Recursion - function

Q.1, What is recursion? How many types of recursion can be applied in program?

Recursion :

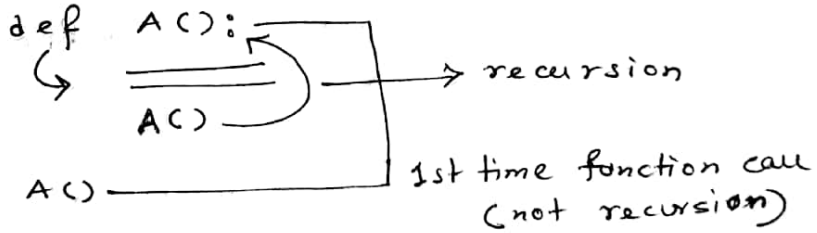
Recursion is a technique of programming in which a function calles itself a number of time based on certain condition,
The function calling itself is called recursive function.
A Recursive function has recursive case/code and Base case/code

Types of Recursion

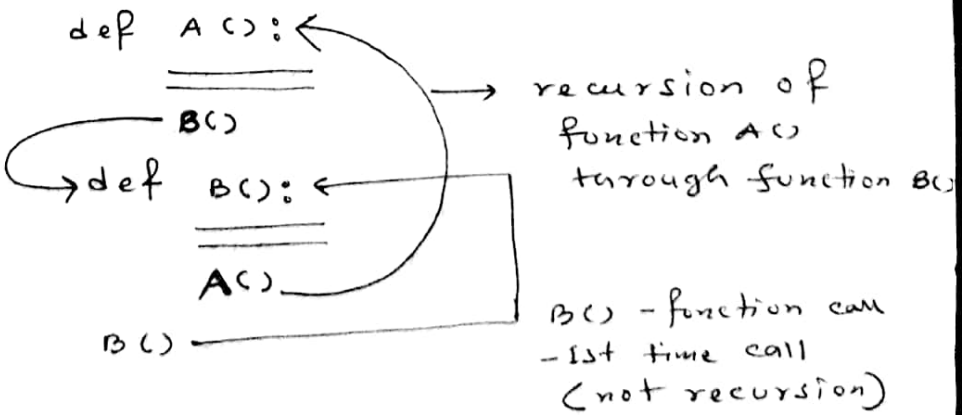
Two types of recursion can be applied in python programming as follows -

(i) Direct Recursion
(ii) Indirect Recursion

ex- (i) Direct Recursion -



(ii) Indirect Recursion -



Q.2.
```
def compute(n):
    if n == 1:
        return 1
    else:
        return n + compute(n-1)

x = 5
sum = compute(x)
print(sum)
```

point out (i) function call
(ii) Recursive function call (iii) Recursive case / code
(iv) Base case / code

Ans -
```
def compute(n): # Recursive function header (i)
    if n == 1: # (iv) Base case / code
        return 1
    else:
        return n + compute(n-1) # Recursive case / code (ii)

x = 5
sum = compute(x) # function call (i)
print(sum)
```

Q.3. which recursive function is called Right or sensible recursive function?

Ans - A Recursive function which has (i) Recursive Case / Code and (ii) Base Case - both, is called Suitable Recursive function,

(i) Recursive case / code is the code by which a function calls itself again and again

(ii) Base case - is the code for which the recursion is stopped

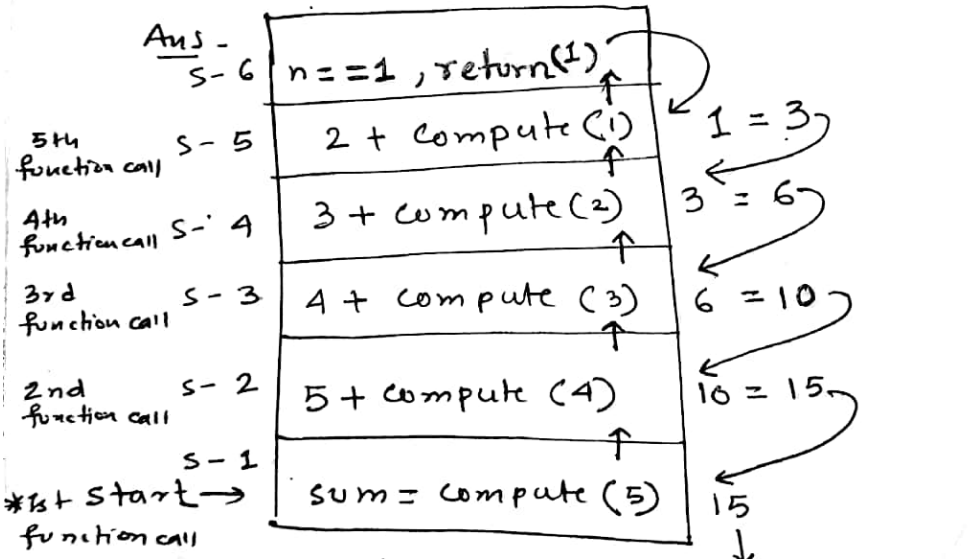
ex:-
```
def compute(n):
    if n == 1:          <-- Base case / code
        return 1
    else:
        return n + compute(n-1)   <-- Recursive case / code
```

Q.4, Write recursive steps of the following recursive function :

```
1  def compute (n):
2      if n==1:
3          return 1
4      else:
5          return  n + compute (n-1)
6  x = 5
7  sum = compute (x)
8  print (sum)
```

* recursive function to find out sum of first n natural numbers

* Recursive steps / sequence →



* flow of execusion - sequence of given program →

1 → 6 → 7 → 1 → 2 → 4 → 5 → 1 → 2 → 4 → 5
→ 1 → 2 → 4 → 5 → 1 → 2 → 4 → 5 → 1 → 2 → 3
→ 7 → 8

Q, 5, What is Base Case and Recursive Case? what is their role in a recursive program? (4)

Ans-

Base Case:

Base case is - the code and condition whose result is known/computed without recursive calling and for which the recursion is stopped,

Recursive Case:

Recursive case is - the code by which the function calls itself again and again with new set of values,

ex-

```
def compute (n):
    if n==1:          <-- Base case/code
        return 1
    else:
        return n + compute (n-1)   <-- Recursive case or code

x=5
sum= compute (x)
print (sum)
```