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Data structure unit 4, les1

LIFO (static alloc, dynamic alloc)

```
Static alloc, init state: 4

Push 'a' to LIFO, state 4 -> ok
Push 'b' to LIFO, state 4 -> ok
Push 'c' to LIFO, state 4 -> ok
Push 'd' to LIFO, state 4 -> ok
Push 'e' to LIFO, state 4 -> ok
Push 'f' to LIFO, state 4 -> ok
Push 'g' to LIFO, state 1 -> full
Push 'h' to LIFO, state 1 -> full
Push 'i' to LIFO, state 1 -> full
Push 'j' to LIFO, state 1 -> full

Pop 'f' to LIFO, state 4 -> ok
Pop 'e' to LIFO, state 4 -> ok
Pop 'd' to LIFO, state 4 -> ok
Pop 'c' to LIFO, state 4 -> ok
Pop 'b' to LIFO, state 4 -> ok
Pop 'a' to LIFO, state 4 -> ok
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
```

```
dynamic alloc, init state: 4
Push 'A' to LIFO, state 4 -> ok
Push 'B' to LIFO, state 4 -> ok
Push 'C' to LIFO, state 4 -> ok
Push 'D' to LIFO, state 4 -> ok
Push 'E' to LIFO, state 4 -> ok
Push 'F' to LIFO, state 1 -> full
Push 'G' to LIFO, state 1 -> full
Push 'H' to LIFO, state 1 -> full
Push 'I' to LIFO, state 1 -> full
Push 'J' to LIFO, state 1 -> full

Pop 'E' to LIFO, state 4 -> ok
Pop 'D' to LIFO, state 4 -> ok
Pop 'C' to LIFO, state 4 -> ok
Pop 'B' to LIFO, state 4 -> ok
Pop 'A' to LIFO, state 4 -> ok
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
Pop from LIFO failed, state 3 -> Empty
```

