Caches and Processes

CSE 351 quiz section. 11/14/2013

Cache makes memory fast

- Cache basics
- Principle of locality
- Memory hierarchies
- Cache organization
- Program optimizations that consider caches

A puzzle.

- What can you infer from this:
  - Cache starts *empty*
  - Access (addr, hit/miss) stream:

- (10, miss), (11, hit), (12, miss)

block size $\geq 2$ bytes  block size $< 8$ bytes

Finding cache geometries in code

- Using for loops to see if they hit or miss
- Can determine
  - Block size
  - Number of blocks
  - Associativity
- Demo...
What is a process?

- What is a program? A processor? A process?

Processes

- Definition: A **process** is an instance of a running program
  - One of the most important ideas in computer science
  - Not the same as “program” or “processor”

- Process provides each program with **two key abstractions**:
  - Logical control flow
    - Each process seems to have exclusive use of the CPU
  - Private virtual address space
    - Each process seems to have exclusive use of main memory

- Why are these illusions important?
- How are these illusions maintained?
  - Process executions interleaved (multi-tasking)
  - Address spaces managed by virtual memory system – next course topic

What is a process?

- Why are we learning about processes?
  - Processes are another **abstraction** in our computer system – the process abstraction provides an **interface** between the program and the underlying CPU + memory.

- What do processes have to do with exceptional control flow (previous lecture)?
  - Exceptional control flow is the mechanism that the OS uses to enable multiple processes to run on the same system.

Questions?

- Homework 3 due on Friday
- Peter and Sara have office hours today
- Discussion board