

BINARY EXERCISES

Summer in JAPAN 2016: Computer Science Workshop

Base 2 (Binary) Place Value Chart to Eight Places

2^7 2 x 64	2^6 2 x 32	2^5 2 x 16	2^4 2 x 8	2^3 2 x 4	2^2 2 x 2	2^1 2 x 1	2^0 1
128 <small>One hundred twenty-eights place</small>	64 <small>Sixty-fours place</small>	32 <small>Thirty-tws place</small>	16 <small>Sixteens place</small>	8 <small>Eights place</small>	4 <small>Fours place</small>	2 <small>Twos place</small>	1 <small>Ones place</small>

Decimal (regular) to Binary:

Convert the decimal (regular) number into binary.

Ex.) $12 = \underline{\hspace{2cm}}00001100\hspace{2cm}$

3) $72 = \underline{\hspace{2cm}}01001000\hspace{2cm}$

1) $7 = \underline{\hspace{2cm}}00000111\hspace{2cm}$

4) $99 = \underline{\hspace{2cm}}01100011\hspace{2cm}$

2) $89 = \underline{\hspace{2cm}}01011001\hspace{2cm}$

5) $252 = \underline{\hspace{2cm}}11111100\hspace{2cm}$

Binary to decimal:

Convert the binary numbers into decimal (regular) numbers.

Ex.) $00000111 = \underline{\hspace{2cm}}7\hspace{2cm}$

3) $11111111 = \underline{\hspace{2cm}}255\hspace{2cm}$

1) $00010110 = \underline{\hspace{2cm}}22\hspace{2cm}$

4) $10101010 = \underline{\hspace{2cm}}170\hspace{2cm}$

2) $00110111 = \underline{\hspace{2cm}}55\hspace{2cm}$

5) $01101011 = \underline{\hspace{2cm}}107\hspace{2cm}$

Bonus - Binary Addition:

Add the binary numbers together. Convert the final number to decimal.

$$\begin{array}{r} 1 1 \\ \text{Ex.) } 00010001 \\ + 00011101 \\ \hline 00101110 \end{array}$$

$$\begin{array}{r} 2) 1 1 1 1 \\ 01001100 \\ + 00010101 \\ \hline 01100001 \end{array}$$

$$\begin{array}{r} 3) 1 1 1 1 \\ 0001110 \\ + 0000111 \\ \hline 0010101 \end{array}$$

Bonus - Binary Subtraction:

Subtract the binary numbers. Convert the final number to decimal.

$$\begin{array}{r} \text{Ex.) } 00001111 \\ - 00000101 \\ \hline 00001010 \end{array}$$

$$\begin{array}{r} 2) 1 1 1 1 \\ 01001100 \\ - 00010101 \\ \hline 00110111 \end{array}$$

$$\begin{array}{r} 3) 1 1 1 1 \\ 0101101 \\ - 0100111 \\ \hline 0000110 \end{array}$$