CS & IT ENGINEERING

Data Structure

Linked List
Chapter- 3
Lec- 03

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TOPICS TO BE COVERED

- Linked List-III

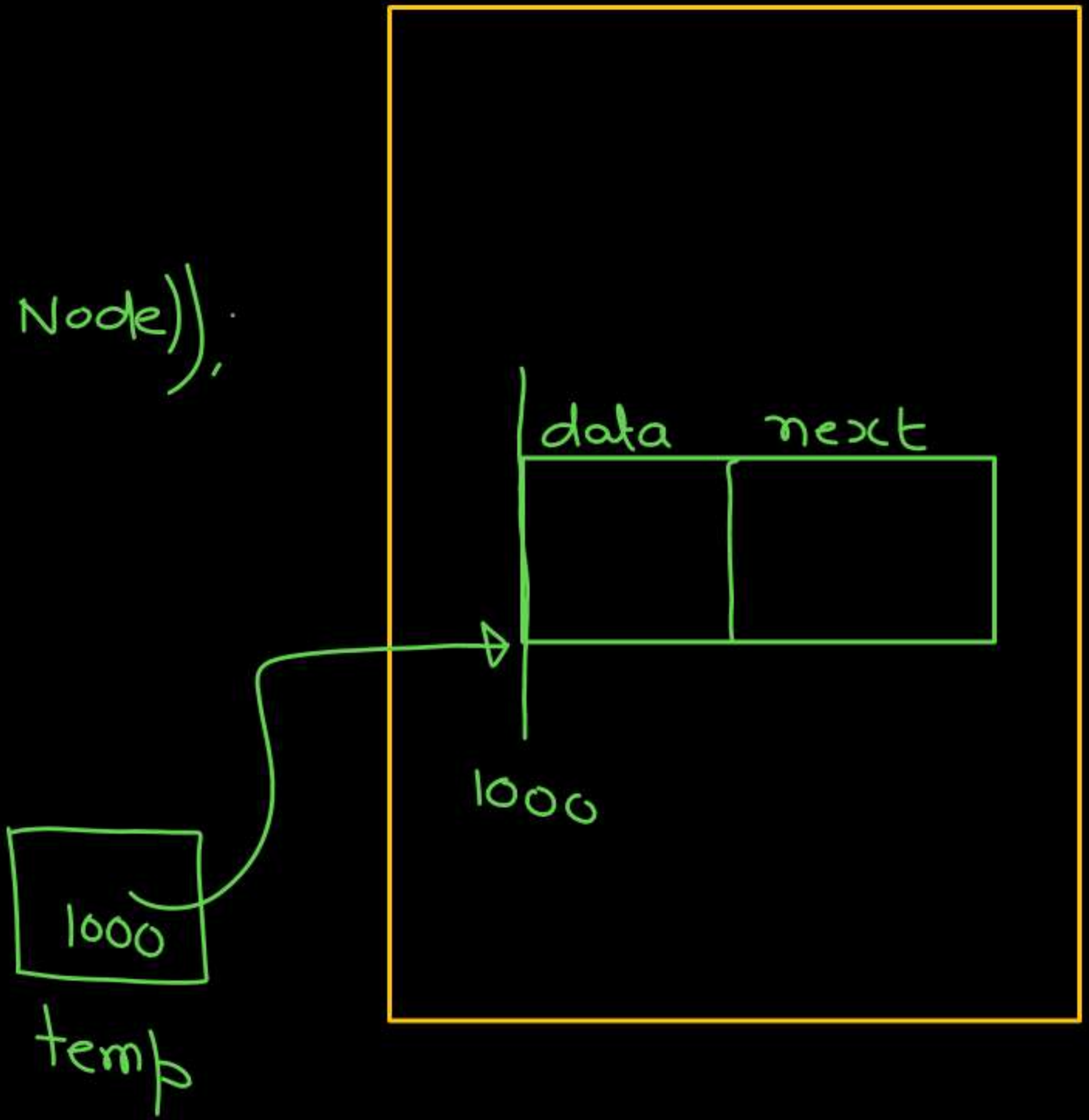
Insertion

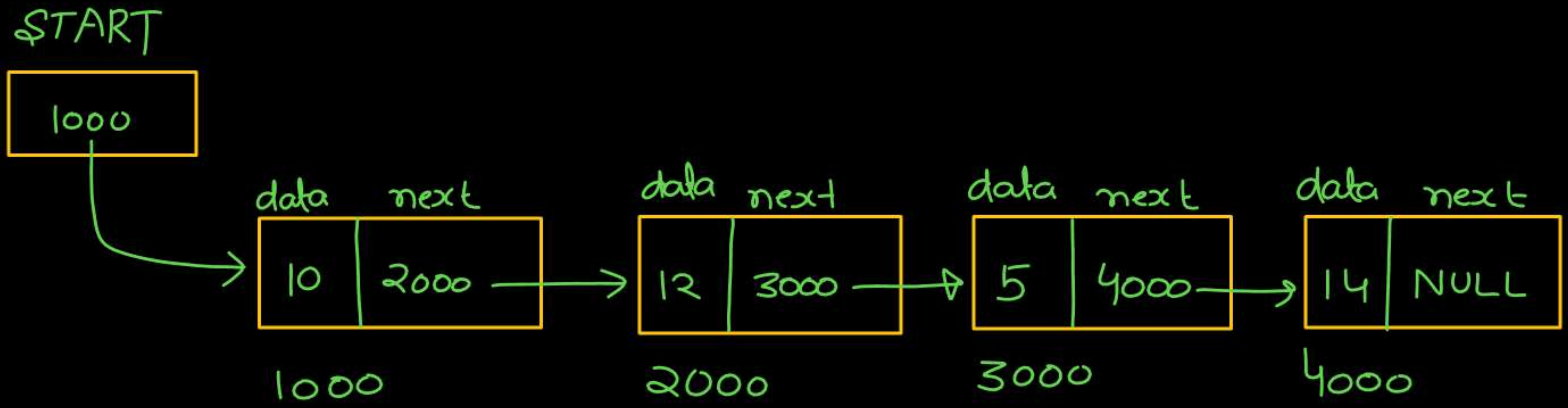
① **Memory allocate**

```
struct Node *temp;
    temp = malloc(sizeof(struct Node));
```

