


1. Conditions

Ternary Condition

```
🔗 max_value = numbers[row][column] if numbers[row][column] > max_value else max_value
```

2. Lists

 **List_Operations1**

```
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 fruits.reverse()
46
47 # sort: Sort the list A-Z or 0-9
48 fruits.sort()
49
50 # sorted: Create a NEW sorted list
51 fruits_new = fruits.sorted()
```

Get item from list

```
🔗 1d_list | num = numbers[i] 🔗 2d_list | num = numbers[row][column]
```

List Comprehension

A short and powerful way to construct a new list.

```
🔗 List | new_list = [item for item in list1 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]]
```

Create an Empty List

Completely Empty:

```
🔗 list = []
```

Null values in a certain length:

```
🔗 list = [None] * length
```

Create an empty 2D list (using List Comprehension)

```
🔗 empty_arr = [[None] * columns for i in range(rows)]
```

Useful List-Building Functions

 **Input_List**

```
1 def input_list(length = 6): # Create a user-input list
2     list = [None] * length
3     print(f'Forming a list. Please enter {length} numbers: ')
4     for item in range(len(list)):
5         list[item] = int(input())
6     return list
```

 **Random_List**

```
1 def random_list(length = 6, max = 100): # Create a random list
2     list = [None] * length
3     for item in range(len(list)):
4         list[item] = random.randint(0, max)
5     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 an 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 row in range(len(two_d_arr)):
4         for column in range(len(two_d_arr[row])):
5             matrix += f'{str(two_d_arr[row][column]).rjust(2)} '
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)
```

Main

```
🔗 if __name__ == '__main__':
```

4. Set

Create a set

🔗 opt1 | set1 = {10, 20, 30} ; 🔗 opt2 | set1 = set(10, 20, 30) ; 🔗 empty | set1 = set()

Create a set from a list / string

🔗 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

🔗 opt1 | set1 = {i for i in range(10)} ; 🔗 opt2 | set1 = set(i for i 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 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

Create a dict

🔗 option1 | dict1 = dict(book_id = var_id, title='AOT', votes = 0)

🔗 option2 | dict1 = {"book_id":var_id, "title":"AOT", "votes":0}

🔗 option3 | dict1 = dict(["book_id", var_id), ("title","AOT"), ("votes",0)])

Get item in location

🔗 example1 | if book['genre'] == the_genre: 🔗 example2 | book['votes'] += 1

Dict's keys

🔗 get_keys | keys1 = dict1.keys()

🔗 loop_on_keys | for key in dict1.keys():

Dict's values

🔗 get_values | values1 = dict1.values()


🔗 loop_on_values | for value in dict1.values():

Dict's pairs / items

🔗 get_pairs | items1 = dict1.items()

USEFUL: 🔗 loop_on_pairs | for key, value in dict1.items(): 🔗 example | for album, songs_list in LinkinPark.items():

🔗 convert_dict_to_list_of_pairs | pairs_list = list(dict1.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.splitlines():** 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'
```