DATA STRUCTURES AND ITS APPLICATIONS

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Singly Linked List

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Singly Linked List: Node Structure

Defining node structure

```
struct node
{
int data;
struct node *link;
};

typedef struct node NODE;
```

data link

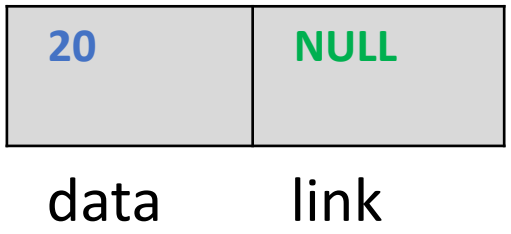
```
struct polydata
{
  int coeff;
  int expo;
};

typedef struct node
 {
polydata data;
struct node *link;
}polynode;
```

coef expo link

Singly Linked List Operations

Creating a node

- Allocate memory for the node dynamically
- If the memory is allocated successfully
  set the data part to user defined value
  set the link part to NULL



Inserting a node

There are 3 cases

- Insertion at the beginning
- Insertion at the end
- Insertion at a given position

Insertion at the beginning

- Create a node

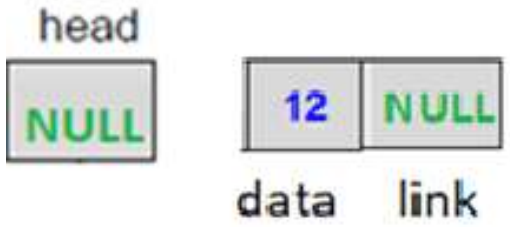
If the list is empty

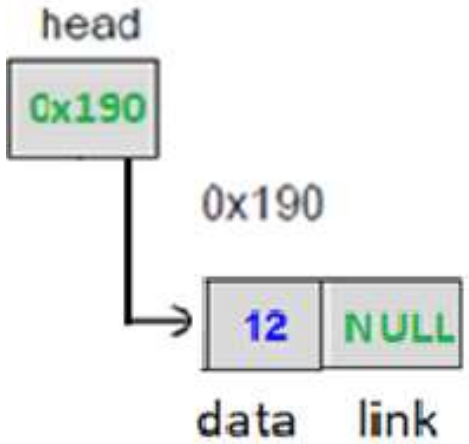
- make the head pointer point towards the new node;

Else

- Make the next pointer of the node point towards the first node of the list
- Make the head pointer point towards this new node

