In python integer values or literals are represented in 4 formats

1. Decimal integer
2. Octal Integer
3. Hexadecimal integer
4. Binary integer

Decimal, octal, hexadecimal and binary are called number system in python.
Number system defines set of rules and regulations for representing numbers in computer science.

**Decimal Integer**
An integer value with base 10 is called decimal integer.
This integer is created using digits range from 0-9
This integer is prefix with + or –
This integer should not start with 0
It is default representation of integer value

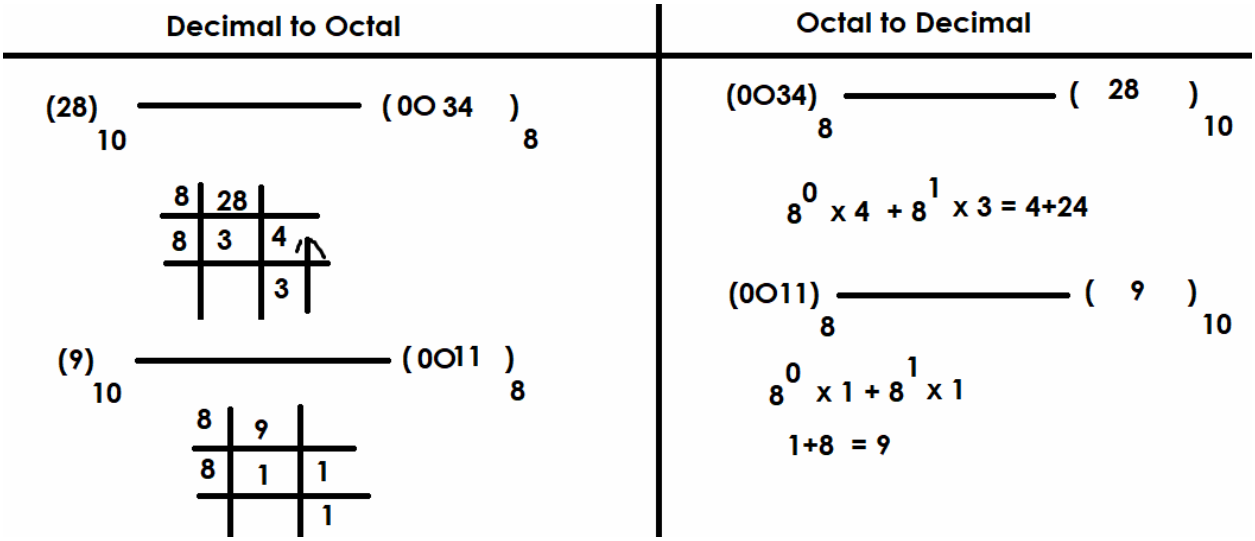
```
>>> n1=56
>>> type(n1)
<class 'int'>
>>> n1
56
>>> rollno=125
>>> type(rollno)
<class 'int'>
>>> rollno
125
>>> n2=0126
SyntaxError: leading zeros in decimal integer literals are not permitted; use an 0o prefix for octal integers
>>> n3=+45
>>> n4=-45
>>> type(n3)
<class 'int'>
>>> type(n4)
<class 'int'>
>>> n3
45
>>> n4
```

-45

**Octal integer**
An integer value with base 8 is called octal integer
This integer is created using digits range from 0-7
This integer is prefix with 0o or 0O

**Where octal integers are used,**

1. Assembly language
2. Integer where 8 and 9 digits not allowed (Operating system permissions)




```
>>> n1=0o75
>>> n1
61
>>> n2=0o11
>>> n2
>>> n3=0o78
SyntaxError: invalid digit '8' in octal literal
>>> n3=0o99
SyntaxError: invalid digit '9' in octal literal
>>> n4=0o4
>>> n4
4
>>> n5=0o25
>>> n5
```