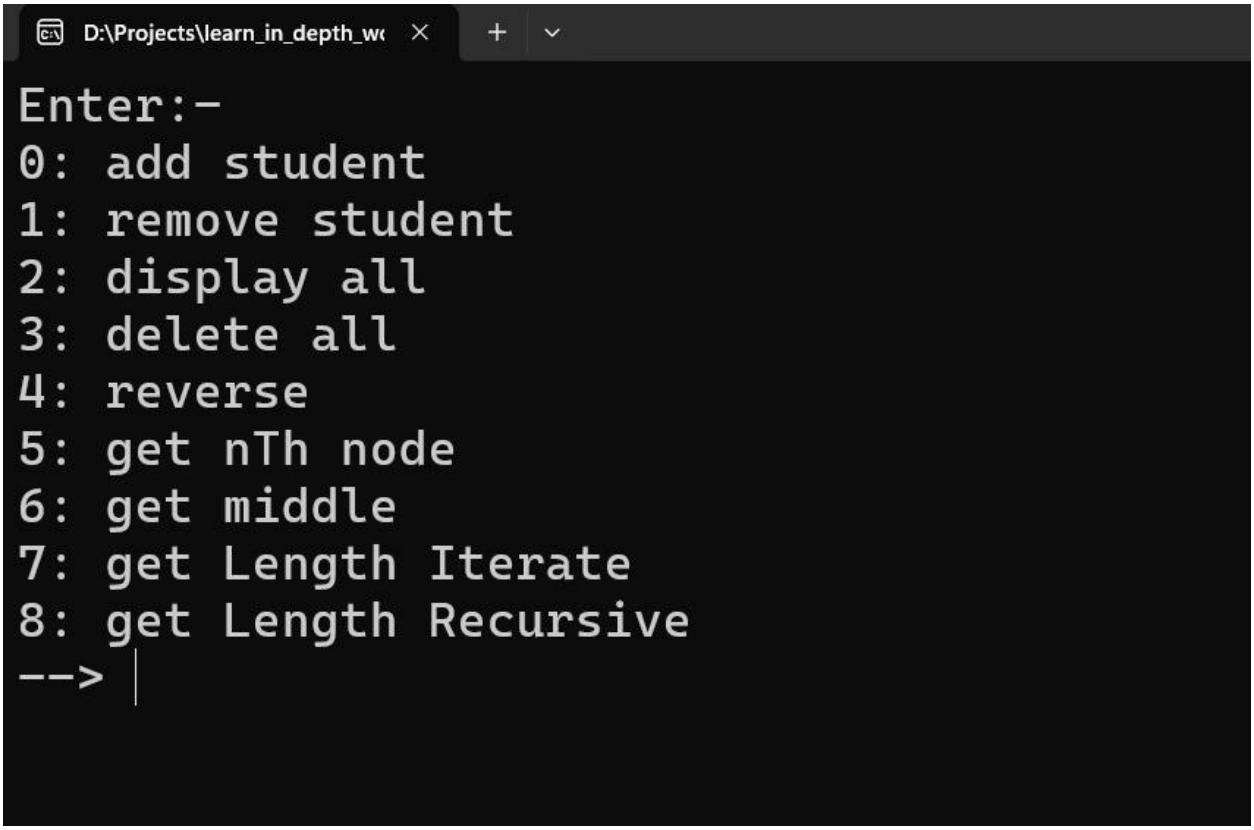
FIFO (static alloc, dynamic alloc)

```
Static alloc, init state: 4

enqueue 'a' to FIFO, state 4 -> ok
enqueue 'b' to FIFO, state 4 -> ok
enqueue 'c' to FIFO, state 4 -> ok
enqueue 'd' to FIFO, state 4 -> ok
enqueue 'e' to FIFO, state 4 -> ok
enqueue 'f' to FIFO, state 4 -> ok
enqueue 'g' to FIFO, state 1 -> full
enqueue 'h' to FIFO, state 1 -> full
enqueue 'i' to FIFO, state 1 -> full
enqueue 'j' to FIFO, state 1 -> full

dequque 'a' to FIFO, state 4 -> ok
dequque 'b' to FIFO, state 4 -> ok
dequque 'c' to FIFO, state 4 -> ok
dequque 'd' to FIFO, state 4 -> ok
dequque 'e' to FIFO, state 4 -> ok
dequque 'f' to FIFO, state 4 -> ok
dequque from FIFO failed, state 3 -> Empty
dequque from FIFO failed, state 3 -> Empty
dequque from FIFO failed, state 3 -> Empty
dequque from FIFO failed, state 3 -> Empty
done
```

```
dynamic alloc, init state: 4
enqueue 'a' to FIFO, state 4 -> ok
enqueue 'b' to FIFO, state 4 -> ok
enqueue 'c' to FIFO, state 4 -> ok
enqueue 'd' to FIFO, state 4 -> ok
enqueue 'e' to FIFO, state 4 -> ok
enqueue 'f' to FIFO, state 4 -> ok
enqueue 'g' to FIFO, state 1 -> full
enqueue 'h' to FIFO, state 1 -> full
enqueue 'i' to FIFO, state 1 -> full
enqueue 'j' to FIFO, state 1 -> full

dequque 'a' to FIFO, state 4 -> ok
dequque 'b' to FIFO, state 4 -> ok
dequque 'c' to FIFO, state 4 -> ok
dequque 'd' to FIFO, state 4 -> ok
dequque 'e' to FIFO, state 4 -> ok
dequque 'f' to FIFO, state 4 -> ok
dequque from FIFO failed, state 3 -> Empty
dequque from FIFO failed, state 3 -> Empty
dequque from FIFO failed, state 3 -> Empty
dequque from FIFO failed, state 3 -> Empty
done
```

Linked List

Menu



Add items

```
--> 0
Enter id: 1
Enter name: kerouls
Enter height: 170
--------------
Press Enter to return to menu
```

```
Enter id: 2
Enter name: youssef
Enter height: 163
--------------
Press Enter to return to menu
```

```
--> 0
Enter id: 3
Enter name: samy
Enter height: 165
--------------
Press Enter to return to menu
```

Display all

```
--> 2
Id: 1   Height: 170.000000      Name: kerlous
Id: 2   Height: 163.000000      Name: youssef
Id: 3   Height: 165.000000      Name: samy
-------------
Press Enter to return to menu
```

