

type	size	bit	Range
byte	1 byte	8 bit	-128 to 127
short	2 bytes	16 bit	-32768 to 32767
int	4 bytes	32 bit	-2147483648 to 2147483647
long	8 bytes	64 bit	-9223372036854775808 to 9223372036854775807
float	4 bytes	32 bit	-3.4e+38 to 3.4e+38
double	8 bytes	64 bit	-1.7e+308 to 1.7e+308

128
 [8, 127]
 256
 [256]
 128 - 0
 256 - 56
 100

Low
 MSB High
 128 - 127
 [-v +v]
 Small Largest

Is Complement
 1's Complement
 0 0 0 0 0 0 0 1
 1 1
 2's Complement
 0 0 0 0 0 0 0 1
 1 1
 2/2 = 1
 -2

byte num = 478

Type Casting

478 - 0	11011110
2 239 - 1	11011110
2 119 - 1	00100001
2 59 - 1	11
2 29 - 1	00100010
2 14 - 0	
2 7 - 1	
2 3 - 1	
2 1 - 1	
2 0	

$$\begin{array}{r}
 10 | 00100010 - 0 \times 2^0 = 0 \\
 10 | 0010001 \rightarrow -1 \times 2^1 = 2 \\
 10 | 001000 \rightarrow -0 \times 2^2 = 0 \\
 10 | 00100 \rightarrow -0 \times 2^3 = 0 \\
 10 | 0010 \rightarrow -0 \times 2^4 = 0 \\
 10 | 001 \rightarrow -1 \times 2^5 = 32 \\
 10 | 00 \rightarrow -0 \times 2^6 = 0 \\
 10 | 0 \rightarrow 0 \times 2^7 = 0
 \end{array} \quad \boxed{-34}$$

2 278	- 0	100010110
2 139	- 1	11101001
2 69	- 1	11
2 34	- 0	
2 17	- 1	
2 8	- 0	
2 4	- 0	
2 2	- 0	
2 1	- 1	

Java has two types of type casting:
 1. Widening Casting (Automatic/Implicit)
 Order (Small to Large): byte → short → int → long → float → double
 2. Narrowing Casting (Manual/Explicit)
 Order (Large to Small): double → float → long → int → short → byte



int a = 10
long b = a

101

