

### Question 1:

1. This code is saved in q1.py
2. - This program doesn't need any input.
  - To check the program, the inputs are already included in the program.
  - The program has a class called SinglyLinkedList. The class contains a method named recursive\_count which recursively counts the number of nodes in a singly linked list.
  - The output is the number of nodes in the linked list.
3. Execute as followings:

```
PS C:\Users\asus> & "D:/Python 3.8.5/python.exe" "d:/py/CSC1001/Assignment 4/q1.py"
"This" is inserted.
"Singly Linked List" is inserted.
"Is Made" is inserted.
"By: Yohandi" is inserted.
The function recursive count() returns: 4
```

### Question 2:

1. This code is saved in q2.py
2. - This program doesn't need any input.
  - To check the program, the inputs are already included in the program.
  - The program has the method named quick\_sort inside SinglyLinkedList class which uses quick sort algorithm to sort over a singly linked list. The input of the function will be a reference pointing to the first node of a linked list, and the output of the function will also be a reference to the first node of a linked list, in which the data have been sorted into the ascending order.
  - The output is the elements of sorted SinglyLinkedList.
3. Execute as followings:

```
PS C:\Users\asus> & "D:/Python 3.8.5/python.exe" "d:/py/CSC1001/Assignment 4/q2.py"
"This" is inserted.
"Singly Linked List" is inserted.
"Is Made" is inserted.
"By: Yohandi" is inserted.
Sorted result: "By: Yohandi" "Is Made" "Singly Linked List" "This"
```

### Question 3:

1. This code is saved in q3.py

2.
  - This program allows the user to input the value of the number of disks.
  - This program prompts the user to input the value in an integer larger than zero.
  - If the user fails to input an integer, an error message "InputError: The number of disks must be an integer!" will show up and the program will ask the user to reinput the value.
  - If the user fails to input an integer larger than zero, an error message "InputError: The number of disks must be larger than 0!" will show up and the program will ask the user to reinput the value.
  - The Tower of Hanoi is a mathematical game or puzzle. It consists of three rods, and a number of disks of different sizes which can slide onto any rod. The puzzle starts with the disks in a neat stack in ascending order of size on one rod, the smallest at the top, thus making a conical shape.
  - The output would print out the steps to move all the disks from rod A to rod C via rod B.

3. Execute as followings:

```
PS C:\Users\asus> & "D:/Python 3.8.5/python.exe" "d:/py/CSC1001/Assignment 4/q3.py"
Please input the number of disks: 3
A --> C
A --> B
C --> B
A --> C
B --> A
B --> C
A --> C
```