

Type Conversion in java

Data Types

- ↳ Integers (Byte, short, int, long)
- ↳ Real → float, double
- ↳ Characters → char
- ↳ Booleans → boolean

Type conversion in java

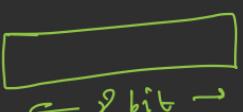
- ↳ Implicit
- ↳ Explicit

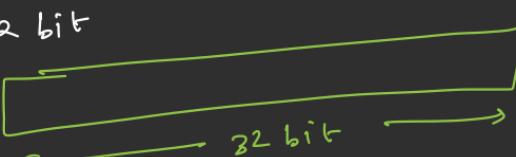
byte b = $\textcircled{24}$
int(i); \leftarrow

i = b;
System.out.println(i); // 24.

* Rule for implicit conversion

↳ Destination data type should be wider than source data type.

byte → $-128 \text{ to } +127$
↳ 8 bit 

int →
↳ 32 bit 

Widening Conversion

$\text{short} \rightarrow \text{int}$

$\text{int} \rightarrow \text{long}$

② Explicit Conversion

↳ Casting.

`int i = 300;`

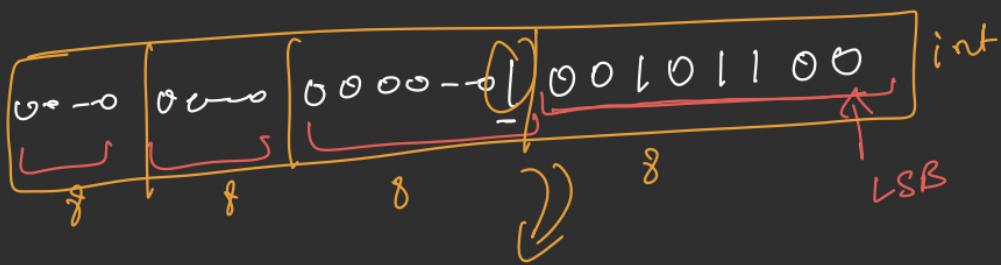
`byte b;`

`b = i;` X

`b = (byte) i;` ✓

`System.out.println(b); // 44`

`int i = 300;`



`00101100` byte
8 bit

`b = 44`

2	300	0	↗
2	150	0	
2	75	0	
2	37	1	
2	18	1	
2	9	0	
2	4	1	
2	2	0	
2	1	0	

`b = [300] / [Range of byte]`

$300 \% 256$

`b = 44` ✓

$$300 \% 256$$

long → int
double → float

Narrowing
conversion

⇒ $\text{char } c = 'a';$ | $\text{char} = 16 \text{ bit}$
 $\underline{\text{int}}[i] = c;$ | $\underline{\text{int}} = 32 \text{ bit}$
 $\text{System.out.println}(i); // 97$

