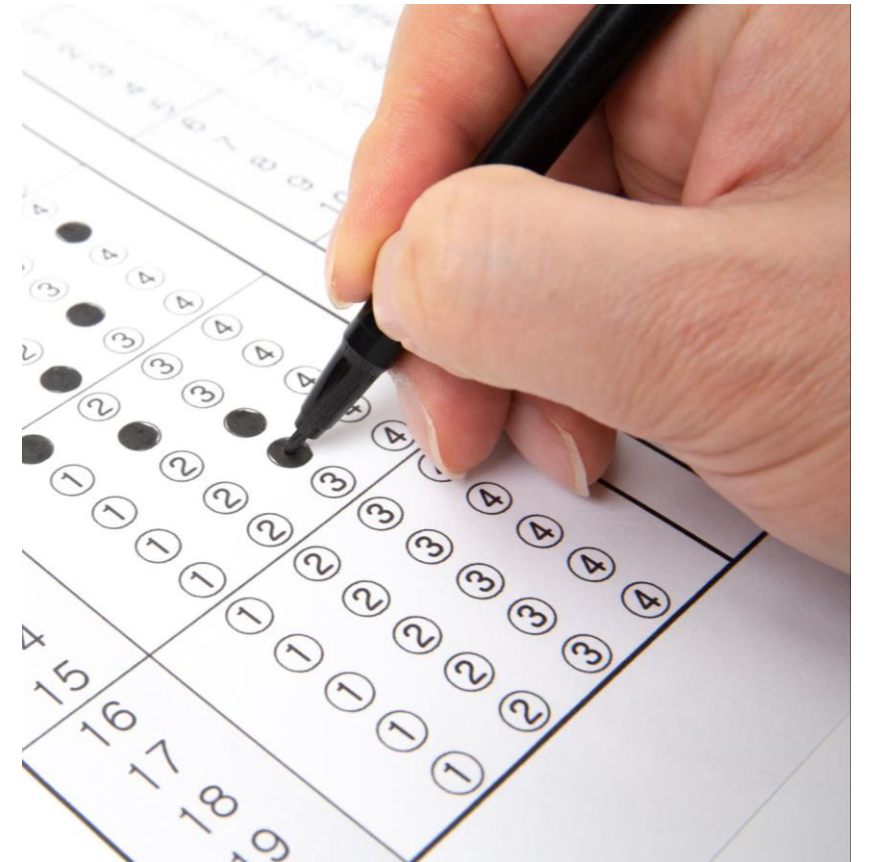# Lists

- Lists are very similar to arrays. They can contain any type of variable, and they can contain as many variables as you wish.

- Lists can also be iterated over in a very simple manner. Here is an example of how to build a list.

```
mylist = []
mylist.append(1)
mylist.append(2)
mylist.append(3)
print(mylist[0]) # prints 1        1
print(mylist[1]) # prints 2        2
print(mylist[2]) # prints 3        3
```

append()
sort()

The append() method adds an item to the end of the list.

The sort() method sorts the elements of a list in ascending order.

Example

```python
currencies = ['Dollar', 'Euro', 'Pound']

# append 'Yen' to the list
currencies.append('Yen')

print(currencies)

# Output: ['Dollar', 'Euro', 'Pound', 'Yen']
```

Example

```python
prime_numbers = [11, 3, 7, 5, 2]

# sort the list in ascending order
prime_numbers.sort()

print(prime_numbers)

# Output: [2, 3, 5, 7, 11]
```

Create a List:

```
thislist = ["apple", "banana", "cherry"]
print(thislist)
['apple', 'banana', 'cherry']
```

List Items - Data Types: String, int and boolean data types:

```
list1 = ["apple", "banana", "cherry"]
list2 = [1, 5, 7, 9, 3]
list3 = [True, False, False]

print(list1)
print(list2)
print(list3)
```

```
['apple', 'banana', 'cherry']
[1, 5, 7, 9, 3]
[True, False, False]
```

A list with strings, integers and boolean values:

```python
list1 = ["abc", 34, True, 40, "male"]

print(list1)
```

```
['abc', 34, True, 40, 'male']
```

