Lists 1

Agenda

- Introduction
- Indexing
- Inserting data
- Iterating over lists

Class or self

ignore them

This will be
covered in
Classes & Objects
(Intermediate Batch)

Data   →   Runs

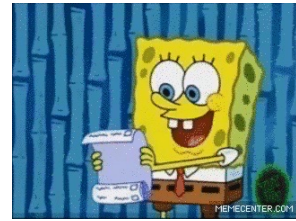   →   Sales

              →   Movies

Data Structures

→ Lists   → Heaps

→ Sets   → Graphs

→ Dictionaries   → Tries

→ Tuples   → Trees

Beginner   . . . .

                                   Intermediate +

                                       Advance

Lists

- Lists are used to store multiple items in a single variable
- Lists are created using square brackets
- List items are ordered, changeable, and allow duplicate values.
- List items are indexed, the first item has index [0], the second item has index [1] etc.
- The list is changeable, meaning that we can change, add, and remove items in a list after it has been created.
- You can also use the list constructor - `list()` to create lists.

Indexing

$$a = [\ 10,\quad -23,\quad 36,\quad \text{"hello"},\ True\ ]$$

0   1   2   3   4

↑

print (a [3])   →   "hello"

a [0]   →   10

a [4]   →   True

a [6]   →   Error

Index Out Of Bounds

$$a = [\ 11,\ 12,\ 13\ ]$$ N = 3

0   1   2

Last   element   =   a [2]

$$b = [\ 31,\ 32,\ 33,\ 34,\ 35\ ]$$ N = 5

Last   element   =   a [4]

List $\rightarrow$ length = N

Last element = $a[N-1]$

$$a = [\ 5,\ \underset{\overset{0}{-6}}{\overset{\downarrow}{\overset{30}{8}}},\ \underset{\overset{1}{-5}}{13},\ \underset{\overset{2}{-4}}{-2},\ \underset{\overset{3}{-3}}{-6},\ \underset{\overset{4}{-2}}{8}\ ]$$

a [3] $\rightarrow$ -2   a [-4] $\rightarrow$ 13
a [0] $\rightarrow$ 5   a [-1] $\rightarrow$ 8

a [1]   =   30

print (a [-5]) $\rightarrow$ 30

Last element $\rightarrow$ a [-1]   Easier

N = len(a)
a [N-1]

Break   till   10 : 03 PM

$$a = [\quad,\quad,\quad,\quad]$$
$$-4 \quad -3 \quad -2 \quad -1$$

Last   Negative   Index $\rightarrow$ $-N$

Community Class for DSML Learners

27th Nov, 6 PM

Register on the link in pinned msg

C R U D

$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
Create	Read	Update	Delete

Create $\downarrow$ Next

Read ✓

Update ✓

Delete $\downarrow$ Next lecture

Insertion

→ .append ( ) → Adds data at the end of your list

→ .insert (index, data) → It inserts data at index parition

→ .extend ( )
↓
list /
it..able
→ Takes data from the new list and appends it in original list

→ Using concatenation
+

$$a = \begin{bmatrix} 10, & 20, & 30 \end{bmatrix}$$
-3 -2 -1

a. inset (-2, 100)

Insert 100 at parition of index = -2

$$\begin{bmatrix} 10, & 100 & ,20, & 30 \end{bmatrix}$$
-4   -3   -2   -1

$$l = [\; 10, \quad 20, \quad 30 \;]$$

$$0 \qquad 1 \qquad 2$$
$$-3 \qquad -2 \qquad -1$$

$$l.\,insert\;(-1,\;100)$$

Insert 100 at
index = −1

$$l.insert\;(2,\;100) \quad \rightarrow \quad [10,\;20,\;100,\;30]$$

$$l = [\; 1,\; 2,\; 3\;,\; 3\;,\; 5\;,\;^{10}6,\; 7\;,\; 5 \;]$$

$$0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7$$

$$1,\,2,\,3,\,3,\,5 \quad ,10, \quad 6,\,7,\,5$$

insert (5, 10)

$$a = [\; 10\;,\; 20,\; 30,\; 40 \;]$$

$$0 \qquad 1 \qquad 2 \qquad 3$$

N = len (a)

print (a[0])

print (a[1])

. . . .

Index → 0 to N-1
↓
range(0 , N)

Default value for
start = 0

range (N)

Python Specific   Generic Name

list   ⟷   array

Doubts

→ Assignments

Doubts related to Assn / HW
→ Community
→ TAs
→ Problem Solving Session

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runs = [10, 55, 4, 67, 17]

runs. append (6)

runs. append (200)

runs [-1] + runs [2]

200 + 4

= 204

---

runs

10, 55, 4, 67, 17

10, 55, 4, 67, 17, 6

10, 55, 4, 67, 17, 6, 200
0   1   2   3   4   5   6
-7 -6 -5 -4 -3 -2 -1

---

i = 0
while i < 100 :
    print (i)

Infinite Loop

$$1 <= N <= 10^8$$

```
for i in range(N):
    if i*i == N :
        ans = N
```

Worst Case $\rightarrow$ $N = 10^8$

$$\sqrt{N} = 10^4$$

$$10^8 = 100000000$$

$$Half = \frac{10^8}{2} = 50000000$$

$$\sqrt{N} = 10^4 = 10000$$

Think about this

Perfect Number

$$\text{Eg} - \quad 6 \quad \rightarrow \quad 1, 2, 3$$

$$1 + 2 + 3 \quad = 6$$

Good Night

Thank You

Monday