Note Title

Homework 1

Solve the following problems from the attached pages

- 57d, 58e, 59e, 60e, 61e
  64c, 64d (8-bit ones complement)
  65c, 65d (same)
  67d, 68, 71d, 72d, 77
  81c, 82c

system performs the task of operating or controlling the computer system, along with its I/O devices. Modern computers use Microsoft Windows in place of DOS as an operating system.

12. The microprocessor is the controlling element in a computer system. The microprocessor performs data transfers, does simple arithmetic and logic operations, and makes simple decisions. The microprocessor executes programs stored in the memory system to perform complex operations in short periods of time.
13. All computer systems contain three buses to control memory and I/O. The address bus is used to request a memory location or I/O device. The data bus transfers data between the microprocessor and its memory and I/O spaces. The control bus controls the memory and I/O, and requests reading or writing of data. Control is accomplished with $\overline{IORC}$ (I/O read control), $\overline{IOWC}$ (I/O write control), $\overline{MRDC}$ (memory read control), and $\overline{MWTC}$ (memory write control).
14. Numbers are converted from any number base to decimal by noting the weights of each position. The weight of the position to the left of the radix point is always the units position in any number system. The position to the left of the units position is always the radix times one. Succeeding positions are determined by multiplying by the radix. The weight of the position to the right of the radix point is always determined by dividing by the radix.
15. Conversion from a whole decimal number to any other base is accomplished by dividing by the radix. Conversion from a fractional decimal number is accomplished by multiplying by the radix.
16. Hexadecimal data are represented in hexadecimal form or in a code called binary-coded hexadecimal (BCH). A binary-coded hexadecimal number is one that is written with a 4-bit binary number that represents each hexadecimal digit.
17. The ASCII code is used to store alphabetic or numeric data. The ASCII code is a 7-bit code; it can have an eighth bit that is used to extend the character set from 128 codes to 256 codes. The carriage return (Enter) code returns the print head or cursor to the left margin. The line feed code moves the cursor or print head down one line. Most modern applications use Unicode, which contains ASCII at codes 0000H–00FFH.
18. Binary-coded decimal (BCD) data are sometimes used in a computer system to store decimal data. These data are stored either in packed (two digits per byte) or unpacked (one digit per byte) form.
19. Binary data are stored as a byte (8 bits), word (16 bits), or doubleword (32 bits) in a computer system. These data may be unsigned or signed. Signed negative data are always stored in the two's complement form. Data that are wider than 8 bits are always stored using the little endian format. In 32-bit Visual C++ these data are represented with char (8 bits), short (16 bits) and int (32 bits).
20. Floating-point data are used in computer systems to store whole, mixed, and fractional numbers. A floating-point number is composed of a sign, a mantissa, and an exponent.
21. The assembler directives DB or BYTE define bytes, DW or WORD define words, DD or DWORD define doublewords, and DQ or QWORD define quadwords.

QUESTIONS AND PROBLEMS

1. Who developed the Analytical Engine?
2. The 1890 census used a new device called a punched card. Who developed the punched card?
3. Who was the founder of IBM Corporation?
4. Who developed the first electronic calculator?
5. The first electronic computer system was developed for what purpose?
6. The first general-purpose, programmable computer was called the _____.
7. The world's first microprocessor was developed in 1971 by _____.

8. Who was the Countess of Lovelace?
9. Who developed the first high-level programming language called FLOWMATIC?
10. What is a von Neumann machine?
11. Which 8-bit microprocessor ushered in the age of the microprocessor?
12. The 8085 microprocessor, introduced in 1977, has sold _____ copies.
13. Which Intel microprocessor was the first to address 1M bytes of memory?
14. The 80286 addresses _____ bytes of memory.
15. How much memory is available to the 80486 microprocessor?
16. When did Intel introduce the Pentium microprocessor?
17. When did Intel introduce the Pentium Pro processor?
18. When did Intel introduce the Pentium 4 microprocessor?
19. Which Intel microprocessor addresses 1T of memory?
20. What is the acronym MIPs?
21. What is the acronym CISC?
22. A binary bit stores a(n) _____or a(n) _____.
23. A computer K (pronounced kay) is equal to _____ bytes.
24. A computer M (pronounced meg) is equal to _____ K bytes.
25. A computer G (pronounced gig) is equal to _____ M bytes.
26. A computer P (pronounced peta) is equal to _____ T bytes.
27. How many typewritten pages of information are stored in a 4G-byte memory?
28. The first 1M byte of memory in a DOS-based computer system contains a(n) _____ and a(n) _____area.
29. How large is the Windows application programming area?
30. How much memory is found in the DOS transient program area?
31. How much memory is found in the Windows systems area?
32. The 8086 microprocessor addresses _____ bytes of memory.
33. The Core2 microprocessor addresses _____ bytes of memory.
34. Which microprocessors address 4G bytes of memory?
35. Memory above the first 1M byte is called _____ memory.
36. What is the system BIOS?
37. What is DOS?
38. What is the difference between an XT and an AT computer system?
39. What is the VESA local bus?
40. The ISA bus holds _____-bit interface cards.
41. What is the USB?
42. What is the AGP?
43. What is the XMS?
44. What is the SATA interface and where is it used in a system?
45. A driver is stored in the _____ area.
46. The personal computer system addresses _____ bytes of I/O space.
47. What is the purpose of the BIOS?
48. Draw the block diagram of a computer system.
49. What is the purpose of the microprocessor in a microprocessor-based computer?
50. List the three buses found in all computer systems.
51. Which bus transfers the memory address to the I/O device or to the memory?
52. Which control signal causes the memory to perform a read operation?
53. What is the purpose of the $\overline{IORC}$ signal?
54. If the $\overline{MRDC}$ signal is a logic 0, which operation is performed by the microprocessor?
55. Define the purpose of the following assembler directives:
    (a) DB
    (b) DQ