List Items - Data Types: String, int and boolean data types:

```python
list1 = ["apple", "banana", "cherry"]
list2 = [1, 5, 7, 9, 3]
list3 = [True, False, False]

print(list1)
print(list2)
print(list3)
```

```
['apple', 'banana', 'cherry']
[1, 5, 7, 9, 3]
[True, False, False]
```

1. Write a Python program using the while loop to get an input of a number from the user, then store the input into a list called `my_list` in incremental order.

```
Enter a number: 1.111
Enter a number: 2.222
Enter a number: 3.333
Enter a number: 4.444
Enter a number: 5.555
my_list = [1.111, 2.222, 3.333, 4.444, 5.555]
```

Flowchart

- Define my_list

- Set count = 1
- While count < = 5

- Ask user to enter a number

- Sort the list
- Print the list

```
Enter a number: 1.111
Enter a number: 2.222
Enter a number: 3.333
Enter a number: 4.444
Enter a number: 5.555
my_list = [1.111, 2.222, 3.333, 4.444, 5.555]
```

```
my_list = []
count = 1
while count <= 5:
    num = float(input('Enter a number: '))
    my_list.append(num)
    count = count +1
my_list.sort()
print('my_list =', my_list)
```

```
>>>
================================================================
Enter a number: 1.111
Enter a number: 2.222
Enter a number: 3.333
Enter a number: 4.444
Enter a number: 5.555
my_list = [1.111, 2.222, 3.333, 4.444, 5.555]
```

2. Write a Python program using the while loop to get an input of a number from the user, then store the input into a list called `my_list` in incremental order. Lastly, calculate the total and average values for the numbers stored in `my_list`.

```
Enter a number: 1.1
Enter a number: 2.2
Enter a number: 3.3
Enter a number: 4.4
Enter a number: 5.5
my_list = [1.1, 2.2, 3.3, 4.4, 5.5]
Total = 16.5
Average = 3.3
```

Flowchart

```
my_list = []
count = 1
total = 0
while count <= 5:
    num = float(input('Enter a number: '))
    my_list.append(num)
    total = total + num
    count = count +1
my_list.sort()
print('my_list =', my_list)
print(f'Total = {total:.2f}')
print(f'Average = {total /5:.2f}')
```

Start

Initialize an empty list called my_list
Initialize a variable count to 1
Initialize a variable total to 0

While count is less than or equal to 5:
    Prompt the user to enter a number and store it in num as a float
    Append num to my_list
    Add num to total
    Increment count by 1

Sort my_list in ascending order

Print 'my_list =' followed by my_list
Print 'Total =' followed by the value of total rounded to 2 decimal places
Print 'Average =' followed by the value of total divided by 5 rounded to 2 decimal places

End

```python
my_list = []
count = 1
total = 0
while count <= 5:
    num = float(input('Enter a number: '))
    my_list.append(num)
    total = total + num
    count = count +1
my_list.sort()
print('my_list =', my_list)
print(f'Total = {total:.2f}')
print(f'Average = {total /5:.2f}')
```

```
- RESTART: C:\Users\warhlaingn\AppDat
Enter a number: 1
Enter a number: 2.5
Enter a number: 3
Enter a number: 4.5
Enter a number: 5
my_list = [1.0, 2.5, 3.0, 4.5, 5.0]
Total = 16.00
Average = 3.20
>>>
```

```python
print(f'Average = {total / 5:.2f}')
```

f'...': This is an f-string (formatted string literal) in Python. It allows you to embed expressions directly into a string by prefixing the string with f or F.

{total / 5:.2f}: This is an expression inside the f-string. It calculates the average of the total variable divided by 5, and formats it to display two decimal places.

{total / 5}: This part calculates the average by dividing the value of total by 5. Assuming total holds the sum of five numbers, this calculates their average.

:.2f: This is a format specifier for floating-point numbers. It specifies that the result should be formatted as a floating-point number with two digits after the decimal point (2f). The colon (:) indicates the start of the format specifier.

