1 复合数据结构

字符串，列表，字典，元组，集合

1.1 字符串

In [1]:
```
1  x = 'mathematical modeling'
```
executed in 15ms, finished 19:03:27 2024-03-26

In [2]:
```
1  x
```
executed in 31ms, finished 19:03:29 2024-03-26

Out[2]: 'mathematical modeling'

索引从0开始，用0来表示第一个元素的位置

In [3]:
```
1  x[0]
```
executed in 31ms, finished 19:05:18 2024-03-26

Out[3]: 'm'

In [4]:
```
1  x[2]
```
executed in 31ms, finished 19:06:33 2024-03-26

Out[4]: 't'

In [5]:
```
1  x[15]
```
executed in 30ms, finished 19:07:57 2024-03-26

Out[5]: 'd'

In [8]:
```
1  x+'1024'
```
executed in 16ms, finished 19:09:00 2024-03-26

Out[8]: 'mathematical modeling1024'

In [9]:
```
1  x.replace('m','M')
```
executed in 31ms, finished 19:09:53 2024-03-26

Out[9]: 'MatheMatical Modeling'

In [10]: ▶| `1  x`

executed in 32ms, finished 19:10:11 2024-03-26

Out[10]: 'mathematical modeling'

1.2 列表 list

In [11]: ▶|
```
1  y = [1, 3, 5, 7, True, 'orange']
```

executed in 16ms, finished 19:11:09 2024-03-26

In [12]: ▶|
```
1  y[2]
```

executed in 32ms, finished 19:11:39 2024-03-26

Out[12]: 5

In [16]: ▶|
```
1  y[5][4]
```

executed in 31ms, finished 19:12:41 2024-03-26

Out[16]: 'g'

In [17]: ▶|
```
1  y.append('student')
```

executed in 31ms, finished 19:13:51 2024-03-26

In [18]: ▶|
```
1  y
```

executed in 31ms, finished 19:13:53 2024-03-26

Out[18]: [1, 3, 5, 7, True, 'orange', 'student']

In [19]: ▶|
```
1  data = [1, 2, 5, 7, 9, 20, 3, 4, 5]
2  def func(x):
3      return x**3+1
```

executed in 15ms, finished 19:15:50 2024-03-26

In [20]: ▶|
```
1  func(5)
```

executed in 21ms, finished 19:16:23 2024-03-26

Out[20]: 126

In [21]: ▶|
```
1  []
```

executed in 24ms, finished 19:16:58 2024-03-26

Out[21]: []

```
In [22]:  ▶  1  results = []
```
executed in 26ms, finished 19:17:31 2024-03-26

```
In [23]:  ▶  1  for i in data:
             2      print(i)
             3      results.append(func(i))
             4      print(results)
             5      print('---------')
```
executed in 12ms, finished 19:18:34 2024-03-26

```
1
[2]
---------
2
[2, 9]
---------
5
[2, 9, 126]
---------
7
[2, 9, 126, 344]
---------
9
[2, 9, 126, 344, 730]
---------
20
[2, 9, 126, 344, 730, 8001]
---------
3
[2, 9, 126, 344, 730, 8001, 28]
---------
4
[2, 9, 126, 344, 730, 8001, 28, 65]
---------
5
[2, 9, 126, 344, 730, 8001, 28, 65, 126]
---------
```

```
In [24]:  ▶  1  sum([2,3,4,5])
```
executed in 26ms, finished 19:24:06 2024-03-26

Out[24]: 14

```
In [25]:  ▶  1  range(1,6)
```
executed in 13ms, finished 19:25:06 2024-03-26

Out[25]: range(1, 6)

```
In [26]:  ▶  1  list(range(1,6))
```
executed in 16ms, finished 19:25:11 2024-03-26

Out[26]: [1, 2, 3, 4, 5]

In [27]:
```python
1  s = []
2  for i in range(1,51):
3      s.append(i**2)
```
executed in 16ms, finished 19:26:32 2024-03-26

In [29]:
```python
1  sum(s)
```
executed in 31ms, finished 19:26:55 2024-03-26

Out[29]: 42925

In [30]:
```python
1  s = []
2  for i in range(3,16):
3      s.append(i**2+2*i+1)
4  sum(s)
```
executed in 31ms, finished 19:29:53 2024-03-26

Out[30]: 1482

1.3 字典 dict

In [31]:
```python
1  z = {'蔡汶学':'Tiger','王家熙':'Adn','车名':'Carl'}
```
executed in 15ms, finished 19:31:40 2024-03-26

