

# 2024-2025 秋季学期备考 计算机组成与体系结构

## 判 断 题

### CH1

1. Instruction Set is higher than Assembly code in the computer level hierarchy (×)
2. Computer chips having multiple processing units on a single chip is called multitasking architecture (×)
3. Peripheral Component Interconnect (PCI) is the recommended replacement for SATA (serial ATA). (×)
4. Any task done by software can also be done using hardware, and any operation directly performed by hardware can be done using software. (√)
5. Most of today's computer systems use the principle of Von Neumann model whereby all programs must reside in computer memory prior to program execution and processing. (√)
6. Principle of equivalence of hardware and software states that any task done by software can also be done by hardware. (√)
7. At the most basic level, a computer can consist of only 2 parts: a processor and an I/O device (×)
8. Computer Architecture encompasses all aspects of computer systems. (×)

### CH4

1. If a computer uses hardwired control, the microprogram determines the instruction set for the machine. This instruction set can never be changed unless the architecture is redesigned. (×)
2. A branch instruction changes the flow of information by changing the PC. (√)
3. Registers are storage locations within the CPU itself. (√)
4. A two-pass assembler generally creates a symbol table during the first pass and finishes the complete translation from assembly language to machine instructions on the second. (√)
5. The MAR, MBR, PC, and IR registers in MARIE can be used to hold arbitrary data values. (×)
6. MARIE has a common bus scheme, which means a number of entities share the bus. (√)
7. An assembler is a program that accepts a symbolic language program and produces the binary machine language equivalent, resulting in a one-to-one correspondence between the assembly language source program and the machine language object program. (√)
8. If a computer uses microprogrammed control, the microprogram determines the instruction set for the machine. (√)
9. The length of a word determines the number of bits necessary in a memory address. (√)
10. If the memory is 16-way interleaved, it means memory is implemented using 4

banks (x)

11. In high-order memory interleaving, the high order bits of the memory address are used to select the memory bank (✓)
12. An assembler "assembles" assembly language into register transfer language (x)
13. Interrupt checking is typically carried out at various times during the execution of a machine instruction (x)
14. The purpose of both hardwired control units and microprogrammed control units is to raise a series of signals that carry out operations inside a computer system(✓)
15. The control unit is responsible for fetching program instruction, decoding each instruction that is fetched and performing the indicated sequence of operations on the correct data (✓)
16. The ALU is part of the CPU. It carries out arithmetic operations (typically only integer arithmetic) and can carry out logical operations such as AND, OR, and XOR, as well as shift operations (✓)
17. A program counter points to the memory address of the instruction that the CPU is currently executing (x)
18. Most computers typically fall into one of three types of CPU organization: (1) general register organization; (2) single accumulator organization; or (3) stack organization. (✓)
19. The advantage of zero-address instruction computers is that they have short programs; the disadvantage is that the instructions require many bits, making them very long. (x)
20. An instruction takes less time to execute on a processor using an instruction pipeline than on a processor without an instruction pipeline. (✓)
21. The term "endianness" refers to an architecture's byte ordering. (✓)
22. Stack architectures have good code density and a simple model for evaluation of expressions, but do not allow random access, which can cause a problem with the generation of efficient code (✓)
23. Most architectures today are accumulator based. (x)
24. Fixed-length instruction format typically results in better performance than variable-length instruction format. (x)
25. Expanding opcodes make instruction decoding much easier than when it is not used. (✓)
26. Instruction set orthogonality refers to the characteristic in an instruction set architecture where each instruction has a "backup" instruction that performs the same operation. (x)
27. The effective address of an operand is the value of its actual address in memory. (✓)
28. Resource conflicts occur in a pipeline when there are multiple instructions that require the same resource. (✓)
29. Data dependencies occur in a pipeline when multiple instructions need the CPU. (✓)
30. In a pure load/store architecture, no instructions other than the load and store instructions are allowed to directly access memory. (✓)

## CH5

1. Short instructions are typically better because they take up less room and can be fetched quickly. (✓)
2. Variable-length instructions are easier to decode than fixed-length instructions. (✗)
3. Memory organization has no effect on instruction format (✗)
4. Fixed-length instructions always have the same number of operands. (✗)
5. A fixed-length instruction must have fixed-length opcodes. (✗)
6. The best architecture for evaluating postfix notation is the stack-based architecture. (✓)
7. Little endian computers store a two-byte integer with the least significant byte at the lower address. (✓)
8. Big endian computers store a two-byte integer with the least significant byte at the lower address. (✗)
9. One disadvantage to big endian representation is that most computers require words to be written on word address boundaries. (✓)
10. Stack architectures store all operands on the stack. (✓)
11. Accumulator architectures store one operand on the stack and the other in the accumulator. (✗)
12. Accumulator architectures use sets of general purpose registers to store operands. (✗)
13. General-purpose register architectures are the most widely accepted models for computers today (✓)
14. The term "Endian" refers to the byte ordering, or the way a computer stores the bytes of a multiple-byte data element. (✓)
15. A Very Long Instruction Word (VLIW) is an architectural characteristic in which each instruction can specify multiple scalar operations. (✓) 必考
16. A stack-organized computer uses indirect addressing. (✗)
17. A stack-organized computer uses zero addressing.
18. To carry out a binary arithmetic operation, an accumulator architectures uses one operand. (✓)
19. Program instructions act on the data, unlike data-driven, or dataflow, architectures. (✓)

