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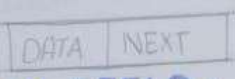
ELEMENT OF A SINGLY LINKED LIST

1- **NODE:**

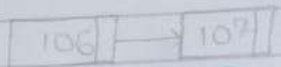
A node is the basic of a linked list. Each node has two parts

- Data
- Nest pointer



2- **DATA FIELD:**

The data field stores the actual value (Number, character, etc.)

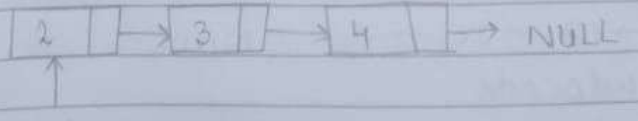


3- **NEXT POINTER:**

The next pointer stores the address the next node in the list. For the last node next pointer stores NULL.

4- **HEAD POINTER:**

The head pointer stores the address of the first node of the linked list. If the list is empty head = NULL.



INSERTION

1- **Insertion at beginning:**

Insert 10 into list:

20 → 30 → 40

- **Initial list**

Head → 20 → 30 → 40 → 40 → NULL

- **Pseudocode**

BEGIN

Create new nod

set. newnod . data = 10

newNode . Next = head

head = newnode

END

- **Dry run**

- Create new node with data 10
- new Node . next = head (20)
- head = new node

Final List

head → 10 → 20 → 30 → 40 → NULL

2- **Insertion at End:**

Insert 50 into:

10 → 20 → 30

- **Initial List**

head → 10 → 20 → 30 → NULL

- **Pseudocode**

BEGIN

create new node

Set newnode.data = 50
newnode.next = NULL
temp = head
WHILE temp.next ≠ NULL
temp = temp.next
END WHILE
temp.next = newnode
END

- **Final list**
  head → 10 → 20 → 30 → NULL
- **Dry run**

1- temp moves From 10 → 20 → 30
2- temp.next = newNode (50)

3- **Insertion at a specific position**
Insert 25 at position into list:
10 → 20 → 30 → 40

- **intial ust**
  head → 10 → 20 → 30 → 40 → NULL
- **Pseudocode**
  BEGIN
Create new node
set newNode.data = 25
temp = head
For i=1 to position - 2
temp = temp.next
END For
newnode.next = temp.next
temp.next = newNode
END

- **Dry run**

1- temp stops at node 20
2- newnode.next = 30

3- temp.next = newNode

FINAL List

head → 10 → 25 → 30 → 40 → NULL

DELETION

1- Deletion from the Beginning

Deletion first node from list:

10 → 20 → 30

- Intial List

head → 10 → 20 → 30 → NULL

- Pseudocode

```
BEGIN
IF head = NULL
   print "List is empty"
ELSE
      temp = head
      head = head.next
        delete temp
END if
END
```

- Dry run

1- temp = 10

2- head = 20

3- delete temp

Final List:

head → 20 → 30 → NULL

2- Deletion at END

Deletion last node from list:

10 → 20 → 30 → 40

- Intial List:

head → 10 → 20 → 30 → 40 → NULL

Pseudocode

```
BEGIN
  temp = head
WHILE temp.next.next ≠ NULL
    temp = temp.next
END.WHILE
  delete temp.next
  temp.next = NULL
END
```

- Dry run

1- temp moves to node 30
2- delete node 40
3- temp.next = NULL

Final list:

head → 10 → 20 → 30 → NULL

3- Deletion from a specific position

Delete nod at position 2 from list:

10 → 20 → 30 → 40

- intial list

10 → 20 → 30 → 40 → NULL

Pseudocode

```
BEGIN
temp = head
For i=1 to position-2
    temp= temp.next
END for
  del = temp.next
temp.next = del.next
  delete del
END
```

- Dry run

1 temp stops at node 10

2- del = 20

3- temp.next = 30

4- delete del

Final list

head → 10 → 30 → 40 → NULL