② a) Insert ⟹ Key

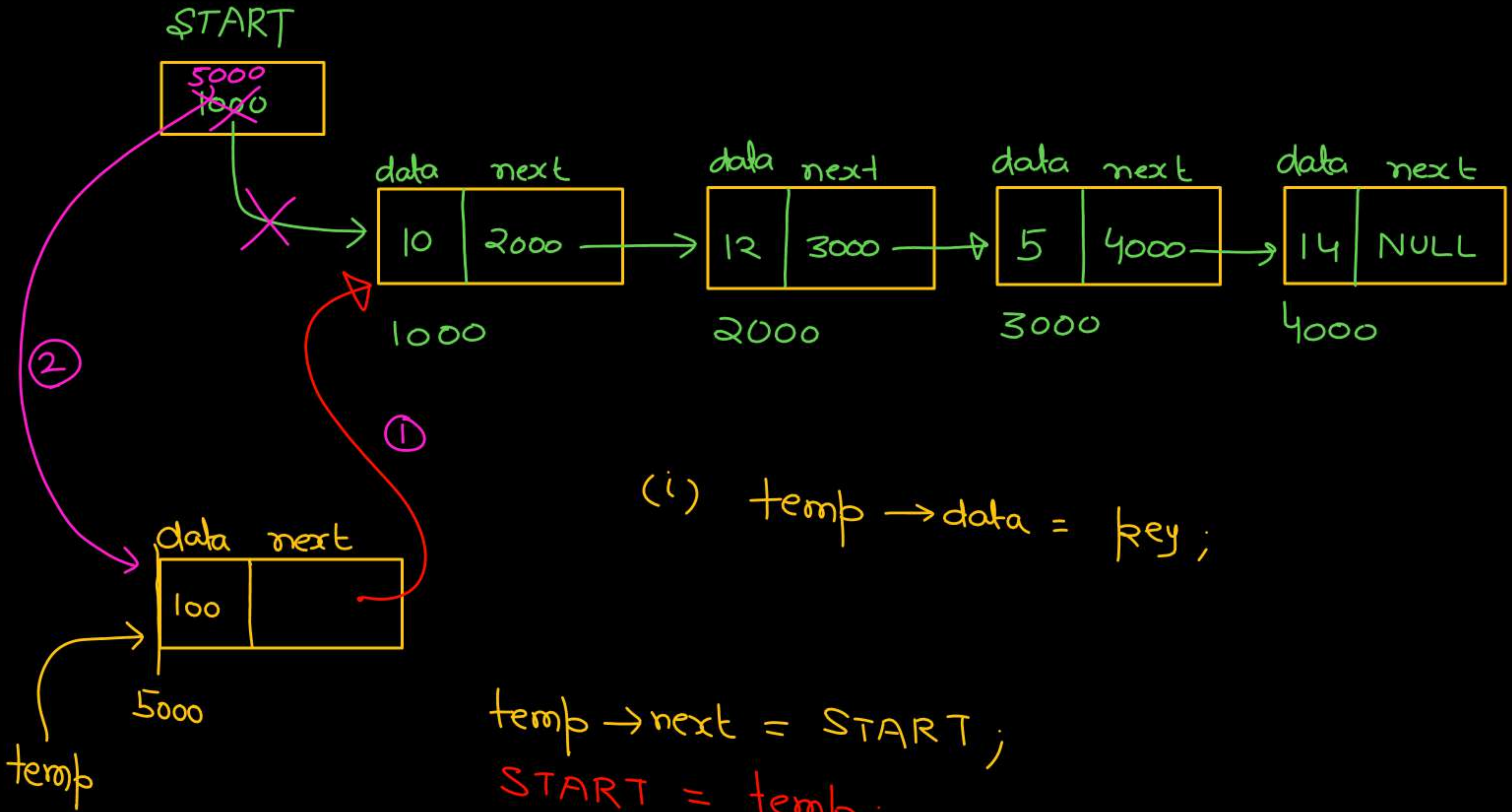
b) Where to insert





1) begining
2) End
3) After a given node

✓

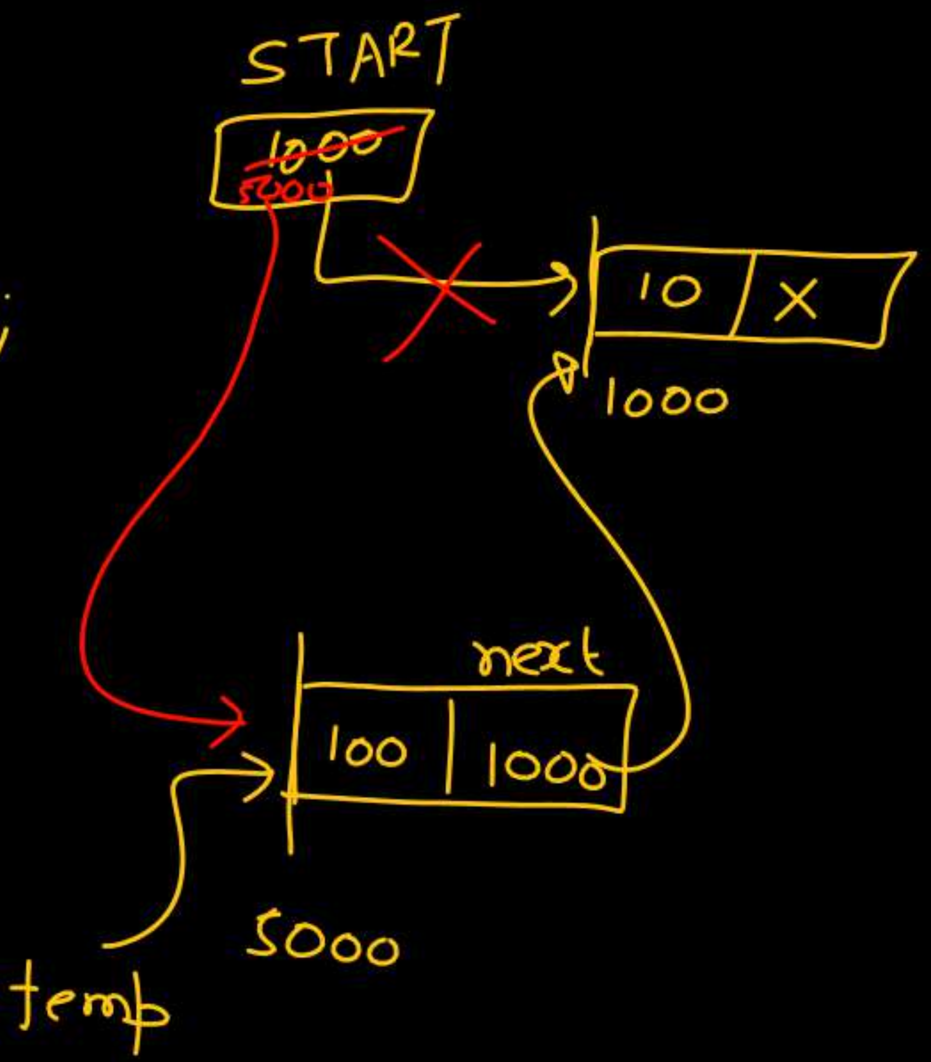


(i) temp → data = key;

