

# Day 13 Operators in python

## 1) Operators

⇒ Operators are symbols or keywords that tell program to perform a specific operation on one or more values (called operands)

### 1. Arithmetic operation

+ - \* / normal maths →  $a+3$ ,  $3-2$ ,  $2*1$ ,  $2/3$

% module : gives remainder  $2 \% 3 = 2$

\*\* Exponential : base to the power of another number  $3 ** 2 = 9$

// Floor division :- dividing 2 numbers & rounding the result down to the nearest whole number

$$7 // 2 = 3.5 \text{ Floor} = 3$$

### 2) Logical operation

#### 2.1 Relational operation

== Equal to

$2 == 3 \rightarrow \text{False}$

!= not equal to

$2 != 3 = \text{True}$

> greater than

$10 > 5 = \text{Yes True}$

< smaller than

$5 < 10 = \text{Yes True}$

$> =$  greater than or equal to  $5 >= 4$  True

$< =$  smaller than or equal to  $4 < = 5$  True

### 3) Logical Operators

1) AND and checks both is true (correct)  
2) OR or - checks one is correct  
3) NOT not  $\rightarrow$  reverse if true  $\rightarrow$  False  
if False  $\rightarrow$  True

AND: True and False  $\rightarrow$  False

NOT: not True  $\rightarrow$  False

OR: True or False  $\rightarrow$  True

### 4) Bitwise operators

And (1) binary AND do multiplication  
 $5 = 101$  in binary  
 $2 = 010$  in binary

101	
$\times 010$	
000	

binary

OR (1) binary or

$5 = 101$  in binary  
 $2 = 010$  in binary

101  
 $\times 010$   
000

101	101 bitwise
$\times 010$	010 OR
000	111
	$\rightarrow 2^2, 2^1, 2^0$
	$4 + 2 + 1 = 7$

do addition with binary value

101  
 $+ 010$   
111 = 7

XOR (A)

5 1 2

1 0 1  
A 0 1 0  
1 1 1

XOR gives 1 if two bits are different  
gives 0 if they are the same

NOT (A)

5 → 101  
2 → 010  
inverted  
010 → 6  
101 → 3

~5 → -6

~2 → -3

-(5+1) = -6

-(2+1) = -3

5 → 101

2 → 010

~~6~~

inverted

010 → 2

101 → 5

Left shift (←)

5 ← 1 → 0101 ← 1 = 1010 (10)

5 ← 2 → 0101 ← 2 = 10100 (20)

$2^3 \quad 2^2 \quad 2^1 \quad 2^0$   
0 1 0 1 = 5  
4+0+1 = 5  
left

after shift

$2^3 \quad 2^2 \quad 2^1 \quad 2^0$   
1 0 1 0 = 10  
8+0+2+0

multiple by  $2^{\text{power}}$

1 time =  $2^1 = 2$

2 time =  $2^2 = 4$

3 time =  $2^3 = 8$

5 ← 1 →  $5 \times 2^1 = 5 \times 2 = 10$

5 ← 2 →  $5 \times 2^2 = 5 \times 4 = 20$

5 ← 3 →  $5 \times 2^3 = 5 \times 8 = 40$



Right shift ( $\gg$ )

right shift is the opposite of left shift  
 $\rightarrow$  It divides by power of 2

$$20 \gg 1 = 20/2^1 = 20/2 = 10$$

$$20 \gg 2 = 20/2^2 = 20/4 = 5$$

$$20 \gg 3 = 20/2^3 = 20/8 = 2$$

take 5  $\gg 1 = 5/2^1 = 5/2 = 2$

$$5 \gg 2 = 5/2^2 = 5/4 = 1$$

$$5 \gg 3 = 5/2^3 = 5/8 = 0$$

5) assignment operators

$=$  assign value  $= \boxed{a = 5}$   $\rightarrow$  # a is 5  $a = 5$

$+=$  add and assign  $= a += 2 = 5 + 2 = 7, a = 7$

~~$+=$  add and assign~~

$-=$  subtract and assign  $= a -= 2 = 5 - 2 = 3, a = 3$

$*=$  multiply and assign  $= a *= 2 = 5 * 2 = 10, a = 10$

$/=$  division and assign  $= a /= 2 = 5/2 = 2.5, a = 2.5$

$//=$  <sup>floor</sup> division and assign  $= a //= 2 = 5//2 = 2, a = 2$

$**=$  power and assign  $= a ** 2 = 5 ** 2 = 25, a = 25$

$\%=$  modulus and assign  $= a \% 2 = 5 \% 2 = 1, a = 1$