3. Write a Python program using the while loop to get an input of a number from the user, then store the input into a list called `my_list` in incremental order. Lastly, print the content of `my_list` in decremental order. Except for `append()` and `sort`, **do not use the built-in list functions to complete the task.**

```
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 4
Enter a number: 5
forward_list = [1.0, 2.0, 3.0, 4.0, 5.0]
reverse_list = [5.0, 4.0, 3.0, 2.0, 1.0]
```

Flowchart

Start

Initialize an empty list called forward_list
Initialize an empty list called reverse_list
Initialize a variable lst_index to 1
Initialize a variable maxloop to 5

While lst_index is less than or equal to maxloop:
    Prompt the user to enter a number and store it in num as a float
    Append num to forward_list
    Increment lst_index by 1

Sort forward_list in ascending order
Print "forward list :" followed by forward_list

Set lst_index to maxloop - 1

While lst_index is greater than or equal to 0:
    Append the element at index lst_index of forward_list to reverse_list
    Decrement lst_index by 1

Print "reverse list :" followed by reverse_list

End

```python
forward_list = []
reverse_list = []
lst_index = 1
maxloop = 5
while lst_index <= maxloop:
    num = float (input('Enter a number: '))
    forward_list.append(num)
    lst_index = lst_index + 1

forward_list.sort()
print("forward list :", forward_list)

lst_index = maxloop -1
while lst_index>= 0:
    reverse_list.append(forward_list[lst_index])
    lst_index = lst_index - 1

print("reverse list :", reverse_list)
```

```python
forward_list = []
reverse_list = []
lst_index = 1
maxloop = 5
while lst_index <= maxloop:
    num = float (input('Enter a number: '))
    forward_list.append(num)
    lst_index = lst_index + 1

forward_list.sort()
print("forward list :", forward_list)

lst_index = maxloop -1
while lst_index>= 0:
    reverse_list.append(forward_list[lst_index])
    lst_index = lst_index - 1

print("reverse list :", reverse_list)
```

```
= RESTART: C:/Users/warhlaingn/AppData/Loca
Python312/Lab5Q3.py
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 4
Enter a number: 5
forward list : [1.0, 2.0, 3.0, 4.0, 5.0]
reverse list : [5.0, 4.0, 3.0, 2.0, 1.0]
```

4. Write a Python program using the while loop to get an input of a number from the user, then **store the input into a list called my_list in incremental order**. Lastly, delete the content of my_list one by one in decremental order. Except for `append()` and `del`, do not use the built-in list functions to complete the task.

```
my_list = []
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 4
Enter a number: 5
my_list = [1.0, 2.0, 3.0, 4.0, 5.0]
my_list = [1.0, 2.0, 3.0, 4.0]
my_list = [1.0, 2.0, 3.0]
my_list = [1.0, 2.0]
my_list = [1.0]
my_list = []
```

Flowchart

```python
my_list = []
lst_index = 0
print ('my_list =', my_list)

while lst_index < 5:
    num = float(input('Enter a number: '))
    my_list.append(num)
    lst_index =lst_index + 1

my_list.sort()
print('my_list =', my_list)

lst_index = lst_index - 1
while lst_index >= 0:
    del my_list[lst_index]
    print('my_list =', my_list)
    lst_index = lst_index - 1
```

```
= RESTART: C:/Users/warhlaingn/AppDat
Python312/Lab5Q4.py
my_list = []
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 4
Enter a number: 5
my_list = [1.0, 2.0, 3.0, 4.0, 5.0]
my_list = [1.0, 2.0, 3.0, 4.0]
my_list = [1.0, 2.0, 3.0]
my_list = [1.0, 2.0]
my_list = [1.0]
my_list = []
```

5. Modify the Python program for Question 4 to allow `my_list` to store multiple data types of data. The data does NOT have to be sorted in this case but is added to the list in the order that the user enters it.

```
my_list = []
Enter a data: 1
Enter a data: SUNWAY
Enter a data: UNIVERSITY
Enter a data: [1.0, -1, A]
Enter a data: 0.1
my_list = ['1', 'SUNWAY', 'UNIVERSITY', '[1.0, -1, A]', '0.1']
my_list = ['1', 'SUNWAY', 'UNIVERSITY', '[1.0, -1, A]']
my_list = ['1', 'SUNWAY', 'UNIVERSITY']
my_list = ['1', 'SUNWAY']
my_list = ['1']
my_list = []
```

Flowchart

Start

Initialize an empty list called my_list
Initialize a variable lst_index to 0
Print 'my_list =' followed by my_list