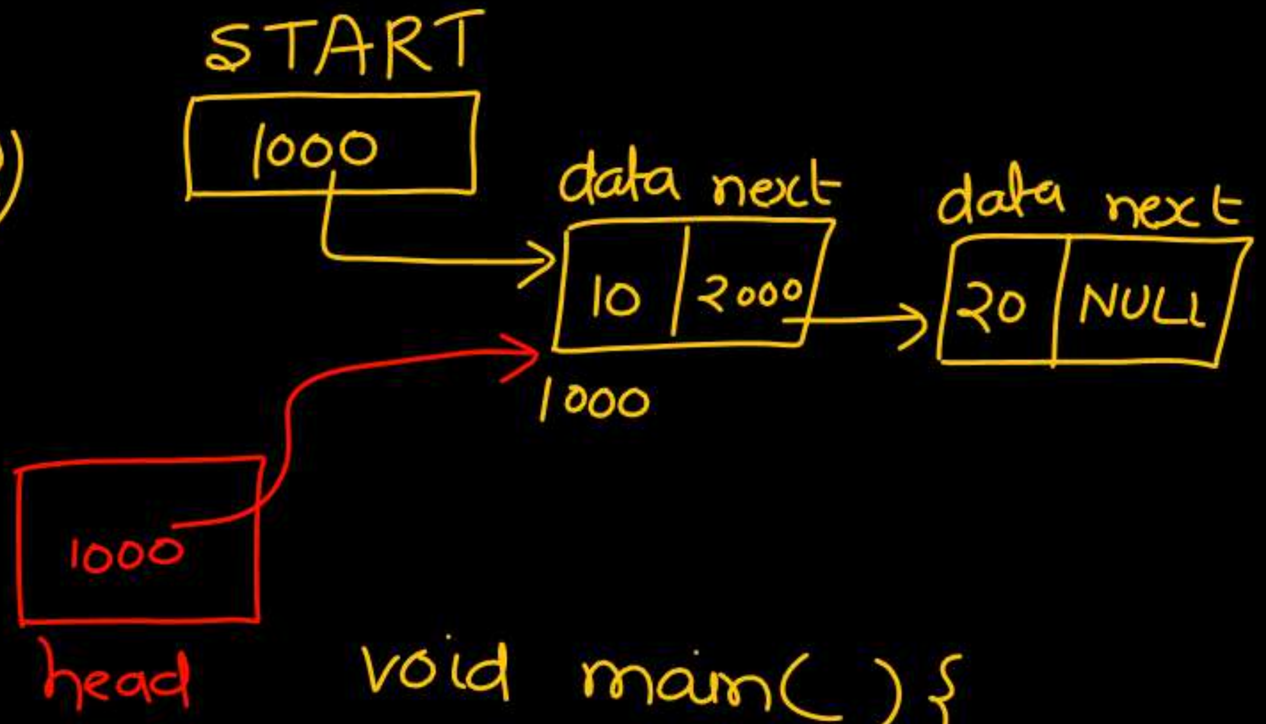
```
temp → next = START;
START = temp;
```

START
→global

```
void Insert_at_begin( int key){
        struct Node *temp;
       temp = malloc(sizeof(struct Node));
          if(temp!=NULL)
       {
           temp→data = Key;
           temp→next = START;
           START = temp;
       }


                                      }
```



