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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

1. 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

1. 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

1. 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

1. 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

1. 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.

1. Convert the binary number 111111011011 into –
   1. hexadecimal: FBDB

1111 1101 1011

F B D B

* 1. 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

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

0001 1111 0011

1 F 3

* 1. 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

1. 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

1. 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

1. 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

1. 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>