

0. Main

```
🐡 if __name__ == '__main__':
```

1. Conditions

Ternary Condition: 🐡 `max_value = numbers[row][column] if numbers[row][column] > max_value else max_value`

2. Lists



List_Operations

```
1 # append: Adding 10 to end of list
2 l1.append(10)
3
4 # insert: Inserting 5 at index 0
5 l1.insert(0, 5)
6
7 # extend: Adding multiple elements [15, 20, 25] at the end
8 l1.extend([15, 20, 25])
9
10 # max: find the max value in the list
11 max_val = max(l1)
12
13 # min: find the min value in the list
14 min_val = min(l1)
15
16 # sum: Sum all items of the list
17 summed_list = sum(l1)
18
19 # -----
20 l2 = [10, 20, 30, 40, 50]
21
22 # slicing
23 l2_new = l2[1:3] # l2 from index 1 to 3 (not included!), or 1 to 2 included. (= [20, 30])
24
25 # remove: Removes the first occurrence of 30
26 l2.remove(30)
27 print("After remove(30):", l2)
28
29 # pop: Removes the element at index 1 (20)
30 popped_val = l2.pop(1)
31
32 # delete: Deletes the first element (10)
33 del l1[0]
34
35 # -----
36 fruits = ['orange', 'apple', 'pear', 'banana', 'kiwi', 'apple', 'banana']
37
38 # count: Return the number of occurrences of an item
39 fruits.count('apple') # Output: 2
40
41 # index: Find index of next item from index 2 to index 6
42 fruits.index('apple', 3, 6) # Output: 5
43
44 # reverse: Reverse the order of the list
45 rev = fruits.reverse() # opt1
46 rev = fruits[::-1] # opt2
47 rev = [fruits[i] for i in range(len(fruits) -1, -1, -1)] # opt3
48
49 # sort: Sort the list A-Z or 0-9
50 fruits.sort()
51
52 # sorted: Create a NEW sorted list
53 fruits_new = fruits.sorted()
```

Create / clone lists using List Comprehension:

- **Null 1D List:** 🐡 `empty_arr = [None] * length`
- **Null 2D List:** 🐡 `empty_2d_arr = [[None] * columns for row in range(rows)]`
- **Clone a 1D List:** 🐡 `1D | cloned_arr = [item for item in arr1] # Create a CLONE of arr1`
- **Clone a 2D List:** 🐡 `2D | cloned_arr = [x[:] for x in arr1] # Create a CLONE of arr1`
- **1D with condition:** 🐡 `List_Comprehension | new_arr = [item for item in arr1 if (var satisfies this condition)]`

The following list comprehension will transpose rows and columns:

```
🐡 Input | # Input: matrix = [[1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12]]
🐡 Transpose | transposed = [[row[i] for row in matrix] for i in range(4)]
🐡 Output | # Output: [[1, 5, 9], [2, 6, 10], [3, 7, 11], [4, 8, 12]]
```

Useful list-building functions



Input_List

```
1 def input_list(length = 6): # Create a user-input list
2     print(f'Forming a list. Please enter {length} numbers: ')
3     list = [int(input()) for item in range(length)]
4     return list
```



Random_List

```
1 def random_list(length = 6, max = 100): # Create a random list
2     list = [random.randint(0, max) for item in range(length)]
3     return list
```



Random_into_2D_List

```
1 # This function overwrites the original list!
2 def rng_into_2d_arr(two_d_arr): # Insert random values into en empty 2D list
3     for row in range(len(arr)):
4         for column in range(len(arr[row])):
5             arr[row][column] = random.randint(1, 99)
```



View_as_Matrix

```
1 def view_as_matrix(two_d_arr): # View a 2D List as a Matrix
2     matrix = ''
3     for i in range(len(two_d_arr)):
4         for j in range(len(two_d_arr[i])):
5             matrix += f'{str(two_d_arr[i][j]).rjust(3)} '
6         matrix += '\n'
7     return matrix
```

3. Tuple

Creating / packing

🐡 `opt1 | tuple = num1, num2, num3` 🐡 `opt2 | tuple = (num1, num2)` 🐡 `empty | tuple = ()`

Unpacking



Tuple_Unpacking

```
1 t1 = (10, 20, 30)
2 num1, num2, num3 = t1
3 print(num1 + num2 + num3) # Output will be: 60
```

Convert from List to Tuple

```
🐡 List_To_Tuple | tup1 = tuple(list1)
🐡 Set_To_Tuple | tup1 = tuple(set1)
```

4. Set

Set creation

```
opt1 | set1 = {10, 20, 30} ; opt2 | set1 = set(10, 20, 30) ; empty | set1 = set()
set_from_list | set1 = set([2, 4, 5, 1]) set_from_list | set1 = {[2, 4, 5, 1]}
set_from_str | set1 = set("hello")
```

Set Comprehension

```
set1 = set(n for n in range(10)) # Output will be {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}
```

