



DATA STRUCTURE SECOND CLASS LAB 1

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Lecture Outline: -

1- List



List declaration:-

1. `list=[]`

Empty list

2. `a=[4,2,5]`

indexes	0	1	2
	-3	-2	-1
	4	2	5

3. `ls=[1,"ali",-9,3.5,"python","d",7]`

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7



Examples:-

```
ls=[1,"ali",-9,3.5,"python","d",7]
```

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7



Examples:-

```
ls=[1,"ali",-9,3.5,"python","d",7]
```

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

1- print(ls[1])



ali



Examples:-

```
ls=[1,"ali",-9,3.5,"python","d",7]
```

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

2- `print(ls[-3])`



python



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

3- print(ls[4])




python



Examples:-

```
ls=[1,"ali",-9,3.5,"python","d",7]
```

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

4- `print(ls[4][1])`  *y*



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7


5- print(ls[4][7])  Error out of range



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

6- print(ls[4][0:3])  pyt



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

7- print(ls[3])



3.5



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

8- print(ls[3][1])



Error (float)



Examples:-

```
ls=[1,"ali",-9,3.5,"python","d",7]
```

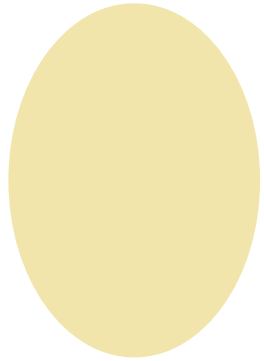
0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

9- print(ls[-1])  7



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]



0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

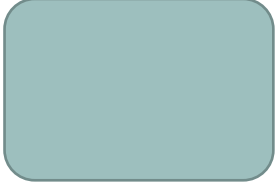
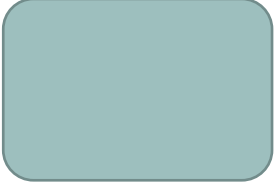
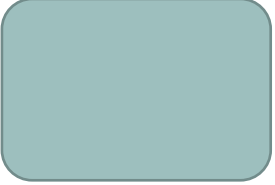
10- print(ls[-9])



Error out of range



List Slicing: -


list[ :  : ]

Default = list[from the begin : to the end : step = 1]



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]



0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

1- print(ls[-4:])

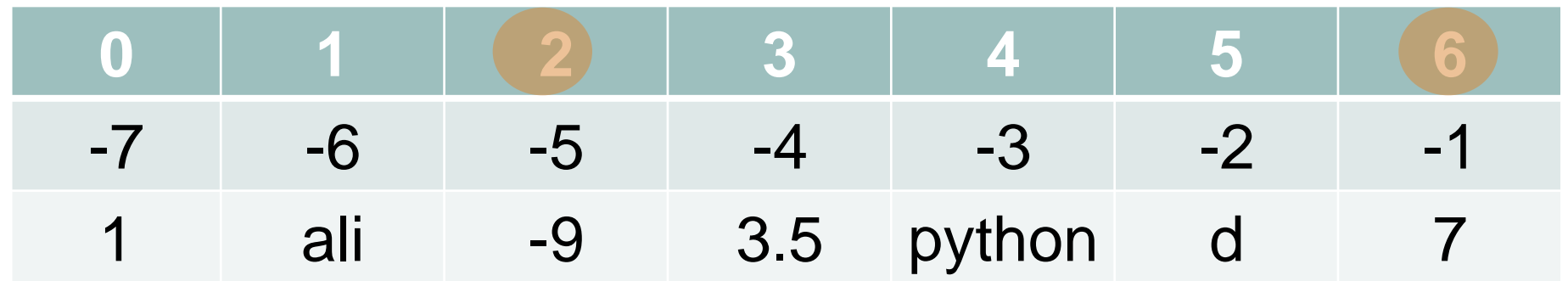


[3.5, 'python', 'd', 7]



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]




0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

2- print(ls[2:6])  [-9, 3.5, 'python', 'd']



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]



0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7


3- print(ls[2:-2])  [-9, 3.5, 'python']



