

## C23 Operator Precedence

| Order | Operator                 | Description                       | Associativity        |
|-------|--------------------------|-----------------------------------|----------------------|
| 1     | ++                       | Postfix increment                 | <i>Left-to-right</i> |
|       | --                       | Postfix decrement                 |                      |
|       | ()                       | Function call                     |                      |
|       | []                       | Array Subscripting                |                      |
|       | .                        | Element selection by reference    |                      |
|       | ->                       | Element selection through pointer |                      |
|       | (type){list}             | Compound literal (C99)            |                      |
| 2     | ++                       | Prefix increment                  | <i>Right-to-left</i> |
|       | --                       | Postfix decrement                 |                      |
|       | +                        | Unary plus                        |                      |
|       | -                        | Unary minus                       |                      |
|       | !                        | Logical NOT                       |                      |
|       | ~                        | Bitwise NOT (ones' complement)    |                      |
|       | (type)                   | Type cast                         |                      |
|       | *                        | Indirection (dereference)         |                      |
|       | &                        | Address-of                        |                      |
|       | sizeof                   | Size-of                           |                      |
|       | alignof                  | Alignment requirement (C23)       |                      |
| 3     | *                        | Multiplication                    | <i>Left-to-right</i> |
|       | /                        | Division                          |                      |
|       | %                        | Modulo (remainder)                |                      |
| 4     | +                        | Addition                          | <i>Left-to-right</i> |
|       | -                        | Subtraction                       |                      |
| 5     | <<                       | Bitwise left shift                | <i>Left-to-right</i> |
|       | >>                       | Bitwise right shift               |                      |
| 6     | <                        | Less than                         | <i>Left-to-right</i> |
|       | <=                       | Less than or equal to             |                      |
|       | >                        | Greater than                      |                      |
|       | >=                       | Greater than or equal to          |                      |
| 7     | ==                       | Equal to                          | <i>Left-to-right</i> |
|       | !=                       | Not equal to                      |                      |
| 8     | &                        | Bitwise AND                       | <i>Left-to-right</i> |
| 9     | ^                        | Bitwise XOR                       | <i>Left-to-right</i> |
| 10    |                          | Bitwise OR                        | <i>Left-to-right</i> |
| 11    | &&                       | Logical AND                       | <i>Left-to-right</i> |
| 12    |                          | Logical OR                        | <i>Left-to-right</i> |
| 13    | ?:                       | Ternary conditional               | <i>Right-to-left</i> |
| 14    | =                        | Direct assignment                 | <i>Right-to-left</i> |
|       | +=                       | Assignment by sum                 |                      |
|       | -=                       | Assignment by difference          |                      |
|       | *=                       | Assignment by product             |                      |
|       | /=                       | Assignment by quotient            |                      |
|       | %=                       | Assignment by remainder           |                      |
|       | <<=                      | Assignment by bitwise left shift  |                      |
|       | >>=                      | Assignment by bitwise right shift |                      |
|       | &=                       | Assignment by bitwise AND         |                      |
|       | ^=                       | Assignment by bitwise XOR         |                      |
| =     | Assignment by bitwise OR |                                   |                      |
| 15    | ,                        | Comma                             | <i>Left-to-right</i> |