

Computer Mathematics

Week 3 Examples

1. Perform the following additions in binary. In each case, indicate whether overflow occurs.

$\begin{array}{r} 0\ 1\ 1\ 0 \\ + 1\ 0\ 0\ 1 \\ \hline \end{array}$	$\begin{array}{r} 0\ 0\ 1\ 1 \\ + 0\ 1\ 1\ 0 \\ \hline \end{array}$	$\begin{array}{r} 0\ 1\ 1\ 1 \\ + 0\ 1\ 1\ 0 \\ \hline \end{array}$	$\begin{array}{r} 0\ 1\ 1\ 1 \\ + 1\ 1\ 1\ 0 \\ \hline \end{array}$	$\begin{array}{r} 0\ 1\ 0\ 1 \\ + 1\ 1\ 1\ 1 \\ \hline \end{array}$
Overflow?	Overflow?	Overflow?	Overflow?	Overflow?

2. Perform the following subtractions in binary. In each case, indicate whether overflow occurs.

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

3. Perform the following multiplications in binary. In each case, indicate whether overflow occurs.

$\begin{array}{r} \\ \times \\ \hline \\ \\ + \\ \hline \\ \hline \end{array}$	$\begin{array}{r} \\ \times \\ \hline \\ \\ + \\ \hline \\ \hline \end{array}$
Overflow?	Overflow?

4. Perform the following divisions in binary. In each case, indicate both the quotient and the remainder.

$11 \overline{) 1110}$	$10 \overline{) 1010}$
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5. What is the maximum unsigned value (in decimal) that can be represented in an 8-bit byte? _____

6. [bonus] Perform the following calculations:

$BC_{16} + 2A_{16} = \underline{\hspace{2cm}}_{16}$	$12_{16} \times 34_{16} = \underline{\hspace{2cm}}_{16}$
$BA_{16} - 2C_{16} = \underline{\hspace{2cm}}_{16}$	$F0_{16} \div 0B_{16} = \underline{\hspace{2cm}}_{16}$