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

4- print(ls[1][0:2])  al



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

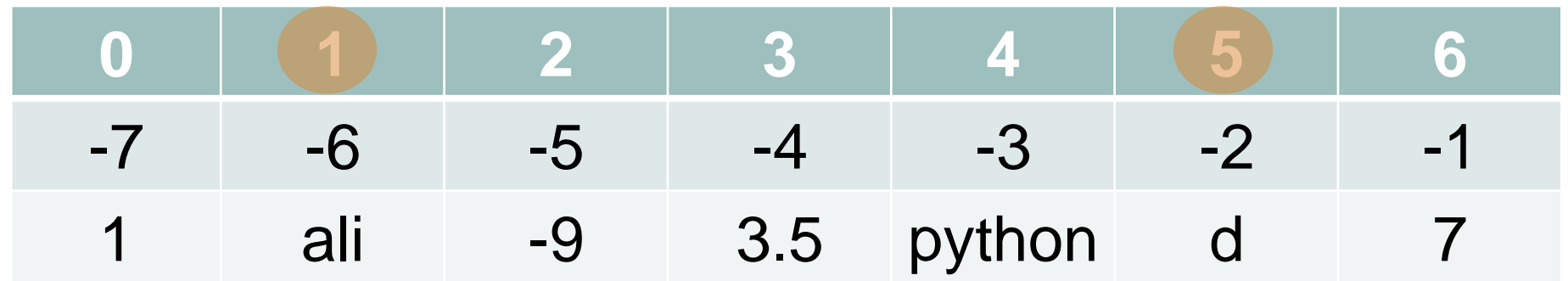
0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

5- print(ls[0:5:2]) → [1, -9, 'python']



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]



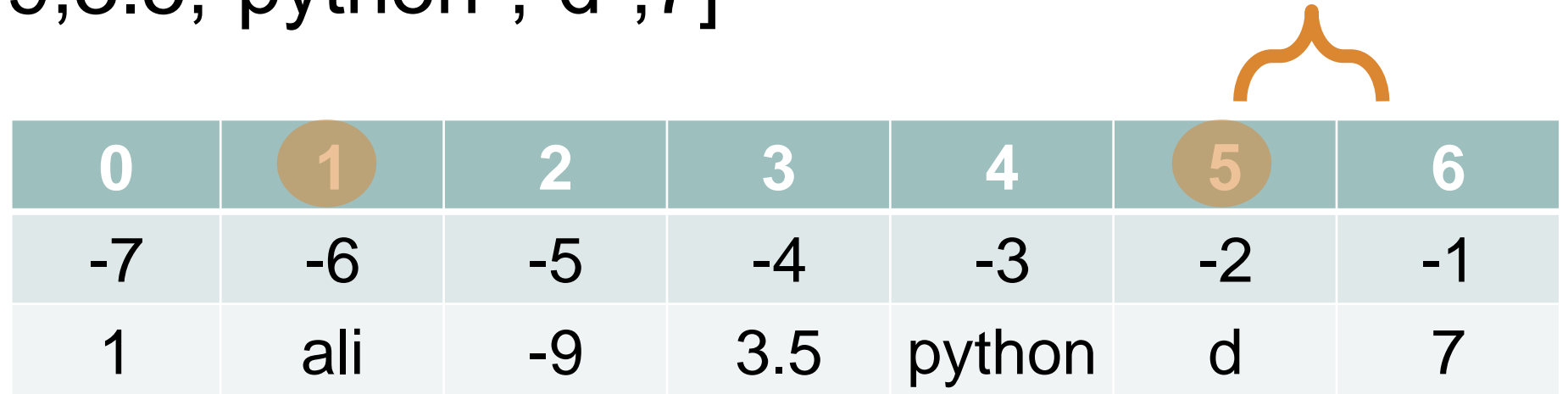
0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

6- print(ls[5:1:-1])  ['d', 'python', 3.5, -9]



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]



0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

7- print(ls[5:1:1]) → []



Examples:-

ls=[1,"ali",-9,3.5,"python","d",7]

0	1	2	3	4	5	6
-7	-6	-5	-4	-3	-2	-1
1	ali	-9	3.5	python	d	7

8- print(ls[-1:2:-2]) → [7, 'python']



Change Elements of a list

Example

```
ls=[3,2,5]
```

```
ls[0]=1
```

```
print(ls)
```



[1,2,5]

```
ls[0:2]=[8,9]
```

```
print(ls)
```



[8,9,5]



