

Python Bootcamp & Masterclass

bitwise operators

Operators



Arithmetic

+

Comparison

>

Assignment

=

Logical

or

Bitwise

Membership

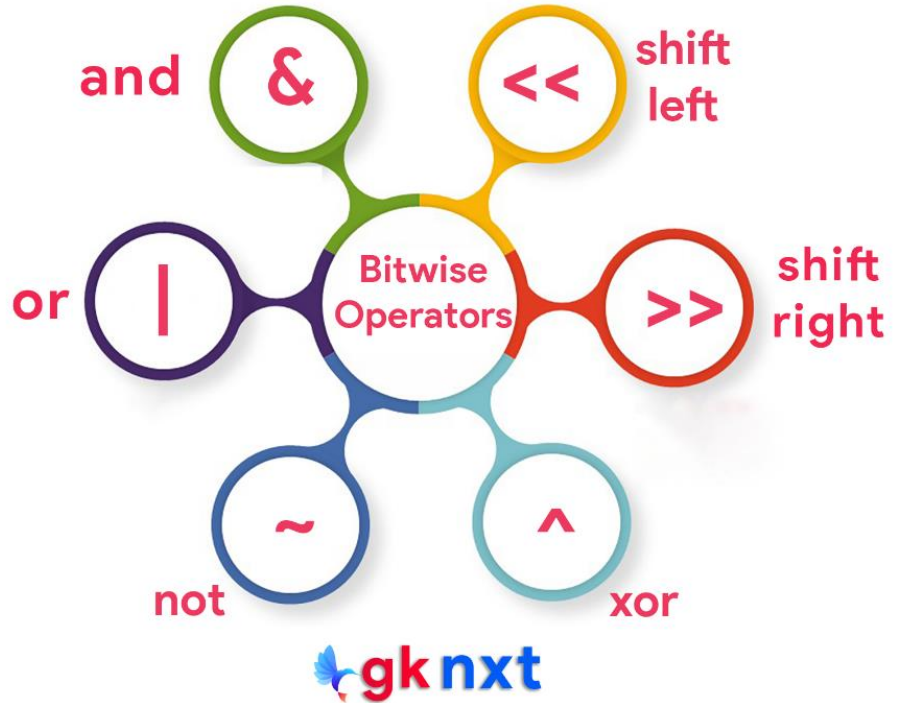
in

Identity

is



Computers store information using binary digits (0 and 1) called bits.

- bitwise operators are useful in working with individual bits of data at the most granular level
- bitwise operators are used to implement algorithms for data compression, data encryption, and error detection as well as to control physical devices (sensors etc) using single-board computers like Raspberry Pi etc.



bitwise NOT

bitwise NOT operator (\sim) is the only unary bitwise operator (it works with only one operand) It performs logical negation by flipping each and every bit.

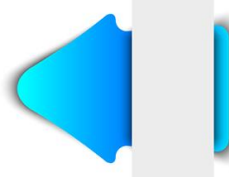
	binary									decimal
4	0	0	0	0	0	1	0	0	=	4
										
~ 4	1	1	1	1	1	0	1	1	=	-5

~ 4

-5



bitwise AND



bitwise AND operator (&) performs logical AND on each bit position (each output bit is **1** if both input bits at the same position are **1**, otherwise, it's **0**)

5 & 9

1

binary				decimal
0	1	0	1	5
&	&	&	&	&
1	0	0	1	9
<hr/>				
0	0	0	1	1

bitwise OR

bitwise OR operator (`|`) performs logical OR on each bit position (each output bit is **1** if at least one of the two input bits at the same position is **1**, otherwise, it's **0**)

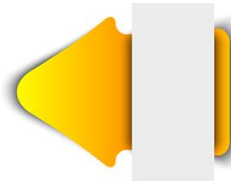
10 | 12

14

binary				decimal
1	0	1	0	10
1	1	0	0	12
<hr/>				
1	1	1	0	14



bitwise XOR

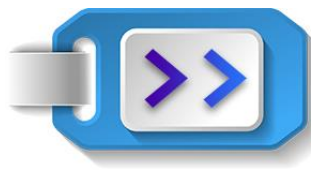


bitwise XOR operator (^) performs logical OR on each bit position (each output bit is **1** if exactly one of the two input bits at the same position is **1**, otherwise, it's **0**)

