21/10/25 BITWISE OPERATOERS

```
In [2]:   #complement operator
          ~20
```

Out[2]: -21

```
In [4]:   print(~100)
```
          -101

```
In [6]:   print(~1010)
```
          -1011

```
In [8]:   ~500
```

Out[8]: -501

```
In [10]:  ~0
```

Out[10]: -1

```
In [32]:  #number systems
          #binary
          bin(5)
```

Out[32]: '0b101'

```
In [74]:  bin(31)
```

Out[74]: '0b11111'

```
In [36]:  bin(15)
```

Out[36]: '0b1111'

```
In [38]:  bin(20)
```

Out[38]: '0b10100'

```
In [42]:  bin(12)
```

Out[42]: '0b1100'

```
In [44]:  bin(17)
```

Out[44]: '0b10001'

```
In [46]:  bin(19)
```

Out[46]:   '0b10011'

In [72]:
```python
bin(10)
```

Out[72]:   '0b1010'

In [70]:
```python
binary_num="1010"
int(binary_num,2)
```

Out[70]:   10

In [40]:
```python
#octal
oct(5)
```

Out[40]:   '0o5'

In [50]:
```python
oct(10)
```

Out[50]:   '0o12'

In [52]:
```python
oct(20)
```

Out[52]:   '0o24'

In [54]:
```python
oct(250)
```

Out[54]:   '0o372'

In [68]:
```python
oct(8)
```

Out[68]:   '0o10'

In [80]:
```python
#decimal
int(0b1010)
```

Out[80]:   10

In [82]:
```python
int(0o31)
```

Out[82]:   25

In [84]:
```python
bin(25)
```

Out[84]:   '0b11001'

In [86]:
```python
int(0b11001)
```

Out[86]:   25

In [88]:
```python
bin(5)
```

```
Out[88]:  '0b101'
```

```
In [90]:  int(0b101)
```

```
Out[90]:  5
```

```
In [92]:  #hexadecimal
          hex(10)
```

```
Out[92]:  '0xa'
```

```
In [94]:  hex(5)
```

```
Out[94]:  '0x5'
```

```
In [96]:  hex(15)
```

```
Out[96]:  '0xf'
```

```
In [98]:  hex(50)
```

```
Out[98]:  '0x32'
```

```
In [100…  hex(18)
```

```
Out[100…  '0x12'
```

```
In [102…  hex(16)
```

```
Out[102…  '0x10'
```

```
In [104…  hex(250)
```

```
Out[104…  '0xfa'
```

```
In [106…  hex(120)
```

```
Out[106…  '0x78'
```

```
In [18]:  #and operator (&)
          print(12 & 13)
```

```
          12
```

```
In [108…  bin(12)
```

```
Out[108…  '0b1100'
```

```
In [110…  bin(13)
```

```
Out[110…  '0b1101'
```

In [112… ```python
          12 & 13
          ```

Out[112…  12

In [114…  ```python
          bin(10)
          ```

Out[114… '0b1010'

In [116… ```python
          bin(20)
          ```

Out[116…  '0b10100'

In [118…  ```python
          10 & 20
          ```

Out[118… 0

In [120… ```python
          bin(100)
          ```

Out[120…  '0b1100100'

In [122…  ```python
          bin(120)
          ```

Out[122… '0b1111000'

In [124… ```python
          100 & 120
          ```

Out[124…  96

In [126…  ```python
          17 & 19
          ```

Out[126… 17

In [128… ```python
          30 & 31
          ```

Out[128…  30

In [130…  ```python
          20 & 80
          ```

Out[130… 16

In [132… ```python
          41 & 42
          ```

Out[132…  40

In [136…  ```python
          #or operator (|)
          bin(12)
          bin(13)
          12 | 13
          ```

Out[136… 13

In [138...

```python
17 | 19
```

Out[138... 19

In [140...

```python
print(bin(17))
print(bin(19))
17 | 19
```

```
0b10001
0b10011
```

Out[140... 19

In [142...

```python
print(bin(31))
print(bin(32))
31 | 32
```

```
0b11111
0b100000
```

Out[142... 63

In [144...

```python
print(bin(20))
print(bin(30))
20 | 30
```

```
0b10100
0b11110
```

Out[144... 30

In [146...

```python
#xor (exclusive or-(^))
print(bin(12))
print(bin(13))
12 ^ 13
```

```
0b1100
0b1101
```

Out[146... 1

In [148...

```python
print(bin(25))
print(bin(30))
25 ^ 30
```

```
0b11001
0b11110
```

Out[148... 7

In [150...

```python
print(bin(18))
print(bin(21))
18 ^ 21
```

```
0b10010
0b10101
```

Out[150... 7

In [152…
```python
print(bin(66))
print(bin(35))
66 ^ 35
```

```
0b1000010
0b100011
```
Out[152…   97

In [162…
```python
int(0b1100001)
```
Out[162…   97

In [166…
```python
print(bin(10))
print(bin(20))
10 ^ 20
```

```
0b1010
0b10100
```
Out[166…   30

