1. What, in general terms, is the distinction between computer organization and computer architecture?
2. Explain the stored program concept.
3. What are some typical distinguishing characteristics of RISC and CISC computer organization?
4. What, in general terms, is the distinction between computer structure and computer functions?
5. Explain how to determine if a number is negative in the following representations: sign magnitude, twos complement, biased.
6. Briefly explain the two basic approaches used to minimize register-memory operations on RISC machines.
7. What are the four main functions of a computer? Von Neumann’s Computer Architecture briefly describe.
8. Explain how a processor knows that an interrupt occurred.
9. Briefly explain the two basic approaches used to minimize register-memory operations on RISC machines.
10. List and briefly define the main structural components of a computer.
11. What is the difference between the twos complement representation of a number and the twos complement of a number?
12. Briefly explain the two basic approaches used to minimize register-memory operations on RISC machines.
13. List and briefly define the main structural components of a processor.
14. What are the four essential elements of a number in floating-point notation?
15. Describe Harvard architecture principle.
16. What is a stored program computer?
17. What are the differences among positive overflow, exponent overflow, and significant overflow?
18. What is the essential characteristic of the superscalar approach to processor design?
19. What are the four main components of any general-purpose computer?
20. List and briefly explain five important instruction set design issues.
21. Describe the difference between the superscalar and superpipelined approaches.
22. At the integrated circuit level, what are the three principal constituents of a computer system?
23. What types of operands are typical in machine instruction sets?
24. Describe the instruction-level parallelism principle.
25. Explain the instruction pipelining principal.
26. Why is cache memory necessary in today's computing environment?
27. What is the distinction between instruction-level parallelism and machine parallelism?
28. List and explain the key characteristics of a computer family.
29. What is an ALU, who invented it, and how does it work?
30. List and briefly define three types of superscalar instruction issue policies.
31. What is the key distinguishing feature of a microprocessor?
32. Describe the difference between big endian and little endian?
33. There are generally three bus types: local bus, system bus, and expansion bus. Explain each.
34. What general categories of functions are specified by computer instructions?
35. What are the advantages and disadvantages of using a variable-length instruction’s format?
36. What are the key elements of a superscalar processor organization?
37. List and briefly define the possible states that define an instruction execution.
38. Briefly define immediate and direct addressing.
39. Explain the distinction between the written sequence and the time sequence of an instruction.
40. List and briefly define two approaches to dealing with multiple interrupts.
41. Briefly compare indirect and register addressing.
42. What is the relationship between instructions and micro-operations?
43. What types of transfers must a computer’s inter-connection structure (e.g., bus) support?
44. Briefly define and compare register’s indirect and displacement addressing modes.
45. What is the overall function of a processor’s control unit?
46. What is the benefit of using a multiple-bus architecture compared to a single-bus architecture?
47. What general roles are performed by processor registers?
48. Outline a three-step process that leads to a characterization of the control unit.
49. Explain the difference between access time and cycle time with regard to memory speed.
50. What categories of data are commonly supported by user-visible registers?
51. What basic tasks does a control unit perform?
52. What are the differences among sequential access, direct access, and random access?
53. What is the function of condition codes?
54. Provide a typical list of the inputs and outputs of a control unit.
55. What is the general relationship among access time, memory cost, and capacity?
56. What is a program status word?
57. Briefly explain what is meant by a hardwired implementation of a control unit.
58. How does the principle of locality relate to the use of multiple memory levels.
59. Why is a two-stage instruction pipeline unlikely to cut the instruction cycle time in half, compared with the use of no pipeline?
60. What is the difference between a hardwired implementation and a microprogrammed implementation of a control unit?
61. What are the differences among direct mapping, associative mapping, and set associative mapping?
62. List and briefly explain various ways in which an instruction pipeline can deal with conditional branch instructions.
63. What is the purpose of a control memory?
64. For a direct-mapped cache, a main memory address is viewed as consisting of three fields. List and define the three fields.
65. Give several reasons for the choice by designers to move to a multicore organization rather than increase parallelism within a single processor.
66. What is the difference between horizontal and vertical microinstructions?
67. For an associative cache, a main memory address is viewed as consisting of two fields. List and define the two fields.
68. Why is there a trend toward given an increasing fraction of chip area to cache memory?
69. What are the basic tasks performed by a microprogrammed control unit?
70. For a set-associative cache, a main memory address is viewed as consisting of three fields. List and define the three fields.
71. List some examples of applications that benefit directly from the ability to scale throughput with the number of cores.
72. What is the difference between hard and soft microprogramming?
73. What are the key properties of semiconductor memory?
74. Give an explanation of designing components of computer systems on FPGA.
75. What is the difference between functional and resource encoding in microprogrammed control unit?
76. What are two senses in which the term random-access memory is used?
77. Hierarchical Architecture of computer memory. Construction principle.
78. List and briefly define three types of computer system organization.
79. What is the difference between DRAM and SRAM in terms of application?
80. Describe associative and virtual memory. Explain the Segmentation of the memory.
81. What are some of the potential advantages of an symmetric multiprocessor (SMP) compared with a uniprocessor?
82. What is the difference between DRAM and SRAM in terms of characteristics such as speed, size, and cost?
83. Explain methods to improve computer performance.
84. What are some applications for ROM?
85. What is an ALU, who invented it, and how does it work?
86. What are some of the key benefits of computer clustering?
87. Give an explanation of each of the four memory access methods that are commonly used.
88. What is the difference between little endian and big endian storage of numeric data?
89. Summarize the differences among simple instruction pipelining, superscalar, and simultaneous multithreading.