

## **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
<b>128</b> <small>One hundred twenty-eights place</small>	<b>64</b> <small>Sixty-fours place</small>	<b>32</b> <small>Thirty-tws place</small>	<b>16</b> <small>Sixteens place</small>	<b>8</b> <small>Eights place</small>	<b>4</b> <small>Fours place</small>	<b>2</b> <small>Twos place</small>	<b>1</b> <small>Ones place</small>

#### **Decimal (regular) to Binary:**

Convert the decimal (regular) number into binary.

Ex.)  $12 = \underline{\hspace{2cm}0000110\hspace{2cm}}$

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

1)  $3 = \underline{\hspace{2cm}}\hspace{2cm}$

3)  $99 = \underline{\hspace{2cm}}\hspace{2cm}$

#### **Binary to decimal:**

Convert the binary numbers into decimal (regular) numbers.

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

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

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

3)  $10101010 = \underline{\hspace{2cm}}\hspace{2cm}$

#### ***Bonus - Binary Addition:***

*Add the binary numbers together.*

$$\begin{array}{r} \phantom{00}1 \phantom{00}1 \\ \text{Ex.) } 00010001 \\ + 00011101 \\ \hline 00101110 \end{array}$$

$$\begin{array}{r} \phantom{00}2) \phantom{00}01001100 \\ + 00010101 \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{00}3) \phantom{00}0001110 \\ + 0000111 \\ \hline \end{array}$$

#### ***Bonus - Binary Subtraction:***

*Subtract the binary numbers.*

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

$$\begin{array}{r} \phantom{00}2) \phantom{00}01001100 \\ - 00010101 \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{00}3) \phantom{00}0101101 \\ - 0100111 \\ \hline \end{array}$$