Insertion at the beginning



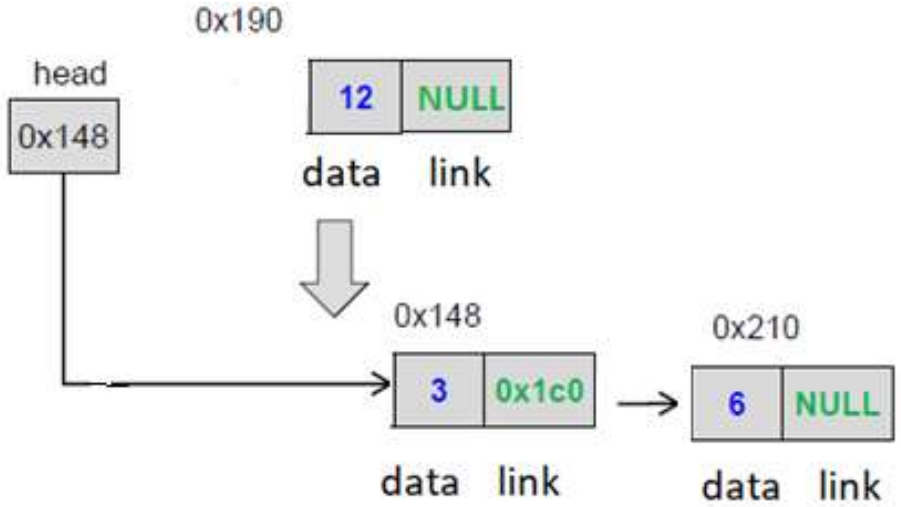


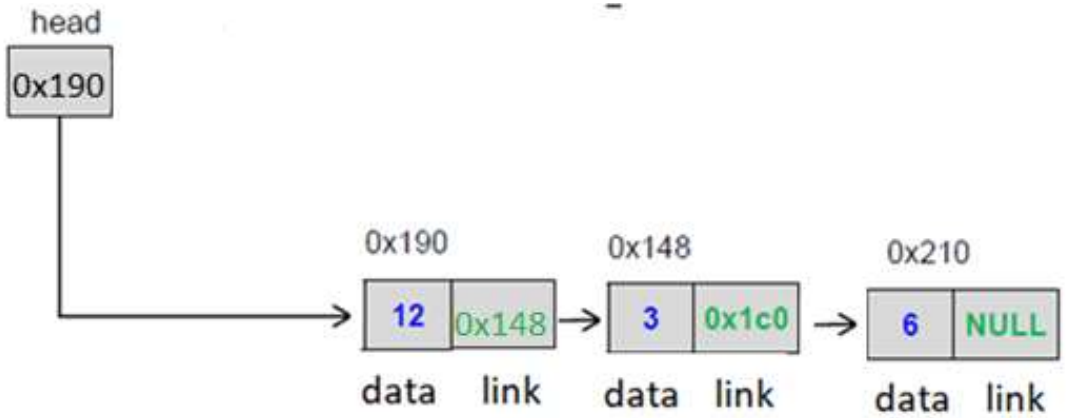
CASE1

DATA STRUCTURES AND ITS APPLICATIONS

Singly Linked List operations

Insertion at the beginning





CASE2

Insertion at the end of the

- Create a node

If the list is empty

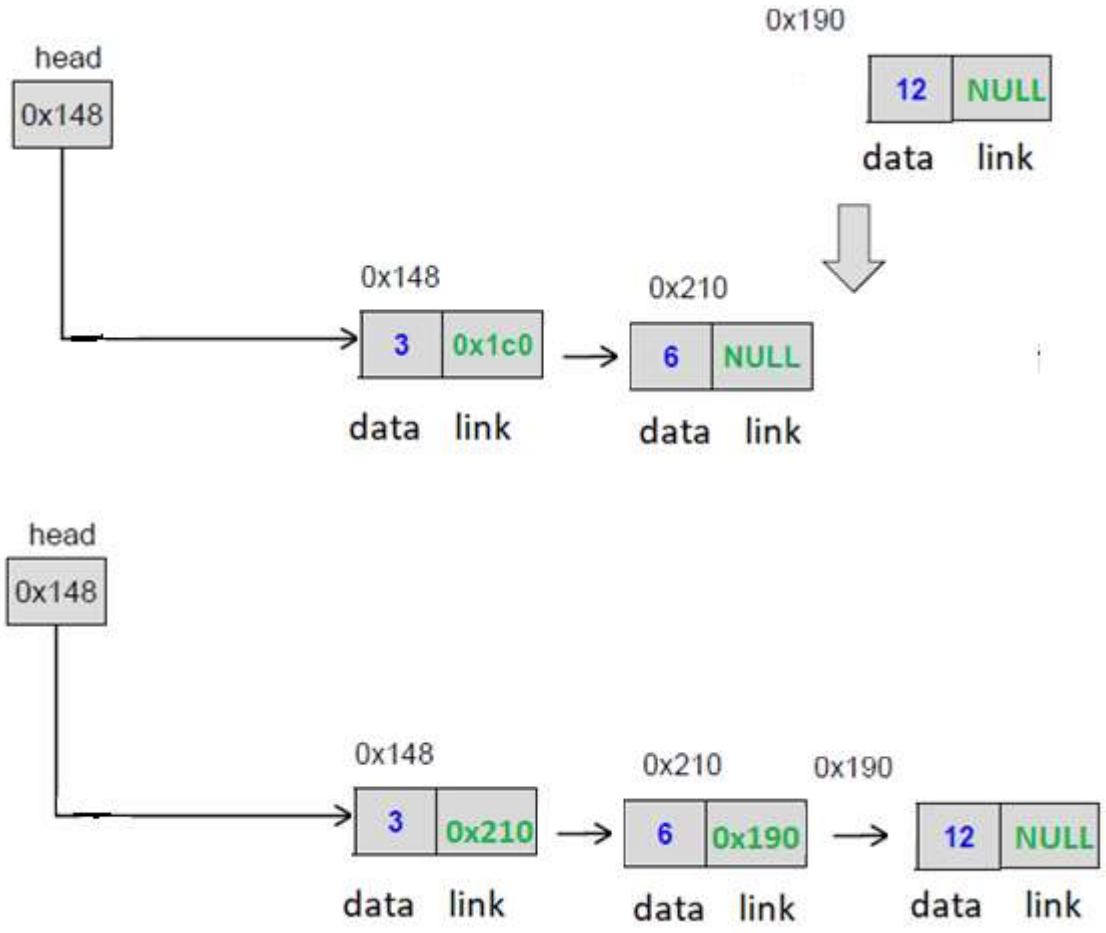
- make the head pointer point towards the new node;