In [168…
```python
int(0b11110)
```
Out[168…   30

In [170…
```python
#left shift
10<<1
```
Out[170…   20

In [178…
```python
bin(10)
```
Out[178…   '0b1010'

In [180…
```python
int(0b10100)
```
Out[180…   20

In [174…
```python
10<<2
```
Out[174…   40

In [182…
```python
bin(10)
```
Out[182…   '0b1010'

In [184…
```python
int(0b101000)
```
Out[184…   40

In [208…
```python
int(0b101011)
```
Out[208…   43

In [176...   `1<<5`

Out[176...   32

In [186...   `bin(1)`

Out[186...   `'0b1'`

In [188...   `int(0b100000)`

Out[188...   32

In [202...   `7<<5`

Out[202...   224

In [204...   `bin(7)`

Out[204...   `'0b111'`

In [206...   `int(0b11100000)`

Out[206...   224

In [190...
```python
#right shift
10>>1
```

Out[190...   5

In [192...   `bin(10)`

Out[192...   `'0b1010'`

In [194...   `int(0b101)`

Out[194...   5

In [196...   `10>>2`

Out[196...   2

In [198...   `bin(10)`

Out[198...   `'0b1010'`

In [200...   `int(0b10)`

Out[200...   2

In [210...   `23>>4`

Out[210…   1

In [212…   `bin(23)`

Out[212…   `'0b10111'`

In [214…   `int(0b1)`

Out[214…   1

In [216…   `27>>2`

Out[216…   6

In [218…   `bin(27)`

Out[218…   `'0b11011'`

In [220…   `int(0b110)`

Out[220…   6

In [224…   `100>>5`

Out[224…   3

In [226…   `bin(100)`

Out[226…   `'0b1100100'`

In [228…   `int(0b11)`

Out[228…   3

In [ ]:

22/10/25 DATA STRUCTURES

LIST

In [232…
```
l=[10,20,30,40,50,60,70]
l
```

Out[232…   `[10, 20, 30, 40, 50, 60, 70]`

In [262…   `len(l)`

Out[262…   9

In [240…
```
l1=["anjali",21,2003,"chinni",12,9]
l1
```

Out[240…   ['anjali', 21, 2003, 'chinni', 12, 9]

In [264…
```python
len(l1)
```

Out[264…   9

In [238…
```python
l.append(80)
l
```

Out[238…   [10, 20, 30, 40, 50, 60, 70, 80, 80]

In [244…
```python
l1.append("dec")
l1
```

Out[244…   ['anjali', 21, 2003, 'chinni', 12, 9, 'dec', 'dec']

In [248…
```python
l1.append("june")
l1
```

Out[248…   ['anjali', 21, 2003, 'chinni', 12, 9, 'dec', 'dec', 'june']

In [266…
```python
len(l1)
```

Out[266…   9

In [252…
```python
l2=l1.copy()
l2
```

Out[252…   ['anjali', 21, 2003, 'chinni', 12, 9, 'dec', 'dec', 'june']

In [254…
```python
l1
```

Out[254…   ['anjali', 21, 2003, 'chinni', 12, 9, 'dec', 'dec', 'june']

In [256…
```python
l2
```

Out[256…   ['anjali', 21, 2003, 'chinni', 12, 9, 'dec', 'dec', 'june']

In [260…
```python
l2.clear()
l2
```

Out[260…   []

In [268…
```python
len(l2)
```

Out[268…   0

In [270…
```python
l.append(20)
l
```

Out[270…   [10, 20, 30, 40, 50, 60, 70, 80, 80, 20]

In [274...   ```python
l.count(10)
```

Out[274...   1

In [276...   ```python
l.count(20)
```

Out[276...   2

In [278...   ```python
l.count(100)
```

Out[278...   0

In [280...   ```python
l1.extend(l)
l1
```

Out[280...   ```
['anjali',
 21,
 2003,
 'chinni',
 12,
 9,
 'dec',
 'dec',
 'june',
 10,
 20,
 30,
 40,
 50,
 60,
 70,
 80,
 80,
 20]
```

In [283...   ```python
l1
```

Out[283…   ['anjali',
               21,
               2003,
               'chinni',
               12,
               9,
               'dec',
               'dec',
               'june',
               10,
               20,
               30,
               40,
               50,
               60,
               70,
               80,
               80,
               20]

In [285…   ```
             l
             ```

Out[285…     [10, 20, 30, 40, 50, 60, 70, 80, 80, 20]

In [287…     ```
             l.index(20)
             ```

Out[287…   1

In [289…   ```
             l.index(60)
             ```

Out[289…     5

In [293…     ```
             l.remove(20)
             l
             ```

Out[293…   [10, 30, 40, 50, 60, 70, 80, 80]

In [295…   ```
             l.remove(80)
             l
             ```

Out[295…     [10, 30, 40, 50, 60, 70, 80]