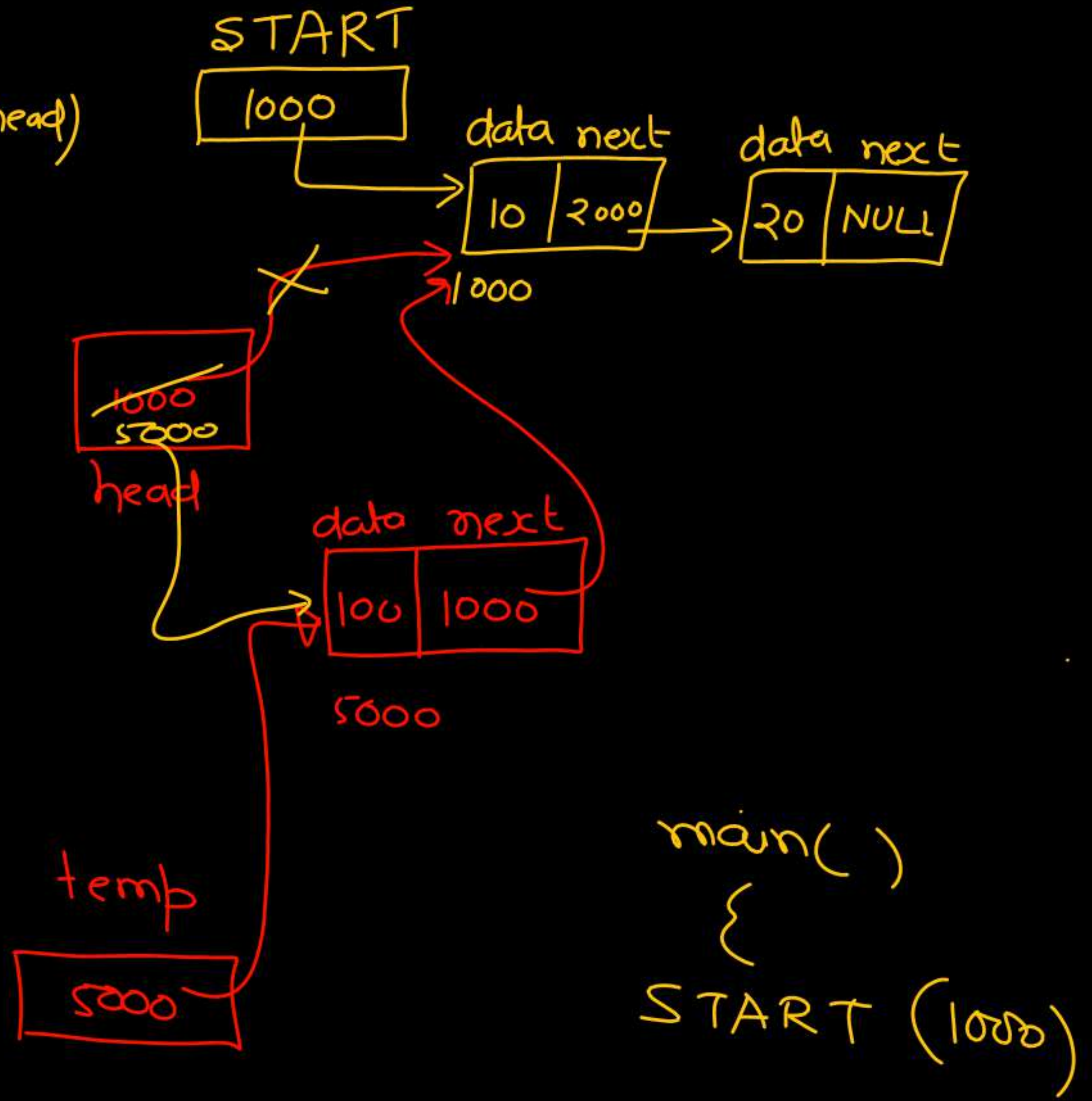
```
void Insert-warpan (int Key, struct Node *head)
        {
      struct Node *temp;

  temp = malloc(sizeof(struct Node));

       if(temp != NULL)
       {
         temp->data = Key;
         temp->next = head;
          head = temp;
        }


        }
```



