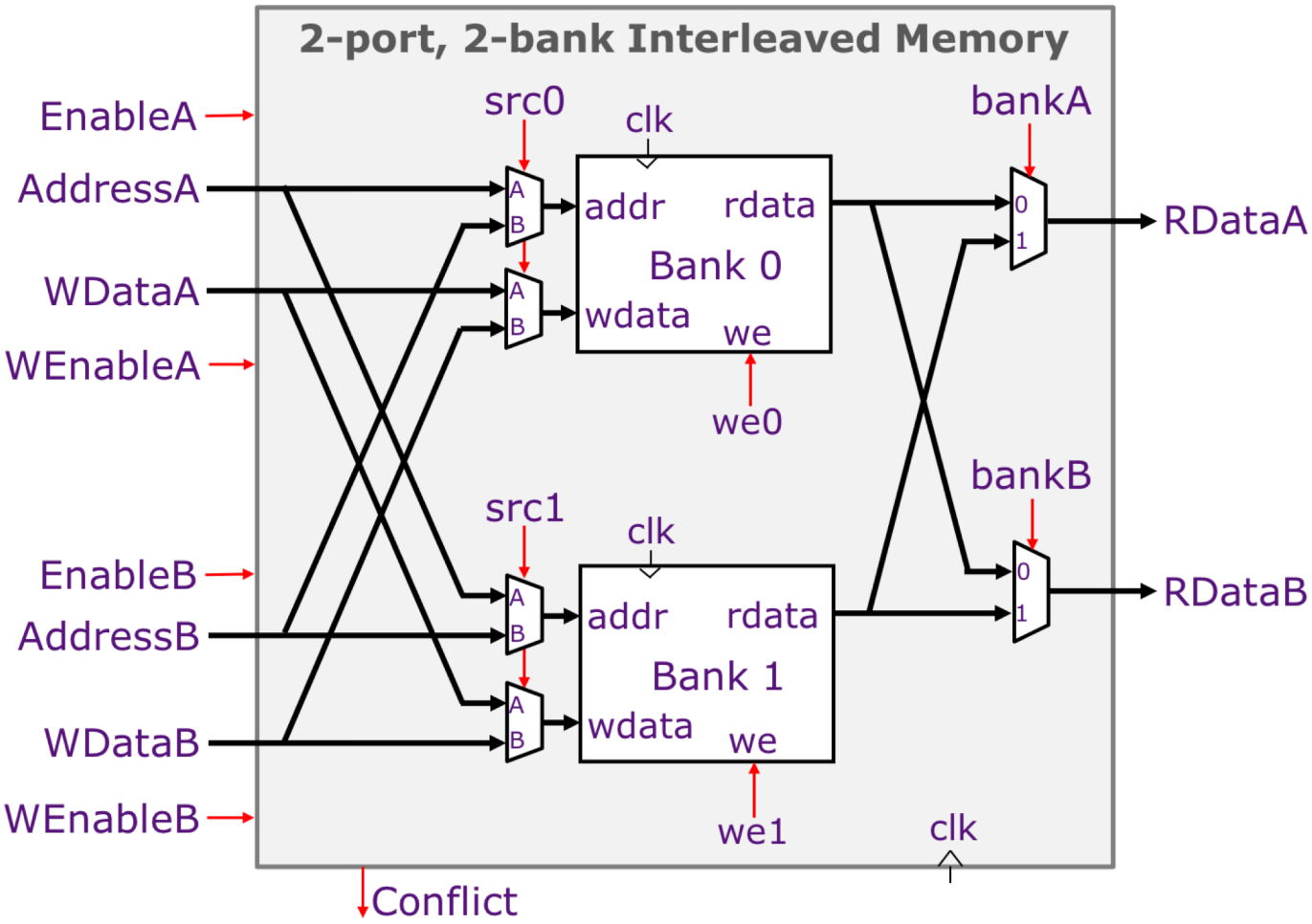
# Handout - SRRIP

```
// Candidates and their RRPVs are indexed by w in [0, W - 1]
if access is a hit on way w:
        RRPVs[w] = 0
else: // access is a miss
        while (maximum value of RRPVs != 2^M - 1): // 3 if M == 2
                Increment all RRPVs by 1
        // Now there must be at least an RRPV with value 2^M - 1
        Select w as the minimum index s.t. RRPVs[w] == 2^M – 1
        // w-th candidate is selected as the victim
        Replace the old data of candidate w with the new data
        RRPVs[w] = 2^M – 2 // 2 if M == 2
```




**State-transition diagram of an RRPV in 2-bit SRRIP**

# Handout – Interleaved Memory



Wish you all the best!