(c) DW
(d) DD

56. Define the purpose of the following 32-bit Visual C++ directives:
(a) char
(b) short
(c) int
(d) float
(e) double

57. Convert the following binary numbers into decimal:
(a) 1101.01
(b) 111001.0011
(c) 101011.0101
(d) 111.0001

58. Convert the following octal numbers into decimal:
(a) 234.5
(b) 12.3
(c) 7767.07
(d) 123.45
(e) 72.72

59. Convert the following hexadecimal numbers into decimal:
(a) A3.3
(b) 129.C
(c) AC.DC
(d) FAB.3
(e) BB8.0D

60. Convert the following decimal integers into binary, octal, and hexadecimal:
(a) 23
(b) 107
(c) 1238
(d) 92
(e) 173

61. Convert the following decimal numbers into binary, octal, and hexadecimal:
(a) 0.625
(b) .00390625
(c) .62890625
(d) 0.75
(e) .9375

62. Convert the following hexadecimal numbers into binary-coded hexadecimal code (BCH):
(a) 23
(b) AD4
(c) 34.AD
(d) BD32
(e) 234.3

63. Convert the following binary-coded hexadecimal numbers into hexadecimal:
(a) 1100 0010
(b) 0001 0000 1111 1101
(c) 1011 1100
(d) 0001 0000
(e) 1000 1011 1010

64. Convert the following binary numbers to the one's complement form:
(a) 1000 1000
(b) 0101 1010

(c) 0111 0111
(d) 1000 0000

65. Convert the following binary numbers to the two's complement form:
(a) 1000 0001
(b) 1010 1100
(c) 1010 1111
(d) 1000 0000
66. Define byte, word, and doubleword.
67. Convert the following words into ASCII-coded character strings:
(a) FROG
(b) Arc
(c) Water
(d) Well
68. What is the ASCII code for the Enter key and what is its purpose?
69. What is the Unicode?
70. Use an assembler directive to store the ASCII-character string 'What time is it?' in the memory.
71. Convert the following decimal numbers into 8-bit signed binary numbers:
(a) +32
(b) −12
(c) +100
(d) −92
72. Convert the following decimal numbers into signed binary words:
(a) +1000
(b) −120
(c) +800
(d) −3212
73. Use an assembler directive to store byte-sized −34 into the memory.
74. Create a byte-sized variable called Fred1 and store a −34 in it in Visual C++.
75. Show how the following 16-bit hexadecimal numbers are stored in the memory system (use the standard Intel little endian format):
(a) 1234H
(b) A122H
(c) B100H
76. What is the difference between the big endian and little endian formats for storing numbers that are larger than 8 bits in width?
77. Use an assembler directive to store a 123A hexadecimal into memory.
78. Convert the following decimal numbers into both packed and unpacked BCD forms:
(a) 102
(b) 44
(c) 301
(d) 1000
79. Convert the following binary numbers into signed decimal numbers:
(a) 10000000
(b) 00110011
(c) 10010010
(d) 10001001
80. Convert the following BCD numbers (assume that these are packed numbers) to decimal numbers:
(a) 10001001
(b) 00001001
(c) 00110010
(d) 00000001

81. Convert the following decimal numbers into single-precision floating-point numbers:
    (a) +1.5
    (b) –10.625
    (c) +100.25
    (d) –1200
82. Convert the following single-precision floating-point numbers into decimal numbers:
    (a) 0 10000000 11000000000000000000000
    (b) 1 01111111 00000000000000000000000
    (c) 0 10000010 10010000000000000000000
83. Use the Internet to write a short report about any one of the following computer pioneers:
    (a) Charles Babbage
    (b) Konrad Zuse
    (c) Joseph Jacquard
    (d) Herman Hollerith
84. Use the Internet to write a short report about any one of the following computer languages:
    (a) COBOL
    (b) ALGOL
    (c) FORTRAN
    (d) PASCAL
85. Use the Internet to write a short report detailing the features of the Itanium 2 microprocessor.
86. Use the Internet to detail the Intel 45 nm (nanometer) fabrication technology.