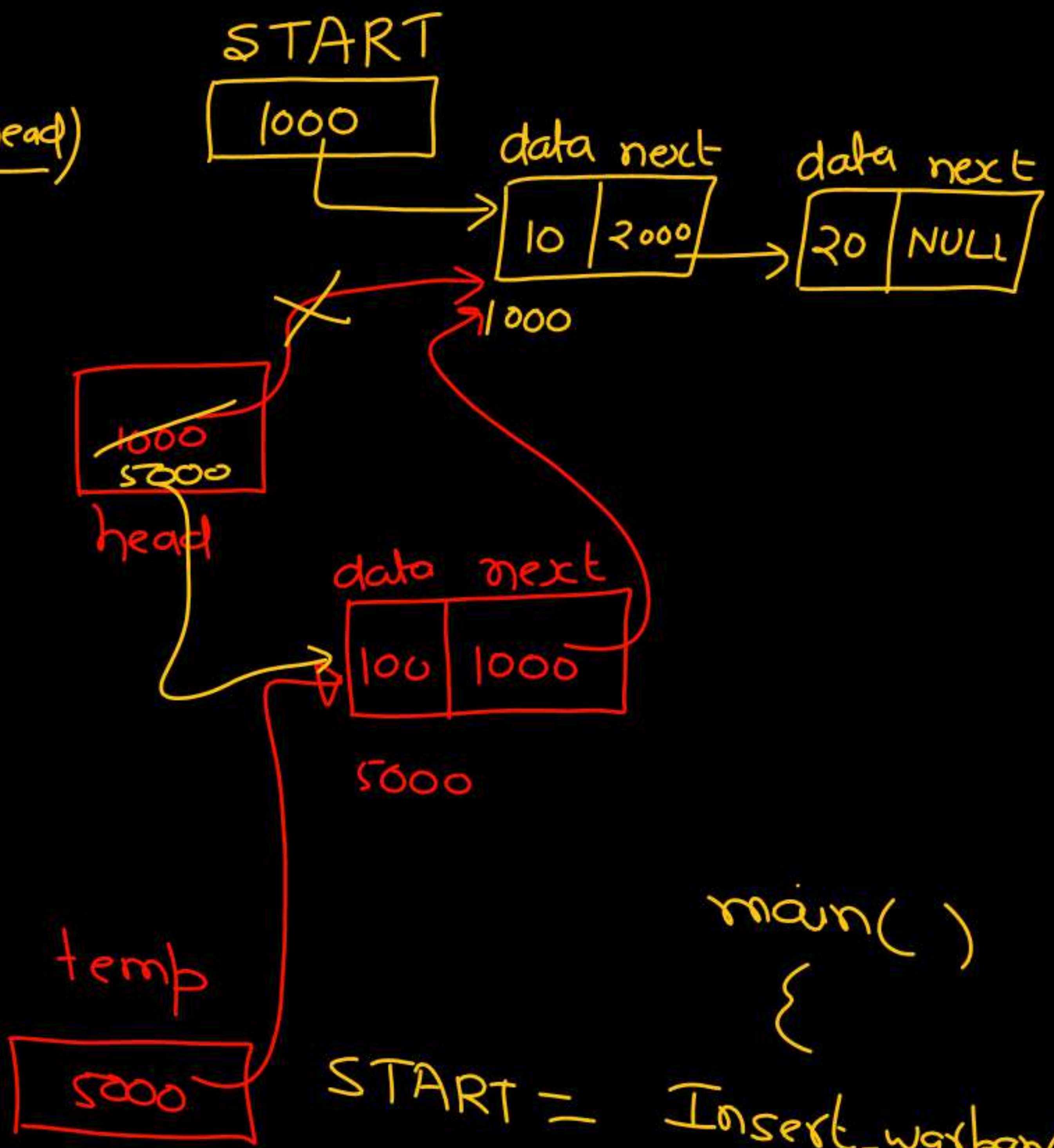
गलत है

```
void main(){

  struct Node *START = NULL;

        ≡

  Insert_at_beg(100, START);
        =

        }
```

```
void Insert-warkan (int Key, struct Node *head)
        {
      struct Node *temp;
   temp = malloc(sizeof(struct Node));
      if(temp != NULL)
      {
        temp->data = Key;
        temp->next = head;
        head = temp;
       }


       }
```

