# Bit Manipulation

## Basics

### Example

Given two integers, a = 60, b = 13.

a = 0011 1100

b = 0000 1101

| Operator | Description | Example |
|---|---|---|
| & (bitwise AND) | Copy a bit to the result if it exists in both operands. | a & b = 0000 1100 = 12 |
| \| (bitwise OR) | Copy a bit to the result if it exists in either operand. | a \| b = 0011 1101 = 61 |
| ^ (bitwise XOR) | Copy a bit to the result if it is set in one operand but not in both. | a ^ b = 0011 0001 = 49 |
| ~ (bitwise compliment) | Flip bits. | ~a = 1100 0011 |
| << (left shift) | The left operands value is moved left by the number of bits specified by the right operand. | a << 2 = 1111 0000 = 240 |
| >> (right shift) | The left operands value is moved right by the number of bits specified by the right operand. | a >> 2 = 1111 = 15 |
| >>> (zero fill right shift) | The left operands value is moved right by the number of bits specified by the right operand and shifted values are filled up with zeros. | a >>> 2 = 0000 1111 = 15 |