## CH6

1. All cache mapping schemes require a main memory address to have an offset field (✓)
2. Caching breaks down when programs exhibit good locality (✗)
3. It is important to know if a computer is byte or word addressable because we need to know how many addresses are contained in main memory, cache, and in each block when doing cache mapping. (✓)
4. The type of cache write policies are write-through and write-back. (✓)
5. A unified cache is a cache that holds both data and instructions. (✓)
6. When a computer uses paging, there must be a page table for every process. (✓)

## CH7

1. I/O channels are driven by small CPUs called I/O processors (IOPs). (✓)
2. I/O channels are driven by small CPUs called miniprocessors (✗)
3. The simplest way for a CPU to communicate with an I/O device is through polled I/O (✓)
4. A standard monitor is the only output device that resents results to the user. (✓)
5. Channel I/O is a type of non-isolated I/O because the systems are equipped with separate I/O buses. (✗)
6. Two types of transmission modes are serial and parallel transmission modes. (✓)
7. Serial transfer methods can be used for time sensitive isochronious data transfers (✓)
8. Cylinders describe circular areas on each disk in Rigid disk drives (✓)
9. Rewritable optical media replace the dye and reflective coating layers of a cd-r disk with a non-metallic alloy. (✗)
10. The storage systems that are not protected by RAID are known as just a bunch of disks (JBOD). (✗)
11. Raid level 1, or RAID-1, is also known as disk mirroring. (✓)
12. A hologram is a three-dimensional image rendered by the manipulation of laser beams. (✓)
13. Memristor memories are a type of volatile Ram (✗)
14. The I/O modules take care of data movement between main memory and a particular deice interface. (✓)
15. Solid state drives consist of a micro controller and flash memory. (✓)
16. Raid-2 writes one bit per strip instead of wirtin data in blocks of arbitrary size. (✓)
17. The disadvantage f Raid-1 is that it is costly and requires large memory space. (✓)
18. Like Raid-6, raid dp can tolerate the simultaneous loss of two disk drives without loss of data (✓)
19. Disk drives sometimes skip around to allow time for the drive circuitry to process the contents of a sector prior to reading the next sector. This is called interpathing. (✗)
20. Disk drives sometimes "skip around" to allow time for the drive circuitry to process the contents of a sector prior to reading the next sector. This is called as interleaving. (✓)
21. Large systems are also limited to using only one type of RAID (✗)

## CH11

1. Most of the CPU architectures today have a combination of RISC and CISC. (✓)
2. The RISC clock cycles are often longer than CISC clock. (✗)
3. RISC machines originally offered a smaller instruction set compared with CISC machines. (✓)
4. Super pipelining occurs when a pipeline has stages that require less than two o'clock cycle to execute. (✗)
5. Pervasive computing are the systems that are totally embedded in the environment,

- simple to use, completely connected, typically mobile, and often invisible. (✓)
6. The analogy of human languages can be compared with the qualities of RISC and CISC. (✓)
  7. Distributed computing is another form of multiprocessing. (✓)
  8. DNA computing uses DNA as software and enzymes as hardware. (✓)
  9. Biological computing uses components from living organisms instead of inorganic silicon ones. (✓)
  10. Cloud computing and the classical distributed computing are not the same in all of the concepts they use. (✓)
  11. Optical computing uses photons instead of electrons to perform logic in a computer. (✓)

### 补充

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11. Optical computing uses photons instead of electrons to perform logic in a computer. (✓)
12. Switching networks use switches to dynamically alter routing. (✓)
13. A pile of PCs (PoPC) is a cluster of dedicated heterogeneous hardware used to build a parallel system out of mass market commodity components, or COTs. (✓)
14. One obstacle is the tendency for qubits to decay into a single incoherent state (called decoherence), which leads to inconsistency of data. (✓)
15. Program instructions act on the data, unlike data-driven, or dataflow, architectures. (✓)
16. Neural network computers are composed of a large number of simple processing elements that individually handle one piece of a much larger problem. (✓)
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18. The problem with Flynn's taxonomy is with the MIMD category; it considers how

- the processors are connected and the memory is viewed. (×)
- 19. Data drives processing on dataflow systems, and dataflow multiprocessors do not suffer from the contention and cache coherency problems. (✓)
  - 20. Interconnection networks can be either static or dynamic. (✓)
  - 21. CISC architectures include a large number of instructions that directly access memory. (✓)
  - 22. VLIW processors rely entirely on the compiler rather than on the hardware. (✓)
  - 23. Quantum computers use quantum bits (qubits) that can be in multiple states simultaneously. (✓)
  - 24. General-purpose computers do not need watchdog timers because they interact directly with human beings, who deal with issues when the system hangs or crashes. (✓)
  - 25. Embedded systems can be found in simple items like coffeemakers and tennis shoes. (✓)
  - 26. Verilog is patterned after the C programming language, while VHDL is more similar to the Ada programming language. (✓)
  - 27. SPOOLing is the simplest form of multiprogramming. (✓)
  - 28. An ICE is a test instrument that integrates microprocessor execution control, memory access (read/write), and real-time trace, among other things. (✓)
  - 29. Embedded systems have problems with async programming. (✓)
  - 30. Embedded systems rarely use virtual memory. (✓)
  - 31. Cognitive computing can make inferences within a problem's context using hard facts and incomplete information (✓)

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