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Sequence Type List

- List Creation
- List Mutability
- Operations
- Slicing

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List

- **[1,2,3, True, 'abcd']**
- **Mutable Sequence** type with elements separated by a comma.

```
l1 = []

l2 = list()

l3 = [1,2,3]

l4 = list(l3)

l5 = list('string')
```

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List

- **Mutability**

  l [1] = 4

  l. append(5)

  l. insert(2,33)

  l. extend([10 ,20])

  len(l)

- **WAP** to input a sentence from user , and print one random word out of it.

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List Functions

- **In Place** operations

  l.sort()

  l.index()

  l.pop()

  l.remove()

- Indexing:
  l = [[10, 20], [True, False], [], 'abcd']
  l [0] [1]
  l [3] [3]

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Sequence Type Tupe

- Tuple Creation
- Immutability
- Operations
- Slicing

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Tuple

(1 ,2.3 , True, 'ABCD')

- **Immutable** sequences. Represented by a **()**
- x = ()

  x = tuple()

  x = (1,2,3)

  x = 1,2,3

  x = 1,

  x = tuple([1,2,3])

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Tuple

Modifications not allowed

```
x = (1, 2, 3)
x[1] = 3
```


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Copying Lists

- Simple assignments don't create copy

```
l2 = l1 # both are same
```

- Copying requires special call to **list()** or **slicing**

```
l2 = list( l1 )
l2 = l1 [:]
l2 = l2 [::]
```

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Common operations on Sequences

- **len()** : returns the number of elements
- Slicing.
- Membership check

  in , **not in** # returns Boolean **True** or **False**
- Finding minimum and maximum values:

  min, **max**
- Concatenation and Replication

  +, ***

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Loops

- While Loop
- Break and continue
- List Comprehension

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While Loop

- Syntax :

```
while <condition>:
        statements1
else:           # optional
        statements2
```

- *Statements2* is executed when condition becomes false (but not in case of break)

- WAP to print first 10 natural numbers. Update the program to print their sum
- WAP to count vowels in a string input by user.
- WAP to print all multiples of **3** till **N** (input N from user).

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Break and Continue

- **break** statement is used to terminate the current loop
- On execution, **continue** statement skips the statements below it in the current loop and forces next iteration of the loop.

- Update the **rolling dice** program to ask user to roll again or exit(break).
- Update the **rolling dice** program to also check for invalid inputs(continue)

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Iterating Sequences Python way

- Simple For loop
- Range based for loop

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For loop

- Use **for** loop:

  for *<variable>* in *<sequence type>*:

  # operations using **<variable>**

- Printing a List

  Print Square of elements

  Print length of words in sentence

  Sum elements in a list

  Input a sequence of number separated by spaces and convert it into a list of numbers

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Range

- Represents **immutable sequence** of numbers.
- **range()** method returns a **range object** in python 3
  range(start [,end [, step size]])
- Employed in range based for loops
- Ex:

```
range(10)          # returns object with values 0 till 9
range(5,10)        # 5 till 9
range(20,100, 5)   # 20 till 95 with step size of 5
```

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Practice

- Print Whole numbers till N
- Sum numbers till N
- Print Square of numbers till N
- WAP to print 5 random numbers
- WAP to put 5 random numbers in a list

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List Comprehension : For loop

- Syntax:
  [expression(<*variable*>) **for** <*variable*> **in** <*sequence type*> *[if <condition>]*]
  condition is optional

- WAP to generate list of first 10 natural numbers (Generate a list of their squares also).
- WAP to count vowels using list comprehension
- WAP to find sum of the squares of first 10 even numbers
  4 + 9 + 16 + 25 ….

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