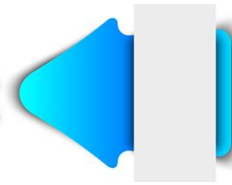
5 ^ 9

12

binary				decimal
0	1	0	1	5
^	^	^	^	^
1	0	0	1	9
<hr/>				
1	1	0	0	12



bitwise right shift

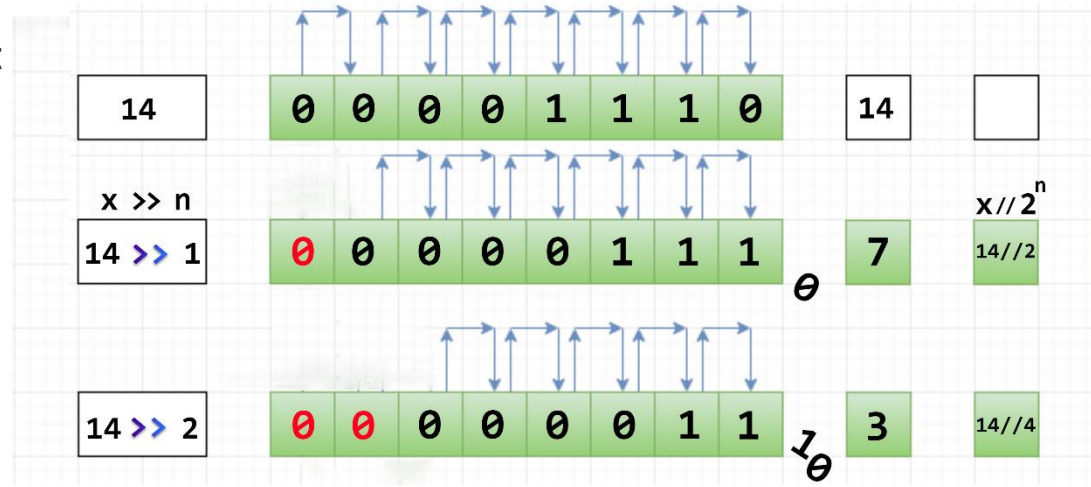


bitwise right shift operator (\gg) shifts the binary representation of integer x by n positions to the right. For positive integers, it inserts n 0 bits on the left and removes n right-most bits.

$x \gg n$

```
14 >> 1
7
```

```
14 >> 2
3
```



bitwise left shift

bitwise left shift operator (\ll) shifts the binary representation of integer x by n positions to the left. For positive integers, it inserts n 0 bits on the right and removes n left-most bits.

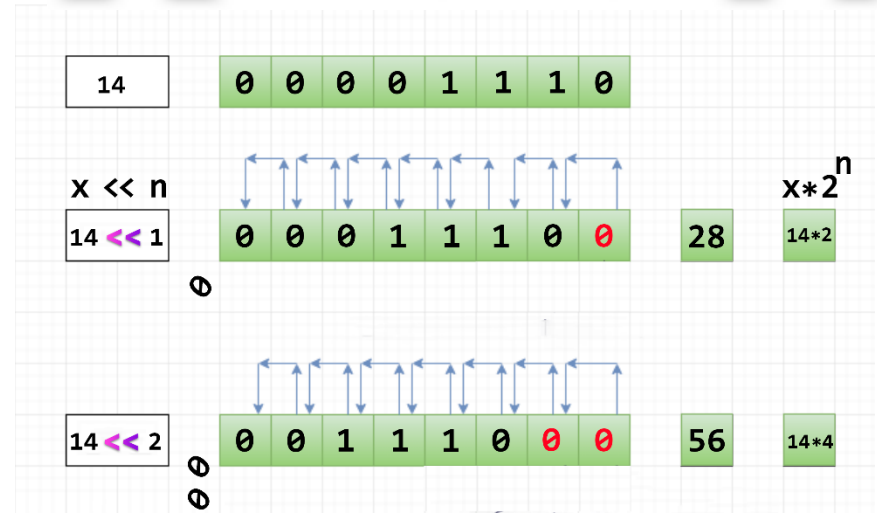
```
14 << 1
```

28

```
14 << 2
```

56

$x \ll n$





Online Resources

For best python resources, please visit:



gknxt.com/python/

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Thank You
for your Rating & Review

