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CIS313 Week 2 Worksheet

You must show your work in details when answering Q1-Q8 . You will lose 50% of the grade if you didn't show your work.

1. What base 10 number is the same as the binary number 11011001? 217
   1 * 2^0 = 1
   0 * 2^1 = 0
   0 * 2^2 = 0
   1 * 2^3 = 8
   1 * 2^4 = 16
   0 * 2^5 = 0
   1 * 2^6 = 64
   1 * 2^7 = 128
   Add them all together 1 + 0 + 0 + 8 + 16 + 0 + 64 + 128 = 217

2. What base 10 number is the same as the binary number 100001? 33
   1 * 2^0 = 1
   0 * 2^1 = 0
   0 * 2^2 = 0
   0 * 2^3 = 0
   0 * 2^4 = 0
   1 * 2^5 = 32
   1 + 0 + 0 + 0 + 0 + 32 = 33

3. What base 10 number is the same as the binary number 1100001111? 793
   1* 2^0 = 1
   1 * 2^1 = 2
   1 * 2^2 = 4
   1 * 2^3 = 8
   0 * 2^4 = 0
   0 * 2^5 = 0
   0 * 2^6 = 0
   0 * 2^7 = 0
   1 * 2^8 = 256
   1 * 2^9 = 512
   1 + 2 + 4 + 8 + 256 + 512 = 793
4. What binary number is the same as the base 10 number 78? 1001110
   78/2 = 39 remainder 0
   39/2 = 19 remainder 1
   19/2 = 9 remainder 1

9/2 = 4 remainder 1
4/2 = 2 remainder 0
2/2 = 1 remainder 0
1/2 = 0 remainder 1
Put all the different remainders in a row

5. What binary number is the same as the base 10 number 974? 1111001110
   974/2 = 487 remainder 0
   487/2 = 243 remainder 1
   243/2 = 121 remainder 1
   121/2 = 60 remainder 1
   60/2 = 30 remainder 0
   30/2 = 15 remainder 0
   15/2 = 7 remainder 1
   7/2 = 3 remainder 1
   3/2 = 1 remainder 1
   1/2 = 0 remainder 1

6. What binary number is the same as the base 10 number 1024? 1000000000
   2^10 = 1024
   With this, I can do a 1 in the 2^10 position and 0s to the right.

7. Convert the binary number 111111011011 into –
   a. hexadecimal: FBDB
      1111 1101 1011
      F B D B
   b. decimal: 5053
      1 * 2^11 = 2048
      1 * 2^10 = 1024
      1 * 2^9 = 512
      1 * 2^8 = 256
      1 * 2^7 = 128
      1 * 2^6 = 64
      0 * 2^5 = 0
      1 * 2^4 = 16
      1 * 2^3 = 8
      0 * 2^2 = 0
      1 * 2^1 = 2
      1 * 2^1 = 1
      Add 2048 + 1024 + 512 + 256 + 128 + 64 + 0 + 16 + 8 + 0 + 2 + 1 = 5053

8. Convert the binary number 111110011 into:
    a. hexadecimal: 1F3

       0001 1111 0011

       1 F 3
    b. decimal: 499

0 * 2^11 = 0
0 * 2^10 = 0
0 * 2^9 = 0
1 * 2^8 = 256
1 * 2^7 = 128
1 * 2^6 = 64
1 * 2^5 = 32
1 * 2^4 = 16
0 * 2^3 = 0
0 * 2^2 = 0
1 * 2^1 = 2
1 * 2^1 = 1
Add 0 + 0 + 0 + 256 + 128 + 64 + 32 + 16 + 0 + 0 + 2 + 1 = 499

9. Use the logical operator AND on the following:

1011011011110001
AND
1110101101001010

1 AND 1 = 1
1 AND 0 = 0
0 AND 1 = 0
0 AND 0 = 0

1010001001000000

10. Use the logical operator OR on the following:

1011011011110001
OR
1110101101001010

1 OR 1 = 1
1 OR 0 = 1
0 OR 1 = 1
0 OR 0 = 0

1111111111111011

11. Use the logical operator XOR on the following:

    1011011011110001
    XOR
    1110101101001010

    1 XOR 1 = 0
    1 XOR 0 = 1
    0 XOR 1 = 1
    0 XOR 0 = 0

    0101110110111011

12. Find at least two applications for converting numbers among binary, decimal, and hexadecimal, and list them, or the sites from which they originate.

https://coolconversion.com/math/binary-octal-hexa-decimal/How-to-Convert_binary__111110011_in_hexadecimal_%3F

https://decimaltobinary.pro/_binary__111110011_in_decimal_-%7C-Work%2C-solution