

### binary numbers

tree branching out  
jar with balls  
clock

### changing a variables value

```
x = 5
x = x +1
output: x = 6
```

### assigning values to multiple variables

```
x, y, z = 1, 2, 3
print( "x is", x)
print( "y is", y)
print( "z is", z)
x = y = x = 5
print( "x is", x)
print( "y is", y)
print( "z is", z)
```

this is a shortcut

### modulus

```
27%10
```

returns 7, remainder of clock arithmetic

### properly evaluating equality of floating points

```
x = 1.1+2.2
epsilon = 0.001
print( abs (x- 3.3 )<e psilon)
```

### algorithm for base conversion

```
procedure baseexpansion(n,b)
q := n
k := 0
while q != 0
ak := q mod b
q := q/b
k = k+1
return (ak-1...a 1,a0)
```

in general, given a base b and a decimal number n, repeat the following until the number is 0

divide n by b and prepend the remainder of the division

let the new number be n divided by b, rounded down

### the life of an object

creation  
manipulation (while it exists)  
stops existing when there are no more references to it

### swapping values

```
x = 137
y = 42
temp_var = x
x = y
y = temp_var
```

temp\_var stores x = 137  
then you take x = y, moves both to 42  
then define y as temp\_var, 137  
y = 137  
prevents loss of information

### input function always returns

a string!

### type error

```
print(int('5')*int('3'))
```

can't multiply between two strings  
must cast string as int

### object references

look up slides...  
if a = 5  
then a = "cat"  
value five is garbage collected

### = is not equality, not commutative

```
x = 7
7 = x
illegal in python
```



By daisz  
[cheatography.com/daisz/](https://cheatography.com/daisz/)

Not published yet.  
Last updated 16th September, 2022.  
Page 1 of 1.

Sponsored by [ApolloPad.com](https://apollopad.com)  
Everyone has a novel in them. Finish Yours!  
<https://apollopad.com>