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) $1 \cdot 2^5 + 0 \cdot 2^4 + 1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 = 43$

   (b) $1 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 + 0 \cdot 2^{-1} + 1 \cdot 2^{-2} + 1 \cdot 2^{-3} = 19.375$

   (c) $2 \cdot 8^1 + 4 \cdot 8^0 + 3 \cdot 8^{-1} = 20.375$

   (d) $1 \cdot 16^1 + 10 \cdot 16^0 + 14 \cdot 16^{-1} = 26.875$

   (e) $5 \cdot 16^2 + 15 \cdot 16^1 + 11 \cdot 16^0 = 1531$

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) $10 \times 1920 \times 1080 \times 8 \times 3 \times 60 = 29859840000(\texttt{bits}) \approx 3559.5703125(\texttt{MB})$

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