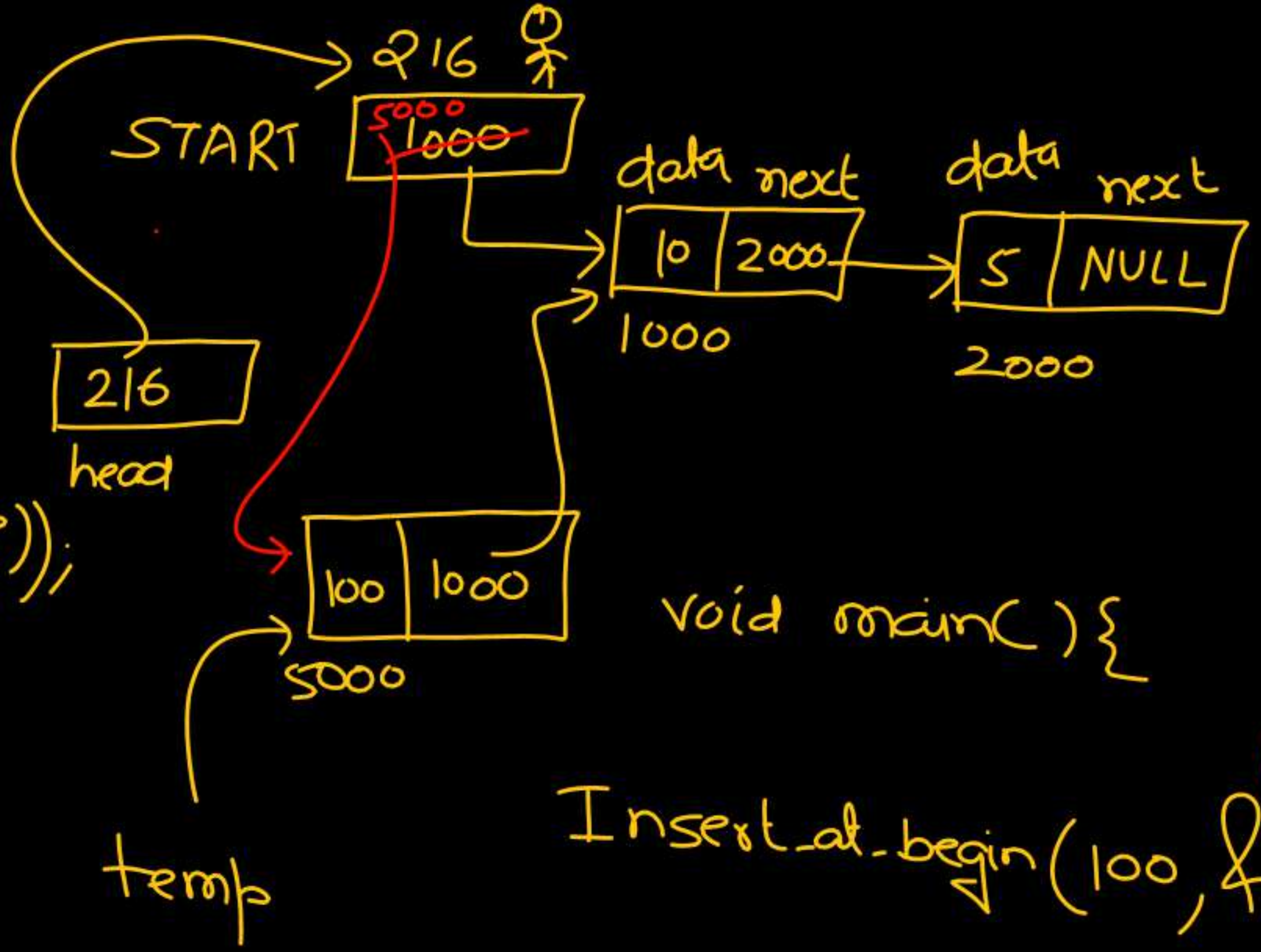


```
void Insert-warkan (int Key, struct Node *head)
        {
      struct Node *temp;
  temp = malloc(sizeof(struct Node));
      if(temp != NULL)
      {
        temp->data = Key;
        temp->next = head;
        head = temp;
      }
    return head;
    }
```



```
main( )
 {
START = Insert_warkan(100,
                      START);
 }
```

```
void Insert_at_begin(int key,
                     struct Node **head)
    {
struct Node *temp;
