```
sum([1,2,3])
6
>>> sum([1,2,3.9])
6.9
>>> sum((1,2,3.9))
6.9
>>> min
<built-in function min>
>>> n = [i for i in range(1, 10_001)]
>>> n


>>> n[-1]
10000
>>> n[0]
1
>>> # create a variable to hold sum. initlz it to 0
>>> # iterate over n and add each value to the sum holder variable
>>> counter = 0
>>> for i in n:
     counter = counter + i


>>> counter
50005000
>>> sum(n)
50005000
>>> n2 = [i for i in range(1, 1_000_000_001)]
Traceback (most recent call last):
  File "<pyshell#18>", line 1, in <module>
    n2 = [i for i in range(1, 1_000_000_001)]
  File "<pyshell#18>", line 1, in <listcomp>
    n2 = [i for i in range(1, 1_000_000_001)]
MemoryError

>>> n2
Traceback (most recent call last):
  File "<pyshell#19>", line 1, in <module>
    n2
NameError: name 'n2' is not defined

>>> n = 1_000_000_000
>>> n * (n + 1) //2  # sum of first 1 billion numbers
500000000500000000
>>> n = [i for i in range(1, 10_001)]
```

```
>>> n[0]
1
>>> n[-1]
10000
>>> min(n)
1
>>> max(n)
10000
>>> l = [1,2,4,3,99,8,13131,83]
>>> max(l)
13131
>>> min(l)
1
>>> l.index(max(l))
6
>>> l[6]
13131
>>> a = ['d','a','b','c']
>>> max(a)
'd'
>>> min(a)
'a'
>>> a = ['bd','ba','ab','ac']
>>> max(a)
'bd'
>>> min(a)
'ab'
>>> a = ['bd','ba','ab','ac',1212]
>>> max(a)
Traceback (most recent call last):
  File "<pyshell#39>", line 1, in <module>
    max(a)
TypeError: '>' not supported between instances of 'int' and 'str'
>>> # Dictionary
>>> # keys, values
>>> num_words = {1: 'one', 2: 'two', 3:'three'}
>>> num_words
{1: 'one', 2: 'two', 3: 'three'}
>>> num_words.keys()
dict_keys([1, 2, 3])
>>> num_words.values()
dict_values(['one', 'two', 'three'])
>>> num_words
{1: 'one', 2: 'two', 3: 'three'}
>>> num_words[1]
```

```
'one'
>>> num_words[-1]  # Indexing is not supported
Traceback (most recent call last):
  File "<pyshell#48>", line 1, in <module>
    num_words[-1]
KeyError: -1
>>> num_words_2 = {'one':1,'two': 3.0 ,'three':'Tree'}
>>> num_words_2['one']
1
>>> num_words_2['two']
3.0
>>> num_words_2['three']
'Tree'
>>> # Keys have to be immutable, Values can be mutable
>>> num_words_3 = {'Virat': 18, 'Rohit': 45}
>>> num_words_3 = {['Virat']: 18}
Traceback (most recent call last):
  File "<pyshell#55>", line 1, in <module>
    num_words_3 = {['Virat']: 18}
TypeError: unhashable type: 'list'
>>> dict_words_3 = {('a','b','c'): 18}
>>> dict_words_3
{('a', 'b', 'c'): 18}
>>> dict_coordinate = {('x1', 'y1', 'z1'): (0,0,0), ('x2', 'y2',
'z2'): (1,2,3)}
>>> dict_coordinate
{('x1', 'y1', 'z1'): (0, 0, 0), ('x2', 'y2', 'z2'): (1, 2, 3)}
>>> dict_coordinate.keys()
dict_keys([('x1', 'y1', 'z1'), ('x2', 'y2', 'z2')])
>>> dict_coordinate.values()
dict_values([(0, 0, 0), (1, 2, 3)])
>>> dict_coordinate[('x1', 'y1', 'z1')]
(0, 0, 0)
>>> dict_coordinate[('x1', 'y1', 'z1')] = (1,0,0)
>>> dict_coordinate[('x1', 'y1', 'z1')]
(1, 0, 0)
>>> dict_coordinate[('x1', 'y1', 'z1')] = 1, 21  # packed as tuple
>>> dict_coordinate[('x1', 'y1', 'z1')] = 1 2332
SyntaxError: invalid syntax
>>> dict_coordinate[('x1', 'y1', 'z1')]
(1, 21)
>>> {}  # empty dictionary, observe no colon(:)
{}
>>> type({})
<class 'dict'>
```