KNOWLEDGE PROBE 2: MICRO & EMBEDDED CONTROLLERS
Part 1: Microcontroller Technology Update
Microcontroller Architecture

Learning Objectives
- Identify and distinguish between microprocessors, microcomputers, embedded controllers, and cores.
- Identify how micro and embedded controllers are categorized and specified.
- Identify important new architectures and features of micro and embedded controllers.

1. Which of the following does NOT describe one characteristic of an embedded controller's architecture?
   a. Clock speed
   b. Number and type of internal and external buses
   c. Register type and organization.
   d. Type and number of instructions

2. Which of the following does NOT affect microcontroller performance?
   a. Bus organization
   b. Clock speed
   c. Number of instructions
   d. Type and organization of memory

3. Which statement best describes the Von Neumann architecture?
   a. A processor with a single address space and bus and a single data bus
   b. A processor with only a few memory access instructions
   c. Two memories, one for data and the other for instructions
   d. Two processors sharing one set of buses

4. In a Von Neumann architecture MPU, both data and instructions use the same data bus.
   a. True
   b. False

5. What makes the Von Neumann architecture work well despite its limitations?
   a. A large number of instructions
   b. A large number of internal registers
   c. Large memory capacity
   d. Very high speed circuits and buses

6. The main characteristic of a Harvard architecture MPU is
   a. A large number of instructions
   b. A large number of internal registers
   c. Separate data and program memories and buses
   d. Super fast clock speed

7. What feature does a processor that uses pipelining have?
    a. A large number of registers
    b. Dual cores
    c. Harvard architecture
    d. Overlapping or simultaneous fetch, decode, and execute operations

8. Which is generally best for all-round, general purpose computing?
    a. CISC
    b. RISC

9. The main characteristic of a CISC processor is
    a. A large number of instructions
    b. A large number of registers
    c. Harvard architecture
    d. High clock speeds

10. Which of the following does NOT generally improve the performance of a RISC processor over a CISC for a given clock speed?
    a. Few memory reference instructions
    b. Large number of instructions
    c. Large number of registers
    d. Small number of instructions

11. What applications generally require floating point math capability?
    a. Business and accounting operations
    b. General monitoring and control operations
    c. Real-time operating system management
    d. Science and engineering calculations

12. What are the two parts of a floating point word called?
    a. Constant and multiplier
    b. Constant and variable
    c. Input and output
    d. Mantissa and exponent

13. Most RISC processors have floating point capability.
    a. True
    b. False