    temp = malloc(sizeof(struct Node));
    if (temp != NULL)
        {
        temp->data = key
        temp->next = *head;
          *head = temp;
        }
    }
```



```
void main(){

Insert_at_begin(100, &START);
```

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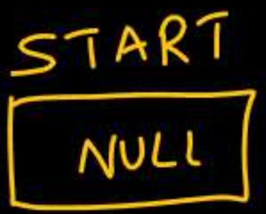
Insertion at End → last node का next ⇒ NULL

case1 : Linked list is Empty

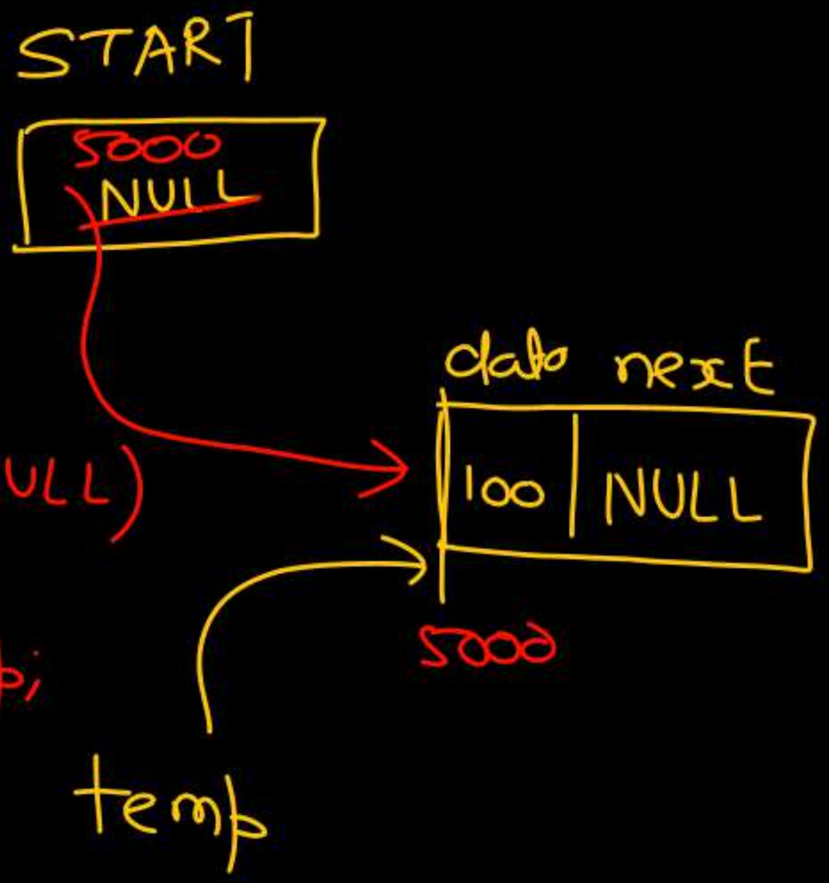


1) Allocate memory

a) temp → data = key ;
b) temp → next = NULL ;

if (START == NULL)

