

Arithmetic

Part A

1 0 1 1	0 1 0 0 0 0	1 0 1 0 1 1	0 1 1 1 1 1
<u>+ 1 1 1 0</u>	<u>+ 1 1 1 1 1 1</u>	<u>+ 1 1 0 1 0 1</u>	<u>+ 0 0 0 0 0 1</u>
0 1 1 0 0 1	0 0 1 1 1 1	1 0 0 0 0 0	1 0 0 0 0 0
overflow? NO	overflow? NO	overflow? NO	overflow? YES
1 1 0 1 1	0 1 0 1 0 0	1 1 1 0 1 1	
<u>+ 1 1 1 1</u>	<u>+ 1 1 1 1 1 1</u>	<u>+ 1 1 0 0 0 1</u>	
1 0 1 0 1 0	0 1 0 0 1 1	1 0 1 1 0 0	
overflow? YES	overflow? NO	overflow? NO	
1 1 1 1	1 1 1 0 0 0	1 1 0 0 0 0	
<u>+ 1 1 1 1</u>	<u>+ 0 0 1 1 1 1</u>	<u>+ 1 1 1 1 1 1</u>	
0 1 1 1 1 0	0 0 0 1 1 1	1 0 1 1 1 1	
overflow? NO	overflow? NO	overflow? NO	

Part B

1 0 1 1	1 0 1 0 0	1 0 1 0 1	1 1 1 1
<u>+ 1 0 1</u>	<u>+ 1 0 1 0 1</u>	<u>+ 1 0 1 1</u>	<u>+ 1 0 0 0 0</u>
1 0 0 0 0	0 1 0 0 1	0 0 0 0 0	1 1 1 1 1
overflow? YES	overflow? YES	overflow? NO	overflow? NO

Part C

1 1 0 1	1 0 1 1 0	1 1 0 1 0	1 0 1
<u>+ 1 1 1</u>	<u>+ 1 1 0 1 1</u>	<u>+ 1 0 1 0 1</u>	<u>+ 1 0 0 1</u>
1 0 1 0 0	1 0 0 0 1	0 1 1 1 1	1 1 1 0
signed error? YES	signed error? NO	signed error? YES	signed error? NO
unsigned error? NO	unsigned error? YES	unsigned error? YES	unsigned error? NO
1 1 1 1 1	1 1 1 1	1 0 0 0 1	1 0 0 0 1
<u>+ 1 1 1 1 1</u>	<u>+ 1 1 1 1</u>	<u>+ 1 1 1 1</u>	<u>+ 1 0 0 0 0</u>
1 1 1 1 0	1 1 1 1 0	0 0 0 0 0	0 0 0 0 1
signed error? NO	signed error? YES	signed error? NO	signed error? YES
unsigned error? YES	unsigned error? NO	unsigned error? YES	unsigned error? YES

Part D

0 1 1 0 0 1	0 1 0 1 1 0	0 1 1 1 1 1
<u>- 0 0 1 1 1 1</u>	<u>- 0 1 0 1 0 1</u>	<u>- 0 1 1 1 1 1</u>
0 0 1 0 1 0	0 0 0 0 0 1	0 0 0 0 0 0

Part E

$$\begin{array}{r}
 1001 \quad 1010 \quad 10101 \quad 11001 \\
 -1100 \quad -101 \quad -10101 \quad -10011 \\
 \hline
 11101 \quad 00101 \quad 00000 \quad 00110
 \end{array}$$

$$\begin{array}{r}
 1110 \quad 101 \quad 10101 \quad 11111 \\
 -11111 \quad -111 \quad -10110 \quad -10000 \\
 \hline
 1111 \quad 11110 \quad 11111 \quad 1111
 \end{array}$$

$$\begin{array}{r}
 1110 \quad 1 \quad 11011 \quad 11001 \\
 -11100 \quad -10 \quad -111 \quad -11001 \\
 \hline
 10010 \quad 11111 \quad 10100 \quad 0
 \end{array}$$

Part F