While lst_index is less than 5:
    Prompt the user to enter a number and store it in num as a
float
    Append num to my_list
    Increment lst_index by 1

Sort my_list in ascending order
Print 'my_list =' followed by my_list

Set lst_index to lst_index - 1

While lst_index is greater than or equal to 0:
    Delete the element at index lst_index from my_list
    Print 'my_list =' followed by my_list
    Decrement lst_index by 1

End

```python
my_list = []
lst_index = 0
print ('my_list =', my_list)

while lst_index < 5:
    num = input('Enter a number: ')
    my_list.append(num)
    lst_index = lst_index + 1

print('my_list =', my_list)

lst_index = lst_index - 1
while lst_index >= 0:
    del my_list[lst_index]
    print('my_list =', my_list)
    lst_index = lst_index - 1
```

```python
my_list = []
lst_index = 0
print ('my_list =', my_list)

while lst_index < 5:
    num = input('Enter a number: ')
    my_list.append(num)
    lst_index = lst_index + 1


print('my_list =', my_list)


lst_index = lst_index - 1
while lst_index >= 0:
    del my_list[lst_index]
    print('my_list =', my_list)
    lst_index = lst_index - 1
```

```
= RESTART: C:/Users/warhlaingn/AppData/Local/Programs/Python/
Python312/Lab5Q5.py
my_list = []
Enter a number: 1
Enter a number: SUNWAY
Enter a number: UNIVERSITY
Enter a number: [1.0, -1, A]
Enter a number: 0.1
my_list = ['1', 'SUNWAY', 'UNIVERSITY', '[1.0, -1, A]', '0.1'
]
my_list = ['1', 'SUNWAY', 'UNIVERSITY', '[1.0, -1, A]']
my_list = ['1', 'SUNWAY', 'UNIVERSITY']
my_list = ['1', 'SUNWAY']
my_list = ['1']
my_list = []
```

6. Modify the Python program for Question 5 to allow `my_list` data to be deleted if a list index is an even number when decrementing the list index in a loop.

```
my_list = []
Enter a data: A
Enter a data: B
Enter a data: 1
Enter a data: 2
Enter a data: HELLO
my_list = ['A', 'B', '1', '2', 'HELLO']
my_list = ['A', 'B', '1', '2']
my_list = ['A', 'B', '2']
my_list = ['B', '2']
```

Flowchart

Start

Initialize an empty list called my_list
Initialize a variable lst_index to 0
Print 'my_list =' followed by my_list

While lst_index is less than 5:
    Prompt the user to enter a number and store it in num
    Append num to my_list
    Increment lst_index by 1

Print 'my_list =' followed by my_list

Set lst_index to lst_index - 1

While lst_index is greater than or equal to 0:
    If lst_index is divisible by 2:
        Delete the element at index lst_index from my_list
        Print 'my_list =' followed by my_list
    Decrement lst_index by 1

End

```python
my_list = []
lst_index = 0
print ('my_list =', my_list)

while lst_index < 5:
    num = input('Enter a number: ')
    my_list.append(num)
    lst_index = lst_index + 1

print('my_list =', my_list)

lst_index = lst_index - 1
while lst_index >= 0:
    if lst_index % 2 == 0:
        del my_list[lst_index]
        print('my_list =', my_list)
    lst_index = lst_index - 1
```

```python
my_list = []
1st_index = 0
print ('my_list =', my_list)

while 1st_index < 5:
    num = input('Enter a number: ')
    my_list.append(num)
    1st_index = 1st_index + 1


print('my_list =', my_list)

1st_index = 1st_index - 1
while 1st_index >= 0:
    if 1st_index % 2 == 0:
        del my_list[1st_index]
        print('my_list =', my_list)
    1st_index = 1st_index - 1
```

```
>>
= RESTART: C:/Users/warhlaingn/AppData/Lo
my_list = []
Enter a number: A
Enter a number: B
Enter a number: 1
Enter a number: 2
Enter a number: HELLO
my_list = ['A', 'B', '1', '2', 'HELLO']
my_list = ['A', 'B', '1', '2']
my_list = ['A', 'B', '2']
my_list = ['B', '2']
>>
```