Introduction to Computers **HW2**

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1. (a) `127`
   (b) `-75`
   (c) `-42`
   (d) `-18`
   (e) `-124`

2. (a) `0111100001011010`
   (b) `101100001000`
   (c) `1000101110011110`
   (d) `110101001001`
   (e) `110110110011`

3. `ltz E@sy haH@`

4. (a) $\mathbf{1}\cdot 2^5+\mathbf{0}\cdot 2^4+\mathbf{1}\cdot 2^3+\mathbf{0}\cdot 2^2+\mathbf{1}\cdot 2^1+\mathbf{1}\cdot 2^0=43$
   (b) $\mathbf{1}\cdot 2^4+\mathbf{0}\cdot 2^3+\mathbf{0}\cdot 2^2+\mathbf{1}\cdot 2^1+\mathbf{1}\cdot 2^0+\mathbf{0}\cdot 2^{-1}+\mathbf{1}\cdot 2^{-2}+\mathbf{1}\cdot 2^{-3}=19.375$
   (c) $\mathbf{2}\cdot 8^1+\mathbf{4}\cdot 8^0+\mathbf{3}\cdot 8^{-1}=20.375$
   (d) $\mathbf{1}\cdot 16^1+\mathbf{10}\cdot 16^0+\mathbf{14}\cdot 16^{-1}=26.875$
   (e) $\mathbf{5}\cdot 16^2+\mathbf{15}\cdot 16^1+\mathbf{11}\cdot 16^0=1531$

5. (a) (1)0000
   (b) (1)0011
   (c) 1110
   (d) (1)0010
   (e) None of them causes any overflow.

6. (a) False. Consider $-1+-1$ always cause a carry at 33-rd bit but the result is correct (-2).
   (b) True.

7. (a) $3\times 60\times 44100\times 16=127008000\texttt{(bits)}=15503.90625\texttt{(KB)}$
   (b) $10\times 1920\times 1080\times 8\times 3\times 60=29859840000\texttt{(bits)}\approx 3559.570312\texttt{(MB)}$

8. (a) 10_{16}
   (b) $3B_{16}$

(c) $E9_{16}$

(d) 10_{16}

(e) $3C_{16}$. Only this summation causes overflow since the result is $13C_{16}$ which is too large to fit in a 8-bit unsigned number.

9.

A	B	C	result
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0