Data structure codes output

1- FIFO (first in first out)

```
<terminated> (exit value: 0) fifo2.exe [C/C++ Application] C:\Users\HP\Downloads\Embedded Syste
fifo_init is done
FIFO Enqueue (0)  n       fifo_enqueue.... is done
FIFO Enqueue (1)  n       fifo_enqueue.... is done
FIFO Enqueue (2)  n       fifo_enqueue.... is done
FIFO Enqueue (3)  n       fifo_enqueue.... is done
FIFO Enqueue (4)  n       fifo_enqueue.... is done
FIFO Enqueue (5)  n       fifo_enqueue.... failed
FIFO Enqueue (6)  n       fifo_enqueue.... failed

 =======fifo_print====
        0
        1
        2
        3
        4

========end==========
        fifo_dequeue 0 .... is done
        fifo_dequeue 1 .... is done

 =======fifo_print====
        2
        3
        4

========end==========
```

2- LIFO (last in first out)

```c
 9    */
10
11   #include "lifo.h"
12   //static allocation in data memory
13   unsigned int buffer1[5]; // we reserved 5*4 bytes = 20 bytes
14
15   int main(void) {
16         int i,temp=0;
17        LIFO_Buf_t uart_lifo,I2C_lifo;
18
```

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<terminated> (exit value: 0) LIFO_Buffer.exe [C/C++ Application] C:\Users\HP\Downloads\Embedded Systems\unit4_dataStr

```
UART LIFO add : 0
UART LIFO add : 1
UART LIFO add : 2
UART LIFO add : 3
UART LIFO add : 4
UART LIFO get : 4
UART LIFO get : 3
UART LIFO get : 2
UART LIFO get : 1
UART LIFO get : 0
```

3- Linked list

1- Add student

We added 4 students

```
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number1

Enter student ID :1

Enter student full name   :Shady mamdouh

Enter student height :170
==================================================
         choose one of the following options

 1 : Add Student
 2 : Delete Student
 3 : View Students
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number1

Enter student ID :2

Enter student full name   :keroles
```

2- Number of students using 2 ways iterative and recursive way .

recursive way option number 10

Iterative way option number 6

```
linked_lists2.exe [C/C++ Application] C:\Users\HP\Downloads\Embedded Systems\unit4_dataS
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
Enter option number10

Number of students : 4
=================================================
          choose one of the following options

 1 : Add Student
 2 : Delete Student
 3 : View Students
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
Enter option number6

Number of students : 4
```

3-Get element by index number

```
linked_lists2.exe [C/C++ Application] C:\Users\HP\Downloads\Embedded Systems\unit4
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
 Enter option number3

 record number 1 :
         ID : 1
         Name : shady
         Height : 170.000000
 record number 2 :
         ID : 2
         Name : keroles
         Height : 170.000000
 record number 3 :
         ID : 3
         Name : emad
         Height : 177.000000
 record number 4 :
         ID : 4
         Name : ahmed
         Height : 175.000000
==================================================
         choose one of the following options

 1 : Add Student
 2 : Delete Student
 3 : View Students
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
 Enter option number5
Enter index :2

 index number 2 :
         ID : 3
         Name : emad
         Height : 177.000000
==================================================
```

4- Get Nth from the end of list

```
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
 Enter option number3

 record number 1 :
         ID : 1
         Name : shady
         Height : 170.000000
 record number 2 :
         ID : 2
         Name : keroles
         Height : 170.000000
 record number 3 :
         ID : 3
         Name : emad
         Height : 177.000000
 record number 4 :
         ID : 4
         Name : ahmed
         Height : 175.000000
==================================================
         choose one of the following options

 1 : Add Student
 2 : Delete Student
 3 : View Students
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
 Enter option number7
Enter index :3

 index number 3 :
         ID : 2
         Name : keroles
         Height : 170.000000
==================================================
```

5- Get the middle of list (case even length)
   The program will tell that it is an even length
   And will take the second middle

```
linked_lists2.exe [C/C++ Application] C:\Users\HP\Downloads\Embedded Systems\unit4
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
Enter option number3

record number 1 :
        ID : 1
        Name : shady
        Height : 170.000000
record number 2 :
        ID : 2
        Name : keroles
        Height : 170.000000
record number 3 :
        ID : 3
        Name : emad
        Height : 177.000000
record number 4 :
        ID : 4
        Name : ahmed
        Height : 175.000000
==================================================
        choose one of the following options

1 : Add Student
2 : Delete Student
3 : View Students
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number8

 list is even, the second middle is :
 index number 2 :
        ID : 3
        Name : emad
        Height : 177.000000
==================================================
```

6- Delete one Student

The program will ask the ID to be deleted

```
2 : Delete Student
3 : View Students
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number2

Enter student ID to be deleted3


=================================================
         choose one of the following options

1 : Add Student
2 : Delete Student
3 : View Students
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number3

record number 1 :
         ID : 1
         Name : shady mamdouh
         Height : 170.000000
record number 2 :
         ID : 2
         Name : keroles
         Height : 170.000000
record number 3 :
         ID : 4
         Name : ahmed
         Height : 175.000000
=================================================
         choose one of the following options
```

7- Get the middle of list (case odd length)

```
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number3

record number 1 :
        ID : 1
        Name : shady mamdouh
        Height : 170.000000
record number 2 :
        ID : 2
        Name : keroles
        Height : 170.000000
record number 3 :
        ID : 4
        Name : ahmed
        Height : 175.000000
==================================================
        choose one of the following options

1 : Add Student
2 : Delete Student
3 : View Students
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number8

index number 1 :
        ID : 2
        Name : keroles
        Height : 170.000000
==================================================
        choose one of the following options
```

8- Reverse linked list

```
linked_lists2.exe [C/C++ Application] C:\Users\HP\Downloads\Embedded Systems\u
 1 : Add Student
 2 : Delete Student
 3 : View Students
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
Enter option number9


=====================================================
          choose one of the following options

 1 : Add Student
 2 : Delete Student
 3 : View Students
 4 : Delete all Students
 5 : Get by index
 6 : Number of students
 7 : Get Nth from the end of list
 8 : Get middle of the list
 9 : reverse linked list
 10 : NUmber of students (recursive way)
Enter option number3

record number 1 :
        ID : 4
        Name : ahmed
        Height : 175.000000
record number 2 :
        ID : 2
        Name : keroles
        Height : 170.000000
record number 3 :
        ID : 1
        Name : shady mamdouh
        Height : 170.000000
=====================================================
          choose one of the following options
```

9- Delete all

```
Height : 173.000000
record number 2 :
        ID : 2
        Name : keroles
        Height : 170.000000
record number 3 :
        ID : 1
        Name : shady mamdouh
        Height : 170.000000
====================================================
        choose one of the following options

1 : Add Student
2 : Delete Student
3 : View Students
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number4


====================================================
        choose one of the following options

1 : Add Student
2 : Delete Student
3 : View Students
4 : Delete all Students
5 : Get by index
6 : Number of students
7 : Get Nth from the end of list
8 : Get middle of the list
9 : reverse linked list
10 : NUmber of students (recursive way)
Enter option number3

list is empty
====================================================
        choose one of the following options
```