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Professor Yu

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CSE 310 Tue/Thurs 11am

Homework 1

1. Explain what a Von Neumann Computer is.

The Von Neumann Computer consists of four parts: the ALU (Arithmetic and logic unit), MU (memory unit), CU (control unit), and an I/O unit (input and output). The ALU is what performs the basic arithmetic and logic functions such as add, subtract, AND, and OR. The memory unit holds many uniquely identifiable locations and the MAR and MDR. The control unit contains the instruction registers and program counter. The I/O unit is the input and output such as a keyboard and monitor.

1. Convert the binary number 10101.11011011 to octal.

|010|101|.110|110|110| = 25.666

**(10101.11011011)2 = (25.666)8**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 000 | 001 | 010 | 011 | 100 | 101 | 110 | 111 |

1. Convert the decimal number 2429.625 to octal.

**(2429.625)10 = (4575.5)8**

1. Convert the decimal number 532.97 to octal.

**(532.97)10 = (1024.7605075)8**

1. Convert the binary number 0.0110111 to hexadecimal.

0|.0110|1110| = 0.6E

**(0.0110111)2 = (0.6E)16**

1. How many different BCD numbers can be stored in 12 switches? (Assume two-position, or on-off switches.) 12 switches equal three sets of four bits. With the maximum amount of 10 numbers per BCD **there would be 103 (1000) different BCD numbers stored.**
2. Determine the value of base x if (211)x = (152 )8

(152)8 = 1 x 82 + 5 x 81 + 2 x 80 = (106)10

(211)x = 2 x X2 + 1 x X1 + 1 x X0 = 2X2 + X + 1

2X2 + X +1 = (106)10

Base 7 = 2(7)2 + (7) + 1 = (106)10

**(211)7 = (152)8**

1. Convert the hexadecimal number F3A7C2 to octal.

F = 1111 3 = 0011 A = 1010 7 = 0111 C = 1100 2 = 0010

**(111 100 111 010 011 111 000 010)2 = (74723702)8**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 0000 | 0001 | 0010 | 0011 | 0100 | 101 | 110 | 111 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 9 | A | B | C | D | E | F |
| 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |

1. Decode the following ASCII code : 1001010 1101111 1101000 1101110 0100000 1000100 1101111 1100101

1001010 = J 1101111 = o 1101000 = h 1101110 = n 0100000 = (space)

1000100 = D 1101111 = o 1100101 = e

**John Doe**

1. Convert the binary number to decimal : 1110101.101

1 x 20 + 0 x 21 + 1 x 22 + 0 x 23 + 1 x 24 + 1 x 25 + 1 x 26 = 117

1 x 2-1 + 0 x 2.2 + 1 x 2.3 = 0.625

**(1110101.101)2 = (117.625)10**

I have successfully completed all of the problems and showed work where needed. Each problem was completed with work shown so I can go back and review at a later date if need be. Even though many of these problems were review from CSE 313 I felt as if it was a needed review since some problems I couldn’t do on my own without review the book or my old notes.

Score: 20/20