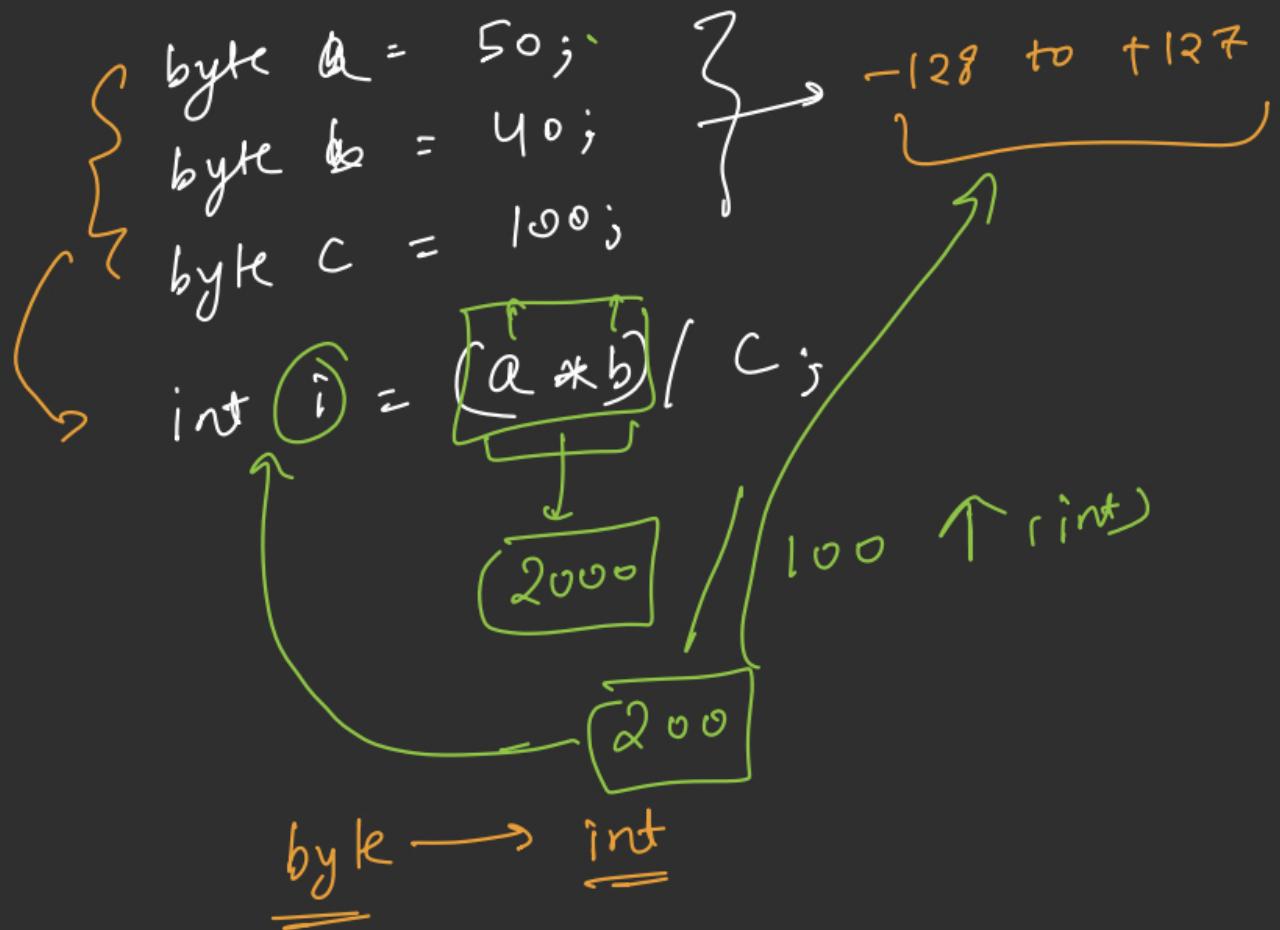
Truncating Conversion

float → int
double → int

$\text{float } b = 16.25;$
 $\text{int } i;$

$i = b;$ X
 $i = (\text{int}) b;$ | $i = 16$

Automatic Type promotion



byte $b = 50;$

$b = b * 2;$

$\frac{50}{\cancel{2}} * 2$

$= \boxed{100 \text{ (int)}}$

$b = (\text{byte}) b * 2$

Detailed description: This diagram illustrates the automatic type promotion of a byte variable for multiplication. A byte variable b is initialized to 50. It is then multiplied by 2, with the multiplication step highlighted in a green box. The result is 100. This result is then converted back to a byte using the casting operator (byte) b * 2, as indicated by the green box around the entire assignment statement. The final result is 100, enclosed in a box and labeled '(int)'.

Type promotion Rules

- ① byte, short and char values are promoted to int.
- ② If one operand is long, the whole expression will become long.
- ③ If one operand is float, entire expression will become float.
- ④ If one operand is double, entire exp is double.