University of Msila
Level : 1st year Maths

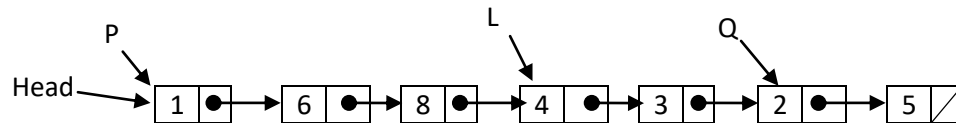**Department of Mathematics**
2023/2024

Module : **ASD2**
Chapter 2: Linked Lists
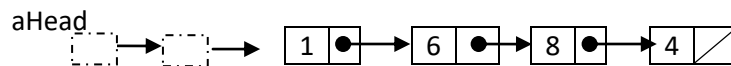**Exercise series**

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TD

Exercise #1.

Consider the following list:

Give the list after executing this sequence of instructions:

```
Q->next->data = p->next->next->data +2 ;
for(p=Head; p!=Q; p=p->next);
L=Head->next ;
for (Q=Head ; q->data<(L->data +2);Q=Q->next);
Q->data ++;
L=Q->next ;
```

Exercise #2.

Run the *Myproc* procedure on the list below. What does the procedure do?


```
void Myproc(List*aHead)
{     List p, t=*aHead;
      *aHead=NULL;
       while(t) {
              p=t;
              t=t->next;
              p->next=*aHead;
              *aHead=p;}    }
```
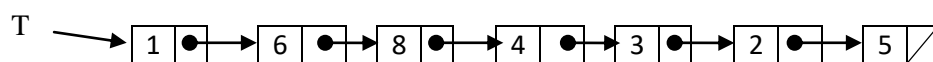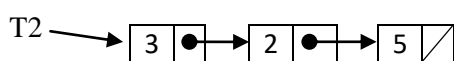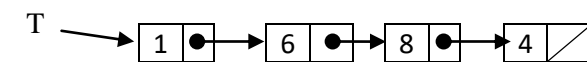
Exercise #3.

Write a program that :
-   Creates the list of integers from 1 to N
-   Write subroutines that calculates the address of the (N/2)th and the address of the last node.
-    Write the subroutine that delete the last 5 (N>5) elements of the list .
-   Write the subroutine to remove the first 5 elements from the list .

Exercise #4.

Write a subroutine which divides the list T into two lists T and T2; division is made from the first occurrence of the element X. *Example : if X=4 and the the list T :*

Resulting lists:

Exercise #5.

write the following subroutines:
-   Calculates the number of occurrences of an integer X in a linked list.
-   Calculates the sum of the elements of a list.
-   Concatenates two lists into a single list.

Exercise #1.

Using the subprograms seen in class: *adHead*(), *append* () *displayList*() and the *sizeList* () function; Write a program that Write a program that Write a program that :

- Creates the list of integers from 1 to 10.
- Display the list.
- Calculate and display list size.
- Add 2 to all list elements.
- Display the list.
- Delete the first two elements from the list.
- Delete the last element.
- Display the list and the new size.
- Display the last element
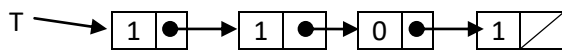
Exercise #2.

By using a procedure; write a program that reverses a linked list.

Exercise #3

Write a program that converts a decimal integer to the binary system. (using successive division and putting the division remainders in a linked list)

If *n*=13.

The resulting list:

Exercise #4.

implementation of exercise 4 (TD)

1. Write a subroutine that checks if a list is symmetrical.
2. Write a subroutine that removes negative elements from a linked list.
3. Write a subprogram that duplicates a linked list
   List : 1->2->3->4
   Duplicate list: 1->1->2->2->3->3->4->4
4. Write a program that adds an element to a list sorted in ascending order
5. Write a program that contains two lists sorted in ascending order
   ```
   List1 :  3->5->9
   List2 :  2->4->7->8->9
   concatenation result:2->3->4->5->7->8->9->9
   ```