

CSE 2021 COMPUTER ORGANIZATION

HUGH CHESSER
CSE B 1012U

Agenda

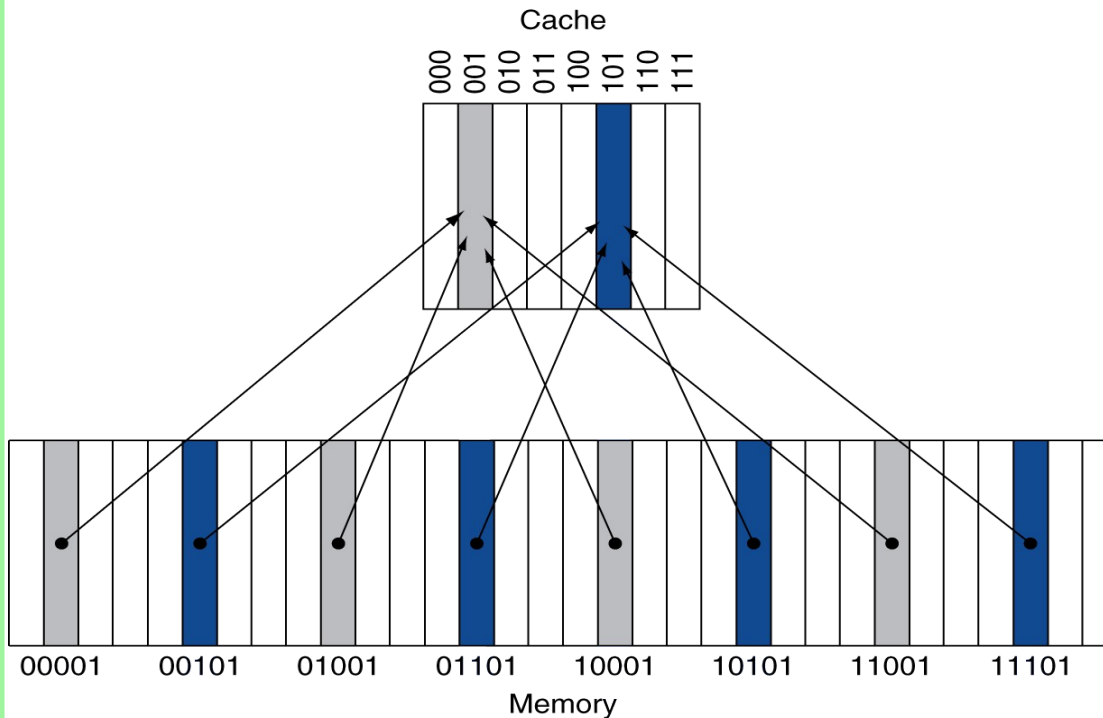
Topics:

