

type	size	bit	Range
byte	1 byte	→ 8 bit	-128 to 127
short	2 byte	→ 16 bit	
int	4 byte	→ 32 bit	
long	8 byte	→ 64 bit	
float	4 byte	→ 32	
double	8 byte	→ 64	

$$\begin{array}{r} 478 - 0 \\ 2 \overline{) 239} - 1 \\ 2 \overline{) 119} - 1 \\ 2 \overline{) 59} - 1 \\ 2 \overline{) 29} - 1 \\ 2 \overline{) 14} - 0 \\ 2 \overline{) 7} - 1 \\ 2 \overline{) 3} - 1 \\ 2 \overline{) 1} - 1 \\ 0 \end{array}$$

$$\begin{array}{r} 1101110 \\ 5215421 \\ \hline 00100001 \\ 11 \\ \hline 00100010 \end{array}$$

10	00100010	$-0 \times 2^0 = 0$
10	0010001	$-1 \times 2^1 = 2$
10	001000	$-0 \times 2^2 = 0$
10	00100	$-0 \times 2^3 = 0$
10	0010	$-0 \times 2^4 = 0$
10	001	$-1 \times 2^5 = 32$
10	00	$-0 \times 2^6 = 0$
10	0	$-0 \times 2^7 = 0$

-34

[illegible]

[illegible]

$$-128 - 127$$

$\begin{bmatrix} -v & +v \\ \text{small} & \text{largest} \end{bmatrix}$

2	278	- 0
2	139	- 1
2	69	- 1
2	34	- 0
2	17	- 1
2	8	- 0
2	4	- 0
2	2	- 0
2	1	- 1

$$\begin{array}{r} 1 \ 2 \ 0 \ 0 \ | \ 0 \ 1 \ 1 \ 0 \\ 1 \ 1 \ 1 \ 0 \ | \ 0 \ 0 \ 1 \ 1 \\ \hline 1 \ 1 \ 1 \ 0 \ | \ 0 \ 1 \ 0 \ 0 \end{array}$$

Is complement

$$\frac{1}{0} - \frac{1}{0} - \frac{1}{0} - \frac{1}{0} - \frac{1}{0} - \frac{1}{0} - \frac{1}{0} - \frac{1}{0}$$

2s Complement

0 0 0 0 0 0 0 1 1] $2^0/2 = 0$
 $2/2 = 1$

— 2010

-2

byte num = 478

type casting

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

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int a = 10
long b = a
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