

1. Recap  
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2. Lists  
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3. For Loops  
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# KOLT Python

## Lists & For Loops

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**KOÇ  
UNIVERSITY**

OFFICE OF LEARNING AND TEACHING



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# Agenda

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## Strings

```
my_string = 'abcde'
```

```
0 1 2 3 4  
'a b c d e'  
-5 -4 -3 -2 -1
```

```
print(my_string[2]) ⇒ prints c
```

```
print(my_string[-2]) ⇒ prints d
```

## Indexing & Slicing

Access specific characters using **indexing**, i.e, `[index]`  
**Slice** strings by using `[start:stop:step]`

```
s = 'Python'
s[1] # => 'y'
s[0:4] # => 'Pyth'
s[:3] # => 'Pyt'
s[3:] # => 'hon'
s[:] # => 'Python'
```

```
s = 'Python'
s[:5:2] # => 'Pto'
s[1:4:3] # => 'y'
s[::3] # => 'Ph'
s[::-1] # => 'nohtyP'
```



# String Operations

```
print('This a simple calculator program.')  
number1 = input('Please enter the first number:')  
number2 = input('Please enter the second number:')  
print(f'{number1}+{number2} is {number1 + number2}')
```

```
number1 = int(input('First number:'))  
number2 = input('Please enter the second number:')  
print(f'{number1}x{number2} is {number1 * number2}')
```

**str1 + str2** ⇒ **Concatenate** str1 and str2

**str1 \* n** ⇒ Repeat str1 *n* times.



# While Loops

Repeat some <expression>s as long as a <condition> is True.

```
while <condition>:  
    <expression>  
    <expression>  
    ...
```

```
x = 15  
while x > 10:  
    print(x)  
    x-=1
```

```
counter = 11  
while counter > 6:  
    counter -= 1  
    print(2**counter)  
    counter -= 1
```

<condition> is only checked before each execution.



# Lists



Imagine variables, but with limitless capacity. . .

```
sunnyside = ['Mr. Potato Head', 'Hamm',  
'Buzz Lightyear', 'Slinky Dog']
```

# Lists

```
empty_list = []  
letters = ['a', 'b', 'c', 'd']  
numbers = [2, 3, 5]
```

```
mixed_list = [4, 13, 'hello']
```



## Accessing Elements

```
values = [1, 'hello', None, [3], True]
```

0	1	2	3	4	
[	1,	'hello',	None,	[3],	True]
-5	-4	-3	-2	-1	

Use **indexing** to access and **update** elements inside list.

```
print(values[2])  
values[2] = 'new value'
```



## Adding New Elements

Append elements at the end of a list by **append()**

```
numbers = [1, 2, 3]
numbers.append(7) # => numbers = [1, 2, 3, 7]
numbers.append(11) # => numbers = [1, 2, 3, 7, 11]

a_list = [1, 'a', 'python', 4.2]
a_list.append(3) # => a_list = [1, 'a', 'python', 4.2, 3]
a_list.append('hello')
# => a_list = [1, 'a', 'python', 4.2, 3, 'hello']
```

```
x = [1, 2, 3]
y = [4, 5]
x.append(y) # => x = [1, 2, 3, [4, 5]]
```

# Inspecting List Elements

Slice lists by using **[start:stop:step]**

```
x = [1, 2, 3, 4, 5]
```

```
x[2:4] # => [3, 4]
```

```
x[3:4] # => [4]
```

```
x[1:-1] # => [2, 3, 4]
```

```
y = ['a', 'b', 'c', 'd', 'e', 'f']
```

```
y[:3] # => ['a', 'b', 'c']
```

```
y[2:] # => ['c', 'd', 'e', 'f']
```

```
y[:-1] # => ['a', 'b', 'c', 'd', 'e']
```

```
y[:] # => ['a', 'b', 'c', 'd', 'e', 'f']
```

## Inspecting List Elements

```
y = ['a', 'b', 'c', 'd', 'e', 'f']
```

```
y[1:5:2] # => ['b', 'd']
```

```
y[::3] # => ['a', 'd']
```

```
y = ['a', 'b', 'c', 'd', 'e', 'f']
```

```
y[::-1] # => ['f', 'e', 'd', 'c', 'b', 'a']
```

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# Removing An Element



## Removing An Element

Remove elements in a list by **remove()**

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Remove elements in a list by **remove()**

```
numbers = [1, 2, 3, 4]
numbers.remove(2) # => numbers = [1, 3, 4]

letters = ['a', 'b', 'c']
letters.remove('b') # => letters = ['a', 'c']

numbers_repeated = [1, 2, 5, 4, 2, 6]
numbers_repeated.remove(2) # => number_repeated = [1, 5, 4, 2, 6]

my_list = [1, 'a']
my_list.remove('b') # => ValueError
```

## Removing An Element

Remove elements in a list by **remove()**

```
numbers = [1, 2, 3, 4]
numbers.remove(2) # => numbers = [1, 3, 4]

letters = ['a', 'b', 'c']
letters.remove('b') # => letters = ['a', 'c']

numbers_repeated = [1, 2, 5, 4, 2, 6]
numbers_repeated.remove(2) # => numbers_repeated = [1, 5, 4, 2, 6]

my_list = [1, 'a']
my_list.remove('b') # => ValueError
```

How to avoid ValueError?