1. Redirect for Block Address example
2. Review of Quiz Answers

Patterson: 5.2, Appendix C.8, C.9

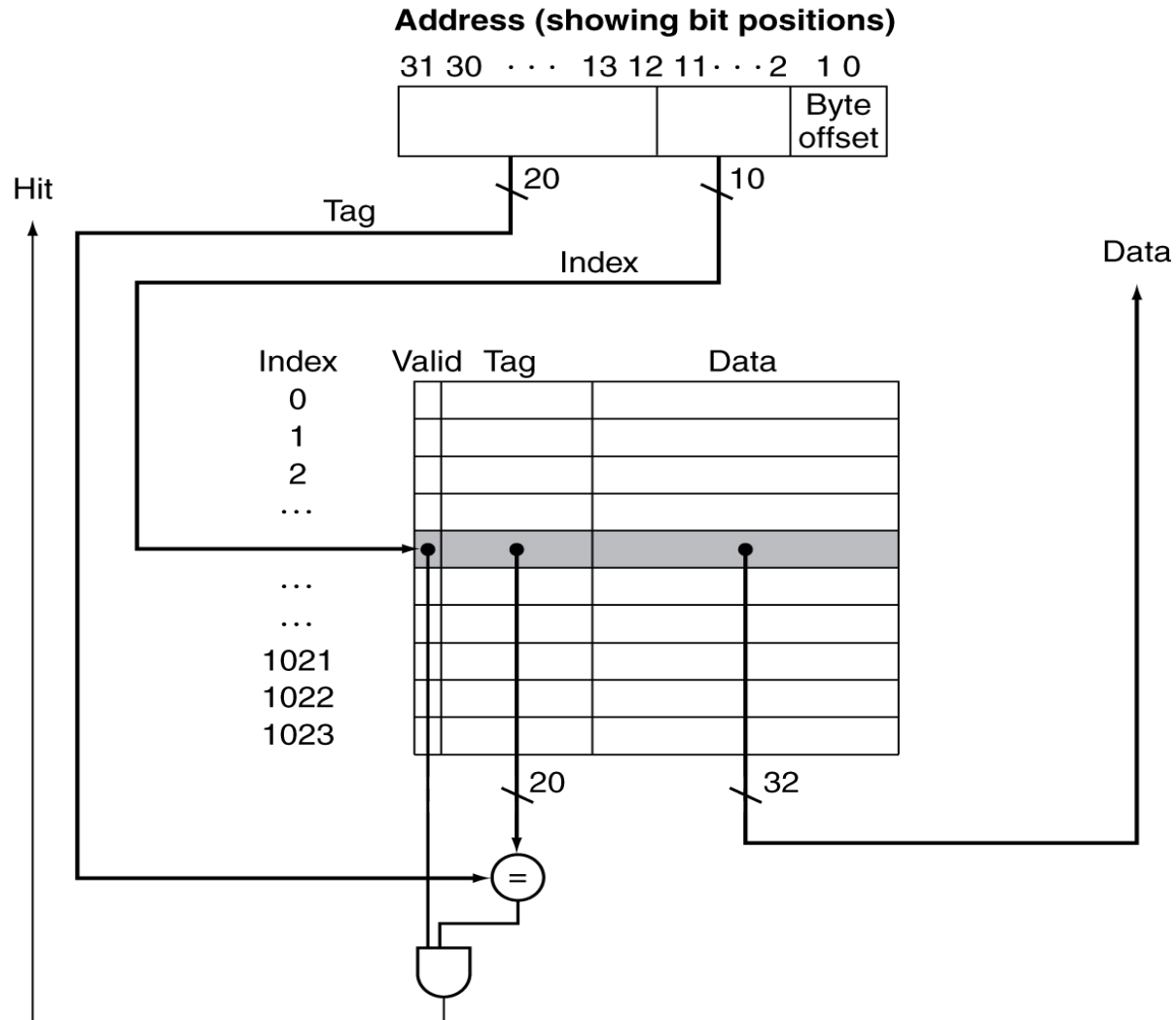
Direct Mapped Cache

- Location determined by address
- Direct mapped: only one choice
 - (Block address) modulo (#Blocks in cache)



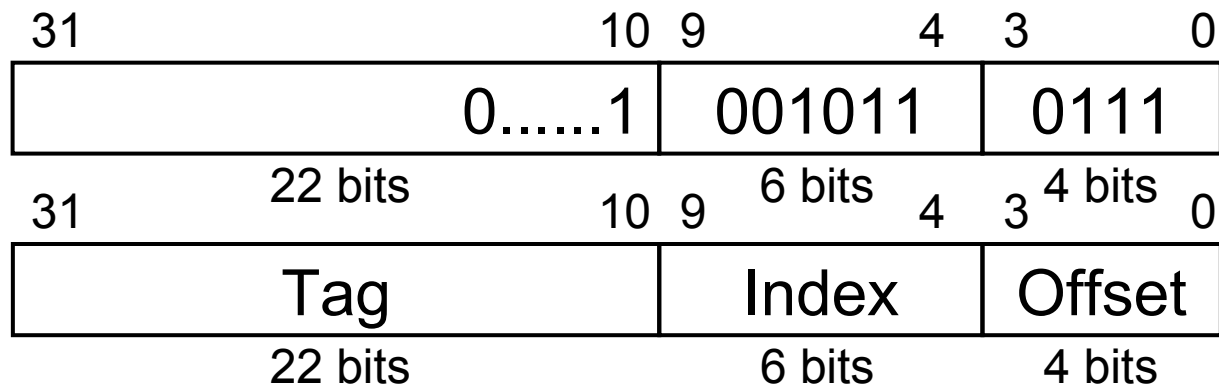
- # of Blocks is a power of 2
- Use low-order address bits

Address Subdivision



Example: Larger Block Size

- 64 blocks, 16 bytes/block
 - To what block number does address 1207 map?
- Block address = $\lfloor 1207/16 \rfloor = 75$
- Block number = $75 \text{ modulo } 64 = 11$



Exam Study Suggestions

Do practice questions! Do NOT simply read the textbook

Questions are available in the back of the chapters:

- Chapters 1, 2, 3, 4, 5 (up to and including section 5.2), Appendix B, C.1 – C.10, D.3 – I have some solutions if stuck
- Practice with spim and iVerilog

Chapter 1 – Computer Terminology, Abstractions

- Instruction set architecture
- Computer performance – measures, benchmarks

Chapter 2 – Assembly Instructions

- MIPS assembly language introduction (details in Appendix B)
- Machine code
- Real, signed/unsigned number and character representations

Chapter 3 – Computer Arithmetic

- Integer addition, subtraction, multiplication, division
- Floating point – not so much

Chapter 4 – Processor Architecture

- Building blocks – logic gates, latches, flip flops
- Components – ALU, Register file, program counter, memory
- Single cycle implementation
- Multi-cycle implementation
- Pipeline implementation – control, data hazards

Chapter 5

- Memory technologies and hierarchy
- Caches

Appendices, Labs

- Appendix B – MIPS assembly and SPIM simulator details
- Appendix C – Logic design details
- Appendix D – Control – Finite state machine implementation
- Labs A – D – MIPS programming
- Labs K – N – Verilog design