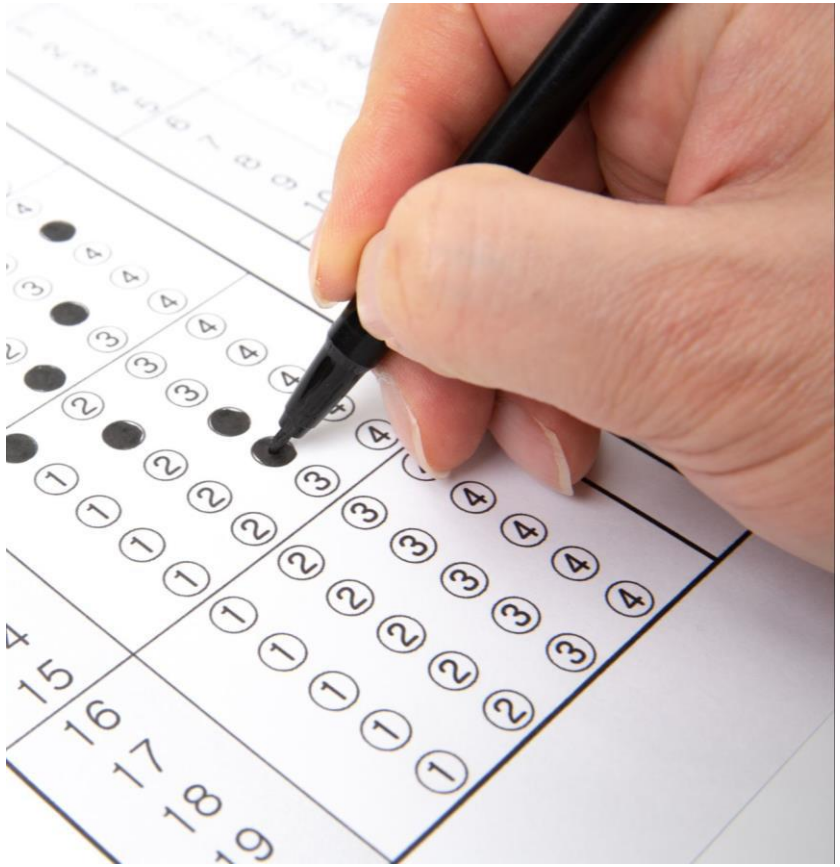
Lists

- 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
print(mylist[1]) # prints 2
print(mylist[2]) # prints 3
```

```
1
2
3
```



append()

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

sort()

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

Example

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

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

print(currencies)

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

Example

```
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:

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

print(list1)
```

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

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]
```

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

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

```
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}')
```

```
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
>>>
```

```
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]
```

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

Flowchart

```
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 = []
```

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

Flowchart

```
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']
```

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

Flowchart

```
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
```

```
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
```

```
>>
= 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']
>>
```