Set Operations

- **Add item:** add_to_set | the_set.add("this", 8)
- **Remove / Pop item:** remove_from_set | the_set.remove(8, "Yon") ; pop_from_set | the_set.pop(index_num)
- **Get length/size of a set:** len_of_set | set1_len = len(set1)
- **Intersect 2 sets:** intersect_sets | intersected = set1 & set2
- **Union 2 sets:** unioned_sets | unioned = set1 | set2
- **XOR 2 sets:** xor_sets | xor_set = set1 ^ set2
- **Diff 2 sets:** diff_sets | unioned = set1 - set2
- **Check if subset (contained):** is_subset | print(set1 <= set2) # True/False

5. Dictionary

Dictionary creation

```
option1 | dict1 = dict(book_id = var_id, title='AOT', votes = 0)
option2 | dict1 = {"book_id":var_id, "title": "AOT", "votes":0}
```

Dict's keys

```
get_keys_into_set | keys_set = set(dict1.keys()) ; get_keys_into_list | keys_list = list(dict1.keys())
loop_on_keys | for key in dict1.keys():
```

Dict's values

```
get_values_into_set | values_set = set(dict1.values()) ; get_values_into_list | values_list = list(dict1.values())
loop_on_values | for value in dict1.values():
```

Dict's pairs / items

```
get_pairs_into_list | pairs_list = list(dict1.items()) ; get_pairs_into_set | pairs_list = set(dict1.items())
USEFUL: loop_on_pairs | for key, value in dict1.items(): example | for album, songs_list in LinkinPark.items():
```

 Dictionary_Operations

```
1 # Define a dict
2 tel = {'Sagi': 4098, 'Amit': 4139}
3
4 # Create / add an item
5 tel['Ilay'] = 4127
6
7 # Get value of a key
8 tel['Sagi'] # Output: 4098
9
10 # Delete an item
11 del tel['Amit'] # opt1
12 tel.pop('Amit') # opt2
13
14 # View the dictionary's keys
15 list(tel) # Output: ['Sagi', 'Amit', 'Ilay']
16
17 # View the dictionary's keys, sorted
18 sorted(tel) # Output: ['Amit', 'Ilay', 'Sagi']
19
20 # Check if a key exists in the dict
21 'Sagi' in tel # Output: True
22 'Amit' not in tel # Output: False
```

6. Integer

- **absolute:** Example | to_user = (abs(user_floor - elevator_floor))
- **random:** Import | import random # First we need to import the library ; Example | bingo = random.randint(1,100)

7. String

String Operations

NOTE: For some of these, we need to import the library: import string

Search

- **var.find()** / **var.rfind()**: Searches the string for a specified value and returns the position of where it was found
- **var.index()**: Searches the string for a specified value and returns the position of where it was found
- **var.count()**: Returns the number of times a specified value occurs in a string

Format / Split / Replace

- **var.rjust()**: syntax | num = num.rjust(width, 'fillchar') example | num = num.rjust(2, '0')
- **var.join()**: var += ''.join('Enter text here')
- **var.partition()** / **var.rpartition()**: Returns a tuple where the string is parted into three parts
- **var.split()** / **var.rsplit()**: Splits the string at the specified separator, and returns a list
- **var.splittlines()**: Splits the string at line breaks and returns a list
- **var.rstrip()** / **var.lstrip()**: Returns a right/left trim version of the string
- **var.replace**: Returns a string where a specified value is replaced with a specified value
- **remove:** remove_ALL_OCCURENCES_of_'a' | st = st.replace('a', ''); remove_2_OCCURENCES_of_'d' | st = st.replace('d', '', 2)


Lowercase / Uppercase Conversion

- **var.upper()**: Convert a string to uppercase
- **var.lower()**: Convert a string to lowercase
- **var.capitalize()**: Capitalizes the string. First letter is CAPITAL, rest are small letters
- **var.swapcase()**: Swaps cases, lower case becomes upper case and vice versa
- **var.title()**: Converts the first character of each word to upper case
- **var.casefold()**: Converts string into lower case

Boolean Checks

- **var.startswith()**: Returns true if the string starts with the specified value
- **var.endswith()**: Returns true if the string ends with the specified value
- **var.istitle()**: Returns True if the string follows the rules of a title
- **var.isalnum()**: Returns True if all characters in the string are alphanumeric
- **var.isalpha()**: Returns True if all characters in the string are in the alphabet
- **var.isnumeric()**: Returns True if all characters in the string are numeric
- **var.isascii()**: Returns True if all characters in the string are ascii characters
- **var.isdigit()**: Returns True if all characters in the string are digits
- **var.isspace()**: Returns True if all characters in the string are whitespaces
- **'text' in var**: Check if a letter/symbol exists in a string. returns True/False check_sym = '@' in address

Slicing

 String_Slicing

```
1 st = "Hello, World!"
2
3 # Get the characters from position 2 to position 5 (not included):
4 print(st[2:5]) # Output: "ell"
5
6 # Get the characters from position -5 to position -2 (not included):
7 print(st[-5:-2]) # Output: "orl"
8
9 # Combined Slicing: Remove characters in the middle of the string; lets say length = 2
10 st = st[0:length - 1] + st[length:] # Removes the char in index {length - 1} = 1 = 'e'
```