Nested while
While loop inside while is called nested while
Syntax:

```
while <condition>: # outer loop
    while <condition>: # inner loop
        statement-1
        statement-2
    statement-3
```

Example:

```
# write a program to print the sum of the following series
# 1!+2!+3!+4!+...+n!
n=int(input("enter the value of n")) # 4
num=1
s=0
while num<=n:
   fact=1
   i=1
   while i<=num:
      fact=fact*i
      i+=1
   s=s+fact
   num+=1

print(f'sum of factorials 1 to {n} is {s}')
```

Output:

```
enter the value of n4
sum of factorials 1 to 4 is 33
>>>
```

break
break is branching control statement, which is used to move execution control outside the loop.
Break is used to terminate execution of looping statement (while or for)

# write a program to print sum of first n even number

```
num=1
n=int(input("Enter the value of n"))
s=0
```

```
c=0
while True:
    if num%2==0:
        s=s+num
        c=c+1
    num=num+1
    if c==n:
        break

print(f'sum of first {n} even numbers is {s}')
```

Output:

```
Enter the value of n5
sum of first 5 even numbers is 30
>>>
```

continue

continue is a keyword
continue is branching statement
continue statement move the execution control to the beginning of the loop

Example:

```
a=1
while a<=10:
    if a%2!=0:
        a+=1
        continue
    print(a)
    a+=1
```

Output:

```
2
4
6
8
10
```

Collections or Data Structures

What is data structure?

Data structure is not language

Date structure define set of rules and regulations for organizing data in memory
Data structure is a method/concept of organizing data in memory

What is collection?
Every collection is one data structure.
Collection groups all individual objects are represent as one object
Every collection is called one container.
In python collections are called iterable
We are grouping all the object into one object to perform aggregate operations
Collections are dynamic in size
Collections can be homogenous or heterogeneous

What is iterable?
An object capable of returning its members one at a time. Examples of iterables include all sequence types (such as list, str, and tuple) and some non-sequence types like dict, file objects

Collections are two types

1. Sequence types
    - List
    - Tuple
    - Str
    - Bytes
    - Bytesarray
2. Non sequence types
    - Set
    - Frozenset
    - Dictionary

Sequence type
In sequence type the data is organized in memory sequential order.
Sequence types are index based collections

List