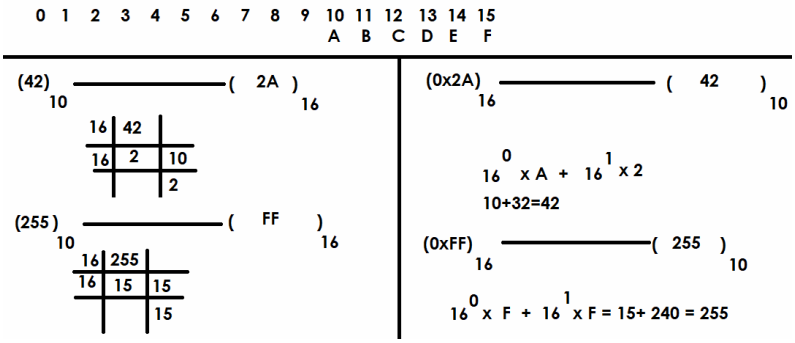
```
21
>>> a=0o11
>>> b=0o12
>>> c=a+b
>>> c
19
>>> a
9
>>> b
10
>>> type(a)
<class 'int'>
>>> type(b)
<class 'int'>
```

**Hexadecimal Integer**

An integer value with base 16 is called hexadecimal integer
This integer is created using digits range from 0-9,A-F/a-f
This integer is prefix with 0x or 0X.

Where hexadecimal integer values are used,

1. Larger values are represented in hexadecimal format
2. Color Values
3. UNICODE values
4. Memory Addresses




```
>>> a=0x9
>>> a
9
>>> b=0x1
>>> b
1
```

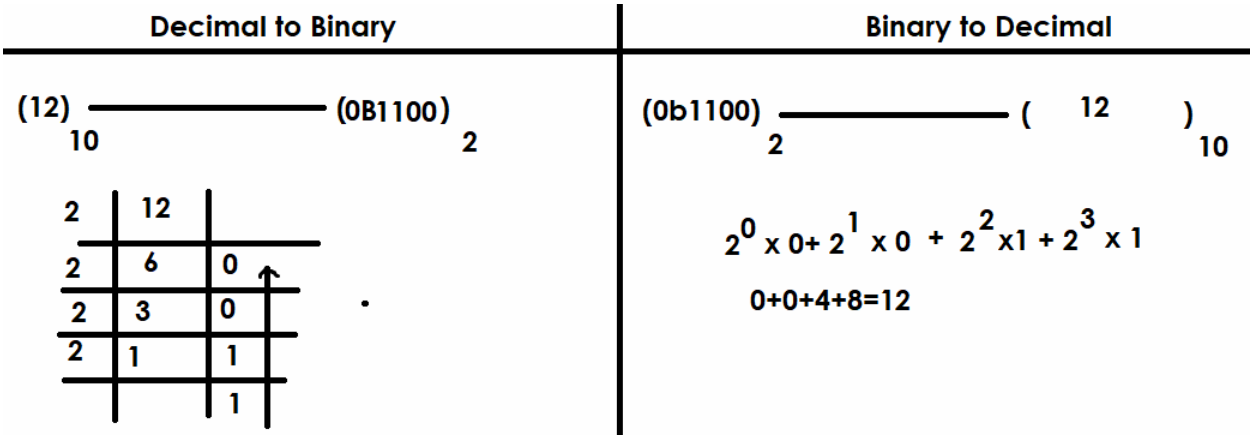
```
>>> a=0xA
>>> a
10
>>> b=0xB
>>> b
11
>>> c=0xD
>>> c
13
>>> d=0xab
>>> d
171
>>> e=0xg1
SyntaxError: invalid hexadecimal literal
>>> f=0X1f
>>> f
31
```

**Binary integer**

An integer value with base 2 is called binary integer
Binary integer is created using two digits 0,1
Binary integer is prefix with 0b or 0B

Where binary integer are used,

1. Embedded Applications (Logic Gates)
2. Images Processing
3. Audio Processing
4. Video Processing




```
>>> a=0b1100
>>> a
12
>>> b=0b101
>>> b
5
>>> c=0b1010
>>> c
10
```

**Base Conversion functions**

Base conversion functions are predefined functions provided by python, to convert base on one number to another

1. Oct()
2. Hex()
3. Bin()

Oct(value) → This function return octal representation of integer value
Hex(value) → This function return hexadecimal representation of integer value
Bin(value) → This function return binary representation of integer value

**Example:**

```
>>> oct(9)
'0o11'
>>> oct(0xA)
'0o12'
```

```
>>> oct(0b1010)
'0o12'
>>> hex(10)
'0xa'
>>> hex(15)
'0xf'
>>> hex(255)
'0xff'
hex(177)
'0xb1'
>>> hex(0b1010)
'0xa'
>>> bin(10)
'0b1010'
>>> bin(5)
'0b101'
>>> bin(0xA)
'0b1010'
>>> bin(0xb)
'0b1011'
```

**float data type**