DSA using Python

Array and list

Saurabh Shukla (MySirG)

Agenda

1. Array and list
2. array module
3. Creating array
4. type codes
5. array methods
6. list
7. Creating list Object
8. methods of list
9. built-in methods
10. NumPy

Array and list

built-in module — builtins

There are several classes defined in builtins module

int, float, str, list, tuple, dict, set, range, bytes, Object, Exception ...

Another module — array

array is not a built-in data structure and therefore need to be imported

array

This module defines an object type which can efficiently represent an array of basic values: characters, integers, floating point numbers.

Arrays are sequence types and behave very much like lists, but arrays can have elements of limited types.

Creating Array

```
from array import *
a1 = array(type code, [,elements])
```

type code	C Type
'b'	signed integer
'B'	unsigned integer
'u'	Unicode character
'h'	signed integer
'H'	unsigned integer
'i'	signed integer
'I'	unsigned integer
'l'	signed integer
'L'	unsigned integer
'q'	signed integer
'Q'	unsigned integer
'f'	floating point
'd'	floating point

Example

```
from array import *
a1 = array('i', [5, 10, 15, 40])


for i in range(4):
    print(a1[i], end=' ')
```

```
5 10 15 40
```

array methods

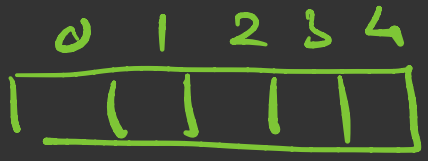
append()
count()
extend()
fromlist()
index()
insert()
pop()
remove()
reverse()
tolist()

list

list is a class
list is mutable
list elements are indexed
list is an iterable
list can grow (dynamic array)
list can contain different type elements.

array

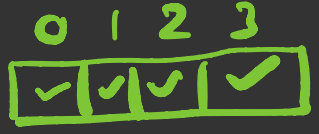
- collection of same type elements
- fixed size
- indexed



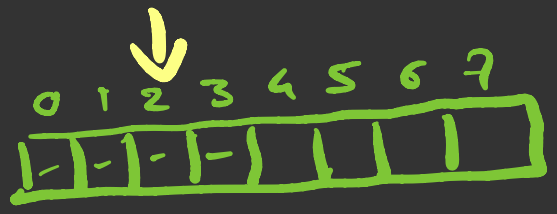
size = 5

Dynamic array

- collection of same type elements
- resizable
- indexed



size = 4



size = 8

Create list Object

```
l1 = [10, 20, 30]
l2 = []
l3 = [10, 5.7, 'abc']
```

Methods of list

append()
clear()
count()
extend()
index()
insert()
pop()
remove()
sort()
reverse()

builtin methods

len()
sum()
max()
min()
sorted()

- list and array both are growable.
- list can contain heterogeneous data
- array can contain homogeneous data

If you want to perform mathematical calculations, then you should use Numpy arrays by importing Numpy package.

Otherwise use lists as it work in a similar way and more flexible to work with.

Install numpy

open cmd / terminal

```
> pip install numpy
```

```
> pip3 install numpy
```

NumPy

```
import numpy as np
a = np.array([1,2,3])
print(a)

b = np.array([[1,2,3],[10,20,30]])
print(b)

c = np.array([[1,2,3],[10,20]])
print(c)
```

2d array

1d array with two list type elements