

## Converting an Integer to Binary:

1) Keep dividing the quotient by 2. Each time you do this, remember the remainder.

2) stop when you can no longer divide and get a whole number.

3) write the remainders of each operation in reverse order. That's your binary number.

Example 1: Convert 460 to Binary

$$\begin{array}{r} 2 \overline{) 460} \\ 4 \\ \hline 06 \\ 6 \\ \hline 000 \\ 0 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_1 \\ \text{R}_2 \end{array}$$

$$\begin{array}{r} 2 \overline{) 230} \\ 2 \\ \hline 03 \\ 2 \\ \hline 10 \\ 10 \\ \hline 0 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_3 \\ \text{R}_4 \end{array}$$

$$\begin{array}{r} 2 \overline{) 115} \\ 10 \\ \hline 15 \\ 14 \\ \hline 1 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_5 \\ \text{R}_6 \end{array}$$

$$\begin{array}{r} 2 \overline{) 57} \\ 4 \\ \hline 17 \\ 16 \\ \hline 1 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_7 \\ \text{R}_8 \end{array}$$

$$\begin{array}{r} 2 \overline{) 14} \\ 2 \\ \hline 08 \\ 8 \\ \hline 0 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_9 \\ \text{R}_{10} \end{array}$$

$$\begin{array}{r} 2 \overline{) 7} \\ 7 \\ \hline 14 \\ 0 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_{11} \\ \text{R}_{12} \end{array}$$

$$\begin{array}{r} 2 \overline{) 3} \\ 3 \\ \hline 6 \\ 0 \\ \hline 1 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_{13} \\ \text{R}_{14} \end{array}$$

$$\begin{array}{r} 2 \overline{) 1} \\ 1 \\ \hline 2 \\ 0 \\ \hline 1 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_{15} \\ \text{R}_{16} \end{array}$$

$$\begin{array}{r} 2 \overline{) 1} \\ 1 \\ \hline 2 \\ 0 \\ \hline 1 \\ \hline \end{array} \quad \begin{array}{l} \text{R}_{17} \\ \text{R}_{18} \end{array}$$

carry down the 1, can't go further.

write the remainders in reverse order:

$R_9 R_8 R_7 R_6 R_5 R_4 R_3 R_2 R_1$

1	1	1	0	0	1	1	0	0
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Example 2: Convert 16 to Binary

$$\begin{array}{r} 8 \\ 2 \overline{) 16} \\ \underline{16} \\ 0 \end{array}$$

$R_1$

$$\begin{array}{r} 4 \\ 2 \overline{) 8} \\ \underline{8} \\ 0 \end{array}$$

$R_2$

$$\begin{array}{r} 2 \\ 2 \overline{) 4} \\ \underline{4} \\ 0 \end{array}$$

$R_3$

$$\begin{array}{r} 1 \\ 2 \overline{) 2} \\ \underline{2} \\ 0 \end{array}$$

$R_4$

$$\begin{array}{r} 0 \\ 2 \overline{) 1} \\ \underline{1} \\ 1 \end{array}$$

$R_5$   
Can't go further, carry down the 1.

$R_5 R_4 R_3 R_2 R_1$

1 0 0 0 0