1. What is the **name** for a computer architecture in which the **main memory holds** not only the data to be used but also **the program instructions to be executed**?

2. **Order** the following architectural layers from **lowest to highest**:

Assembly Language		(highest)
Operating System		
Application Program		
Digital Logic		
Instruction Set Architecture		
Problem Oriented Language		
Microarchitecture		(lowest)

3. What **term** is used to describe each of the following concepts:
   a. The description of the **interface** between an architectural layer and the layer above it

   b. The **way** that an architectural layer performs it's work

4. Name **two ways** that a program written at a given architectural layer can be **converted** for execution by a lower layer.

5. What is the **name of the technique** that can be used to enable a machine with simple hardware to execute complex instructions?

6. What do the acronyms **RISC** and **CISC** stand for?

7. What are the **three** real-world computer chips used by the textbook as **sample architectures**?

8. Identify whether each of the computer chips listed above use **RISC** or **CISC** architectures.

9. **Which** of the following design principles are used with **RISC** systems:

   Provide lots of instructions that can perform complicated tasks

   Minimize instruction issue rate

   Make instructions easy to decode

   Provide lots of registers

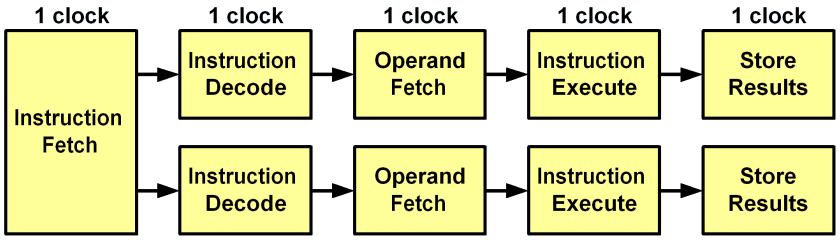
   Make it easy for any instruction to reference memory

10. What **three major subsystems** are part of every computer?

11. **How** does a CPU know which instruction to execute next?

12. **What steps** does a CPU perform in order to do the work specified by a program instruction?

13. A computer with a **2GHz clock speed** has the following pipeline:



a. What is the **bandwidth** of the pipeline?

b. What is the **latency** of the pipeline?

14. What **problem** can occur when you build a system with many CPUs connected to a shared memory?