Else

- Traverse the linked list to find out the last node
- Make the link pointer of the last node to point to the new node

Singly Linked List operations

Insertion at the end of the



Singly Linked List operations

Insertion at the given position

- Create a node

If the list is empty or if insertion is to be done at first position

- Same steps as insert front

Else

- Traverse the linked list to reach given position
- Keep track of the previous node

    If it is an intermediate position

    - Change previous node link to point to the newnode
    - Newnode to point to the next node

    Else

        If it is last position

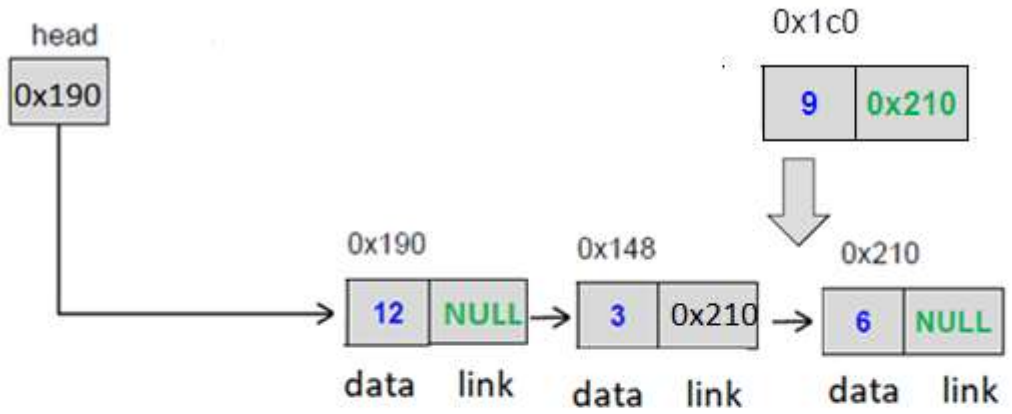
        - Same steps as insert at end

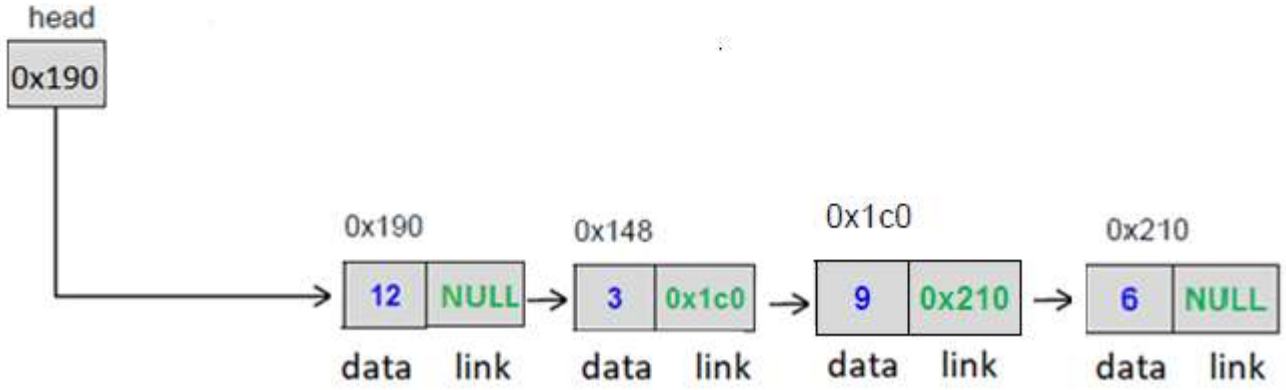
        Else

            Print “Invalid position”

Singly Linked List operations

Insertion at the given position





Singly Linked List insert operation

Apply the concepts to implement following operations on a circular singly linked list

- Count number of nodes
- Concatenate two lists
- Sum of all the node values in the list

THANK YOU

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