In [33]:
```python
1  z['韩艾霖'] = 'Amily'
```
executed in 24ms, finished 19:33:11 2024-03-26

In [34]:
```python
1  z
```
executed in 32ms, finished 19:33:14 2024-03-26

Out[34]: {'蔡汶学':'Tiger','王家熙':'Adn','车名':'Carl','韩艾霖':'Amily'}

In [35]:
```python
1  for n in z.keys():
2      print(f'学生{n}的英文名为{z[n]}')
```
executed in 26ms, finished 19:34:37 2024-03-26

学生蔡汶学的英文名为Tiger
学生王家熙的英文名为Adn
学生车名的英文名为Carl
学生韩艾霖的英文名为Amily

1.4 绘图

In [37]: ▶| `1  #pip install matplotlib`

executed in 16ms, finished 19:39:54 2024-03-26

In [45]: ▶|
```
1  def func1(x):
2      return x**5+3*x**4+2*x**2-10
```

executed in 15ms, finished 19:48:33 2024-03-26

In [46]: ▶|
```
1  xlist = list(range(1,9))
2  ylist = [func1(x) for x in xlist]
```

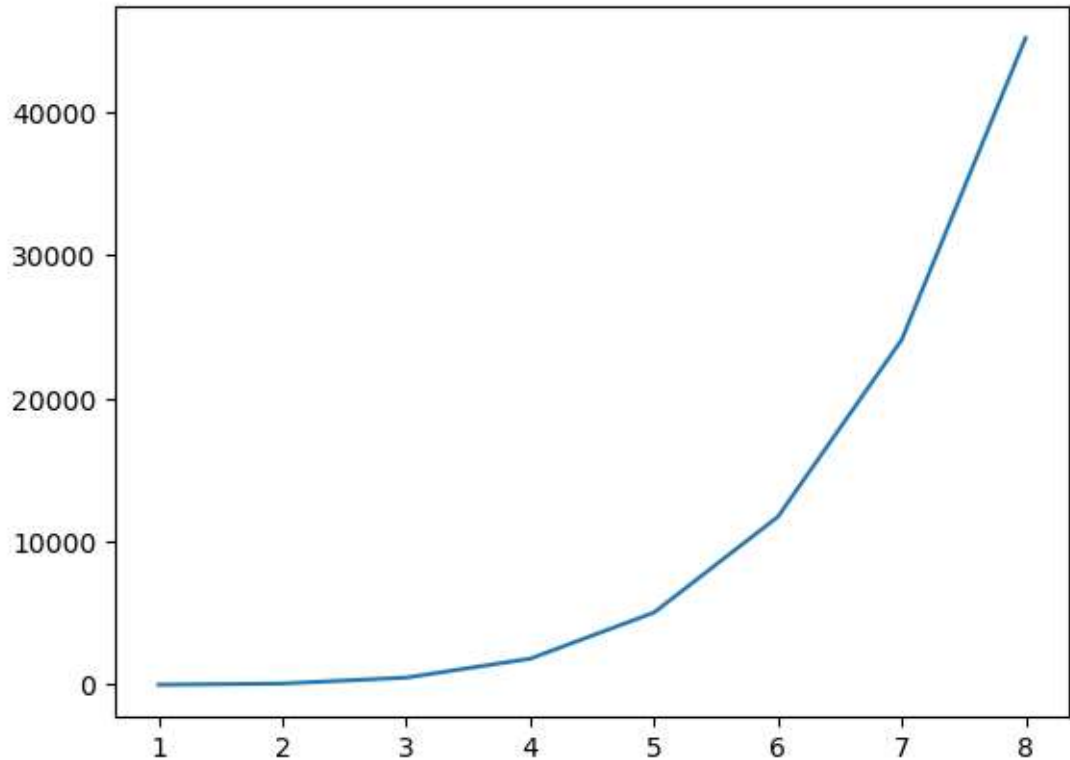executed in 15ms, finished 19:48:34 2024-03-26

In [47]: ▶|
```
1  import matplotlib.pyplot as plt
```

executed in 31ms, finished 19:48:34 2024-03-26

In [48]: ▶|
```
1  plt.plot(xlist,ylist)
```

executed in 397ms, finished 19:48:35 2024-03-26

Out[48]: [<matplotlib.lines.Line2D at 0x1864eecc730>]

In [ ]: ▶| `1`