Get middle

```
--> 6
Id: 2   Height: 163.000000      Name: youssef
-------------
Press Enter to return to menu
```

Get length iterative

```
--> 7
Length: 3
---------------
Press Enter to return to menu
```

Get length recursive

```
--> 8
Length: 3
---------------
Press Enter to return to menu
```

Get nth node from end

```
--> 5
Enter n from End (0,1,2,3,...,size): 0
Id: 3   Height: 165.000000      Name: samy
-------------
Press Enter to return to menu
```

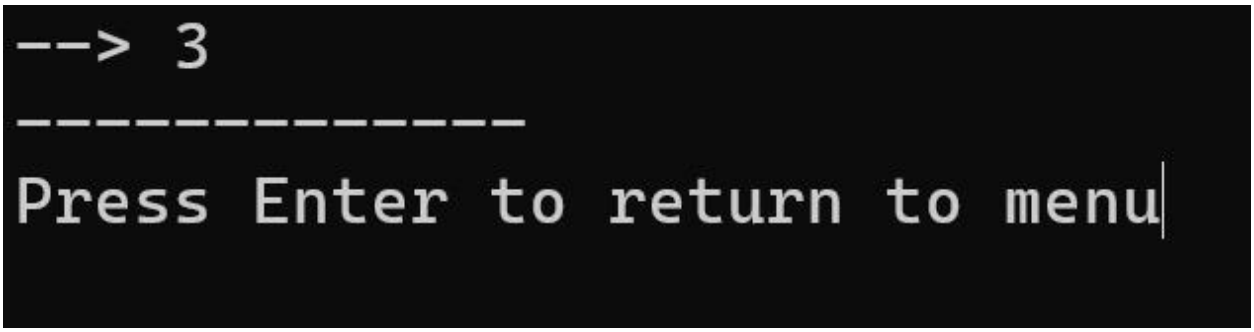
```
--> 5
Enter n from End (0,1,2,3,...,size): 2
Id: 1   Height: 170.000000      Name: kerlous
------------
Press Enter to return to menu
```

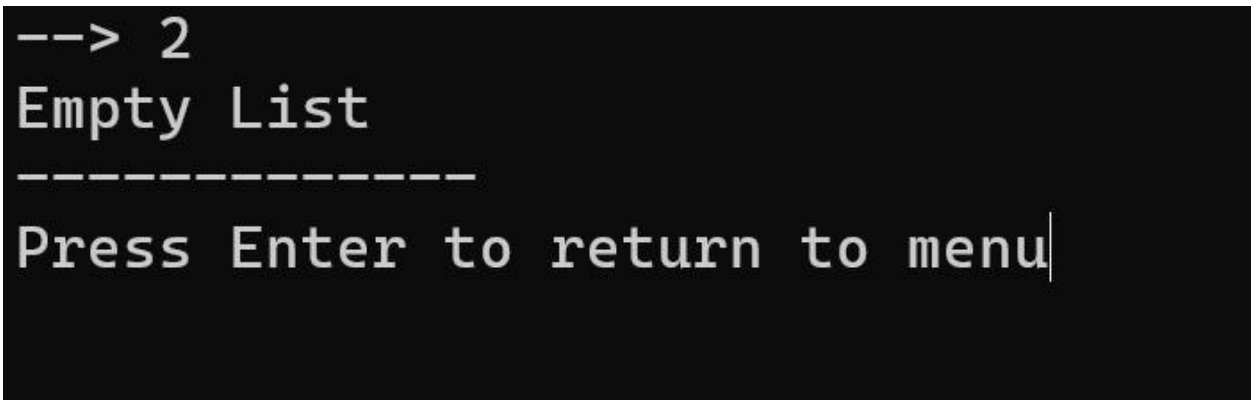
Reverse list

```
--> 4
--------------
Press Enter to return to menu
```

```
--> 2
Id: 3   Height: 165.000000      Name: samy
Id: 2   Height: 163.000000      Name: youssef
Id: 1   Height: 170.000000      Name: kerlous
------------
Press Enter to return to menu
```

Delete all


--> 3
Press Enter to return to menu


--> 2
Empty List
Press Enter to return to menu