## Removing An Element

Remove elements in a list by **remove()**

```
numbers = [1, 2, 3, 4]
numbers.remove(2) # => numbers = [1, 3, 4]

letters = ['a', 'b', 'c']
letters.remove('b') # => letters = ['a', 'c']

numbers_repeated = [1, 2, 5, 4, 2, 6]
numbers_repeated.remove(2) # => numbers_repeated = [1, 5, 4, 2, 6]

my_list = [1, 'a']
my_list.remove('b') # => ValueError
```

How to avoid ValueError? (Hint: **Branching**)

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# in Operator



## in Operator

Search an operand in the specified sequence by using **in**

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Search an operand in the specified sequence by using **in**

```
0 in [] # => False
'y' in 'Python' # => True
23 in ['hello', 40, 'a', 5] # => False
23 in ['hello', 40, 'a', 23] # => True
23 in ['hello', 40, 'a', '23'] # => False
```

## in Operator

Search an operand in the specified sequence by using **in**

```
0 in [] # => False
'y' in 'Python' # => True
23 in ['hello', 40, 'a', 5] # => False
23 in ['hello', 40, 'a', 23] # => True
23 in ['hello', 40, 'a', '23'] # => False
```

- Works with both lists and strings

## in Operator

Search an operand in the specified sequence by using **in**

```
0 in [] # => False
'y' in 'Python' # => True
23 in ['hello', 40, 'a', 5] # => False
23 in ['hello', 40, 'a', 23] # => True
23 in ['hello', 40, 'a', '23'] # => False
```

- Works with both lists and strings
- Works with ranges

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# len() Function



## len() Function

`len()` is an operator to determine the size of lists, strings, etc.



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`len()` is an operator to determine the size of lists, strings, etc.

```
s = 'Python'
len(s) # => 6

my_list = [0, 1, 2, 3]
len(my_list) # => 4
```

## List Mutation

**list.append(x)**: Append x to end of the sequence  
**list.insert(i, x)**: Insert x to index i  
**list.pop(i=-1)**: Remove and return element at index i  
**list.remove(x)**: Remove first occurrence of x  
**list.extend(iterable)**: Add all elements in iterable to end of list  
**list[i] = new\_value**: Update value of index i with new value  
**list[basic\_slice] = iterable**: Change elements in basic slice with elements in iterable, sizes can be different:  
`numbers[:] = []`  
**list[extended\_slice] = iterable**: Change elements in extended slice with elements in iterable 1-1, sizes must be equal.

## Some Other List Operations

**in** operator: Check whether an element is in list.

`3 in numbers`  $\Rightarrow$  `True`

**len(list)**: Returns the length of list (and other collections).

**list.index(value, start=0, stop=len(list))**:

Return first index of value.

**list.count(value)**: Count number of occurrences of value.

**list.reverse()**: Reverse the list (in-place)

**list.sort()**: Sort list elements (in-place)

For more, type `help(list)` in your interactive interpreter.



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## KAHOOT TIME

To play visit the <https://kahoot.it/>



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# range() Function

## range() Function

`range(start, stop, step)` is a function to create ranges

```
a = range(3) # => generates 0, 1, 2
b = range(0,3) # => generates 0, 1, 2
c = range(2,4) # => generates 2, 3
d = range(0,6,2) # => generates 0, 2, 4
0 in a # => True
1 in b # => True
4 in c # => False
2 in d # => True
6 in d # => False
```

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# For Loops



# For Loops

```
for <item> in <iterable>:  
    <expression>  
    <expression>  
    ...
```



# For Loops

```
for <item> in <iterable>:  
    <expression>  
    <expression>  
    ...
```

```
for ch in 'Python':  
    print(ch)
```

# For Loops

```
for <item> in <iterable>:  
    <expression>  
    <expression>  
    ...
```

```
for ch in 'Python':  
    print(ch)
```

```
for num in [4,23,12,0,50]:  
    print(num * 3, sep=".")
```

# For Loops

```
for <item> in <iterable>:  
    <expression>  
    <expression>  
    ...
```

```
for ch in 'Python':  
    print(ch)
```

```
for num in [4,23,12,0,50]:  
    print(num * 3, sep=".")
```

```
for i in range(0,8):  
    print(i)
```

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## Example: Mail Sender

## Example: Mail Sender

Fill out the attendance form:

[tiny.cc/koltpython](https://tiny.cc/koltpython)

Keyword: Gentlemen

## Break, Continue & Pass

**break** immediately terminates the closest loop

```
for i in range(0, 5):  
    if i % 2 == 1:  
        break  
    print(i)
```

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for i in range(0, 5):  
    if i % 2 == 1:  
        break  
    print(i)
```

```
x = 1  
while x < 100:  
    x *= 2  
    if (x+1) % 3 == 0:  
        break  
    print(x)
```

## Break, Continue & Pass

**break** immediately terminates the closest loop

```
for i in range(0, 5):  
    if i % 2 == 1:  
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**continue** skips to the next iteration of the loop

```
for i in range(0, 5):  
    if i % 2 == 1:  
        continue  
    print(i)
```



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while x < 100:  
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```

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# Break, Continue & Pass



## Break, Continue & Pass

**pass** does not have an effect

```
for letter in 'Python':  
    if letter == 'y':  
        pass  
    else:  
        print(letter)
```

```
class CarClass():  
    pass
```

## Break, Continue & Pass

**pass** does not have an effect

```
for letter in 'Python':  
    if letter == 'y':  
        pass  
    else:  
        print(letter)
```

```
class CarClass():  
    pass
```

- Loops, conditional statements, functions, classes etc. cannot be empty