+ = concatenation

Example

```
ls1=[3,2,5]
```

```
ls2=[0,1]
```

```
ls=ls1+ls2
```

```
print(ls)
```



[3,2,5,0,1]



* = Repeat

Example

```
ls1=[0,1]
```

```
ls=ls1*3
```

```
print(ls)
```



[0,1,0,1,0,1]



`len()` = Return the length of the list

Example

```
ls=[5,8,2,1]
```

```
print(len(ls))
```



4



(for) with list: -
Example 1

```
ls=[4,2,1,9]  
for i in range (0,len(ls)):  
    print(ls[i])
```

Example 2

```
ls=[4,2,1,9]  
for i in ls:  
    print(i)
```



Common Python List Methods

1- `append()` → Add an element to the end of the list

Example: -

```
ls=[2,7,9]
```

```
ls.append(4)
```

```
print(ls)
```



`[2,7,9,4]`



Common Python List Methods

2- extend() → Add all elements of a list to the another list

Example: -

```
ls=[2,7,9]
```

```
ls1=[0,8]
```

```
ls.extend(ls1)
```

```
print(ls(
```



[2,7,9,0,8]



Common Python List Methods

3- insert() → Insert an item at the defined index

Example: -

```
ls = [3,7,1]
```

```
ls.insert(2,9)
```

```
print(ls)
```



[3,7,9,1]



Common Python List Methods

4- remove() → Removes an item from the list

Example: -

```
ls = [3,7,1,7,7]
```

```
ls.remove(7)
```

```
print(ls)
```



[3,1,7,7]



Common Python List Methods

5- pop() → Removes and returns an element at the given index

Example 1 : -

```
ls = [3,5,1,8,4]
```

```
x=ls.pop()
```

```
print("x = ",x)
```



x = 4

```
print("list = ",ls)
```



list = [3,5,1,8]

Example 2 : -

```
ls = [3,5,1,8,4]
```

```
x=ls.pop(3)
```

```
print("x = ",x)
```



x = 8

```
print("list = ",ls)
```



list = [3,5,1,4]



Common Python List Methods

6- `clear()` → Removes all items from the list

Example: -

```
ls = [3,7,1,7,7]
```

```
ls.clear()
```

```
print(ls)
```



```
[]
```



Common Python List Methods

7- `index()` → Returns the index of the first matched item

Example: -

```
ls = [3,7,1,7,7]
```

```
x=ls.index(7)
```

```
print(x)
```



1



Common Python List Methods

8- `count()` → Returns the count of the number of items passed as an argument

Example: -

```
ls = [3,7,1,7,7]
```

```
x=ls.count(7)
```

```
print(x)
```



3



Common Python List Methods

9- `sort()` → Sort items in a list in ascending order

Example: -

```
ls = [3,7,5,1,0]
```

```
ls.sort()
```

```
print(ls)
```



`[0,1,3,5,7]`



Common Python List Methods

10- `reverse()` → Reverse the order of items in the list

Example: -

```
ls = [3,7,5,1,0]
```

```
ls.reverse()
```

```
print(ls)
```



`[0,1,5,7,3]`



Some of Applications: -

Example 1: - Write program to read the list from a user then print it

```
ls = []  
size = int(input('Enter the size of list : '))  
for i in range(size):  
    x = eval(input('Enter item : '))  
    ls.append(x)  
print('list = ',ls)
```



Some of Applications: -

Example 2: - Write program to read the integer list from a user then print the summation of it

```
ls = []
size = int(input('Enter the size of list : '))
for i in range(size):
    x = int(input('Enter item : '))
    ls.append(x)
sum=0
for i in ls:
    sum+=i
print('sum = ',sum)
```



Some of Applications: -

Example 3: - Write program to read the integer list from a user then split it to negative and positive lists

```
ls = []
neg=[]
pos=[]
size = int(input('Enter the size of list : '))
for i in range(size):
    x = int(input('Enter item : '))
    ls.append(x)
for i in ls:
    if i<0:
        neg.append(i)
    else:
        pos.append(i)
print(neg)
print(pos)
```



Thank you

