

# **16.482 / 16.561: Computer Architecture and Design**

Fall 2013

## Lecture 1: Key Questions September 9, 2013

1. What information is required to translate a high-level statement such as  $X[i] = i * 2;$  to assembly language?

2. Describe how a processor executes a typical instruction.

3. Describe the four ISA classes discussed in class.

4. For each ISA class mentioned above, list the instructions used for the sequence:

$$A = B - C;$$

$$B = A + C;$$



5. What are three locations in which operands are stored? Which is preferable, and why?

6. Describe the characteristics of a RISC architecture.

7. Describe the differences between response time and throughput as performance metrics.

8. Define relative performance.
  
  
  
  
  
  
  
  
  
  
9. What is CPU time? How is it calculated?
  
  
  
  
  
  
  
  
  
  
10. **Example:** Say Computer A, which has a 2GHz clock, runs a program using 10 seconds of CPU time. We want to design a computer that can run the same program in 6 seconds. Our computer will have a faster clock, but will require 1.2 times as many clock cycles as Computer A to run this program. How much faster must its clock be?

11. Describe the metrics instruction count and CPI.

12. **Example:** Given two computers with the same ISA, running the same program, which is faster, and by how much?

- Computer A: Cycle time = 250 ps, CPI = 2.0
- Computer B: Cycle time = 500 ps, CPI = 1.2

13. Describe how to calculate weighted CPI.

14. Explain Amdahl's Law.