

S2 Binary Number Assessment

S2 ____ Name: _____ ()

Date: _____

1. Convert $11010.1001_{(2)}$ to decimal number.

$$11010.1001_{(2)} = 16 + 8 + 2 + 0.5 + 0.0625 = 26.5625_{(10)}$$

2. Convert the $14.1875_{(10)}$ to binary number.

2	14	
2	7	...0
2	3	...1
2	1	...1
	0	...1

$$0.1875 \times 2 = 0.375$$

$$0.375 \times 2 = 0.75$$

$$0.75 \times 2 = 1.5$$

$$0.5 \times 2 = 1$$

$$\therefore 14.1875_{(10)} = 1110.0011_{(2)}$$

3. Convert $1011001.0001011_{(2)}$ to hexadecimal number.

$$0101\ 1001.0001\ 0110_{(2)} = 59.16_{(16)}$$

4. Convert $20.A_{(16)}$ to binary number.

$$20.A_{(16)} = 11\ 0000.101_{(2)}$$

5. Find the value of each of the following expressions.

(a) $1011_{(2)} + 1110_{(2)}$

(b) $1101_{(2)} - 11_{(2)}$

$$\begin{array}{rcccc}
 & 1 & 0 & 1 & 1 \\
 + & 1 & 1 & 1 & 0 \\
 \hline
 & 1 & 1 & 0 & 0 & 1
 \end{array}$$

$$\begin{array}{r} 1 \quad 1 \quad 0 \quad 1 \\ - \quad \quad \quad 1 \quad 1 \\ \hline 1 \quad 0 \quad 1 \quad 0 \end{array}$$

$$\therefore 1011_{(2)} + 1110_{(2)} = 11001_{(2)}$$

$$\therefore 1101_{(2)} - 11_{(2)} = 1010_{(2)}$$

(c) $10101_{(2)} \times 110_{(2)}$

(d) $10110101_{(2)} \div 1001_{(2)}$

$$\begin{array}{rcccccc} & & 1 & 0 & 1 & 0 & 1 \\ \times & & & & 1 & 1 & 0 \\ \hline & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ \hline 1 & 1 & 1 & 1 & 1 & 1 & 0 \end{array}$$

$$\begin{array}{cccccccc}
 & & & & & 1 & 0 & 1 & 0 & 0 \\
 1 & 0 & 0 & 1 & \sqrt{1} & 0 & 1 & 1 & 0 & 1 & 0 & 1 \\
 & & & & & 1 & 0 & 0 & 1 & & & \\
 \hline
 & & & & & & 1 & 0 & 0 & 1 & 0 & 1 \\
 & & & & & & 1 & 0 & 0 & 1 & 0 & 1 \\
 \hline
 & & & & & & & & & & & 1
 \end{array}$$

$$\therefore 10101_{(2)} \times 110_{(2)} = 1111110_{(2)}$$

$$\therefore 10110101_{(2)} \div 1001_{(2)} = 10100...1_{(2)}$$