JJ Hoffmann

06/29/2024

CSCI 212

**Assignment 1**

**2.2 Exercises**

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| Question 1.  Express the following bit patterns in hexadecimal.   |  |  | | --- | --- | | a. 0100 0101 0110 0111 | b. 1000 1001 1010 1011 | | c. 1111 1110 1101 1100 | d. 0000 0010 0101 0010 |   Answer 1.   |  |  | | --- | --- | | a. 4567 | b. 89ab | | c. fedc | d. 0252 | |
| Question 2.  Express the following bit patterns in binary.   |  |  | | --- | --- | | a. 83af | b. 9001 | | c. aaaa | d. 5555 |   Answer 2.   |  |  | | --- | --- | | a. 1000 0011 1010 1111 | b. 1001 0000 0000 0001 | | c. 1010 1010 1010 1010 | d. 0101 0101 0101 0101 | |
| Question 3.  How many bits are represented by each of the following?   |  |  | | --- | --- | | a. ffff ffff | b. 7fff 58b7 def0 | | c. 11112 | d. 111116 |   Answer 3.   |  |  | | --- | --- | | a. 32 | b.48 | | c. 4 | d. 16 | |
| Question 4.  How many hexadecimal digits are required to represent each of the following?   |  |  | | --- | --- | | a. eight bits | b. thirty-two bits | | c. sixty-four bits | d. ten bits | | e. twenty bits | f. seven bits |   Answer 4.   |  |  | | --- | --- | | a. 2 | b. 8 | | c. 16 | d. 3 | | e. 5 | f. 2 | |

**2.4 Exercises**

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| Question 1.  Referring to Equation 2.3.3 () what are the values of ***r***, ***n*** and each ***di***for the decimal number 29458254? The hexadecimal number 29458254?  Answer 1.  Decimal number:  r = 10, n = 8, d7 = 2, d6 = 9, d5 = 4, d4 = 5, d3 = 8, d2 = 2, d1 = 5, d0 = 4  Hexadecimal number:  r = 16, n = 8, d7 = 2, d6 = 9, d5 = 4, d4 = 5, d3 = 8, d2 = 2, d1 = 5, d0 = 4 |
| Question 2.  Convert the eight-digit binary number 1010 01012 to decimal.  Answer 2.  165 |
| Question 3.  Convert the following 8-bit binary numbers to decimal by hand:   |  |  | | --- | --- | | a. 1010 1010 | b. 0101 0101 | | c. 1111 0000 | d. 0000 1111 | | e. 1000 0000 | f. 0110 0011 | | g. 0111 1011 | h. 1111 1111 |   Answer 3.   |  |  | | --- | --- | | a. 170 | b. 85 | | c. 240 | d. 15 | | e. 128 | f. 99 | | h. 123 | h. 255 | |
| Question 4.  Convert the following 16-bit binary numbers to decimal by hand:   |  |  | | --- | --- | | a. 1010 1011 1100 1101 | b. 0001 0010 0011 0100 | | c. 1111 1110 1101 1100 | d. 0000 0111 1101 1111 | | E 1000 0000 0000 0000 | f. 0000 0100 0000 0000 | | g. 0111 1011 1010 1010 | h. 0011 0000 0011 1001 |   Answer 4.   |  |  | | --- | --- | | a. 43981 | b. 4660 | | c. 65244 | d. 2015 | | e. 32768 | f. 1025 | | g. 31658 | h. 12345 | |

**2.4 Exercises Continued**

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| Question 5.  Develop an algorithm to convert hexadecimal to decimal, and then convert the following 16-bit numbers to decimal by hand:   |  |  | | --- | --- | | a. a000 | b. ffff | | c. 0400 | d. 1111 | | e. 8888 | f. 0190 | | g. abcd | h. 5555 |   Answer 5.   |  |  | | --- | --- | | a. 40960 | b. 65535 | | c. 1024 | d. 4369 | | e. 34952 | f. 400 | | g. 43981 | h. 21845 | |

**2.6 Exercises**

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| Question 1.  Convert 12310 to binary  Answer 1.  1111011 |
| Question 2.  Convert the following unsigned decimal integers to 8-bit hexadecimal representation:   |  |  | | --- | --- | | a. 100 | b. 125 | | c. 10 | d. 88 | | e. 255 | f. 16 | | g. 32 | h. 128 |   Answer 2.   |  |  | | --- | --- | | a. 64 | b. 7d | | c. 0a | d. 58 | | e. ff | f. 10 | | g. 20 | h. 80 | |
| Question 3.  Convert the following unsigned decimal integers to 16-bit hexadecimal representation:   |  |  | | --- | --- | | a. 1024 | b. 1000 | | c. 32768 | d. 32767 | | e. 256 | f. 65535 | | g. 4660 | h. 43981 |   Answer 3.   |  |  | | --- | --- | | a. 0400 | b. 03e8 | | c. 8000 | d. 7fff | | e. 0100 | f. ffff | | g. 12354 | h. abcd | |
| Question 4.  Invent a code that would allow us to store letter grades with plus or minus, that is the grades A, A-b B+, B, B-,…, D, D-, F. How many bits are required for your code?  Answer 4.  4 bits |

**2.8 Exercises**

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| Question 1.  Say you want to allocate an area in memory for storing any number in the range 0-4,000,000,000. This memory area will start at location 2fffeb96. Give the address of each byte of memory that will be required.  Answer 1.  2fffeb96, 2fffeb97, 2fffeb98, 2fffeb99 |

**2.8 Exercises Continued**

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| Question 2.  You need to allocate an area in memory for store an array of 30 bytes. The first byte will have the value 0 stored in it, the second 1, the third 2, etc. This memory area will start at location 00100e. Show what this memory area looks like:  Answer 2.  00100 = 00  00100f = 01  001010 = 02  001011 = 03  001012 = 04  001013 = 05  001014 = 06  001015 = 07  001016 = 08  001017 = 09  001018 = 0a  001019 = 0b  00101a = 0c  00101b = 0d  00101c = 0e  00101d = 0f  00101e = 10  00101f = 11  001020 = 12  001021 = 13  001022 = 14  001023 = 15  001024 = 16  001025 = 17  001026 = 18  001027 = 19  001028 = 1a  001029 = 1b  00102a = 1c  00102b = 1d |
| Question 3.  We have shown how to write only the first sixteen addresses in hexadecimal in Figure 2.7.1. How would you write the address of the seventeenth byte (byte number sixteen) in hexadecimal?  Answer 3.  1016­ or 0x16 |