Basic Concepts (II)

Overflow
- Calculate 127 + 127 by using 8-bits 2'complement

\[
\begin{array}{c}
0111 1111 \longleftrightarrow 127 \\
0111 1111 \longleftrightarrow 127 \\
\hline
1111 1110 \longleftrightarrow -2
\end{array}
\]

(usually the calculation result uses the same representation as the operands; int + int = int)

• The right answer should be 254, which is out of the range of 8-bits in 2’s complement.
• The error is caused by overflow.
• 2’s complement can be thought as a clock, half of it is positive values and the other is negative value. If a positive value exceeds the boundary, it actually enters in the the half for the negative values. So it generates an incorrect value.

- This is why the InfiniteLoop example we discussed in the first class generates a negative value and does not loop forever.