START = temp;



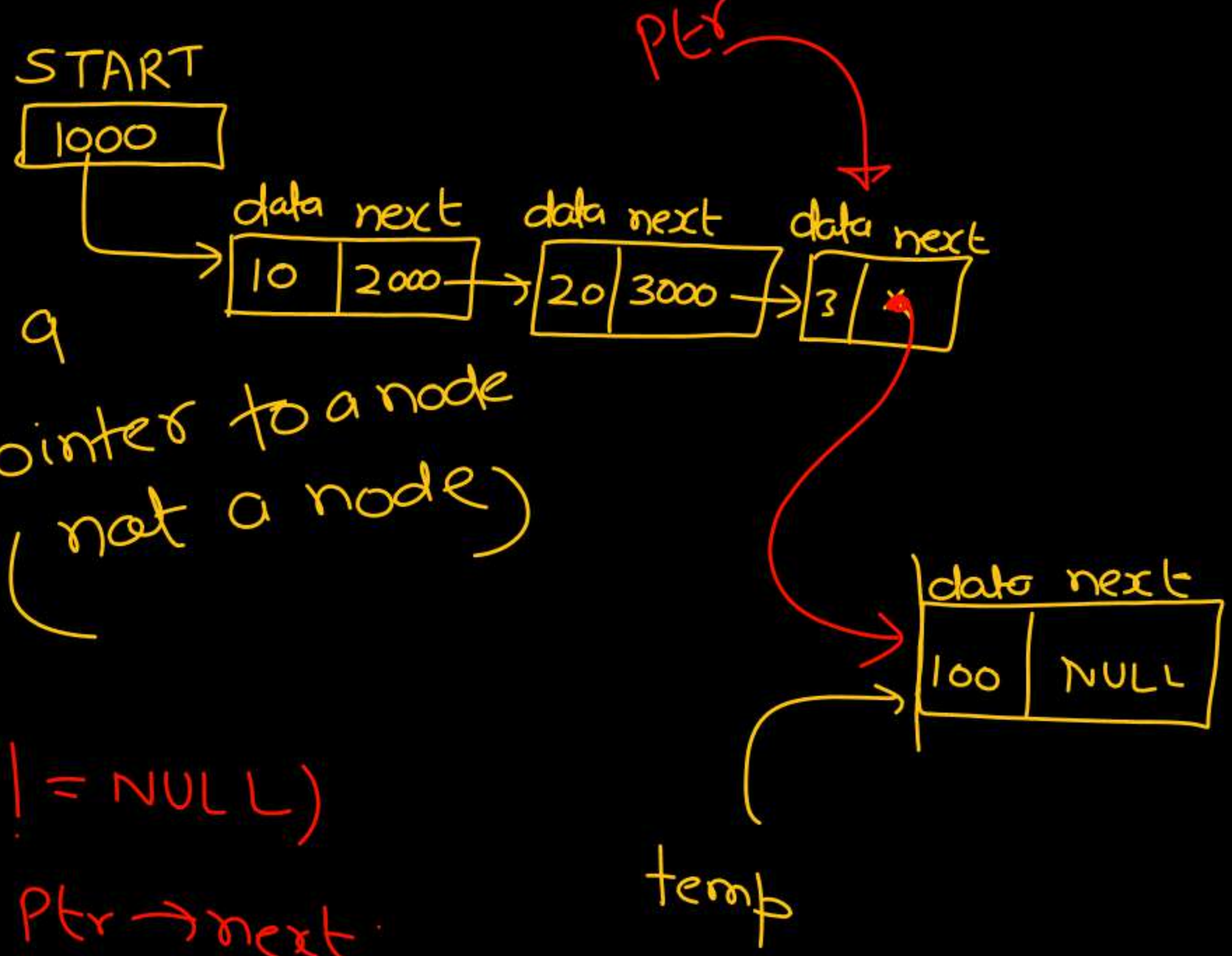
Case2

Non-Empty

struct Node *Ptr; ⟹ it is a pointer to a node (not a node)

```
Ptr = START;
While(Ptr→next != NULL)
        Ptr = Ptr→next;

Ptr→next = temp;
```

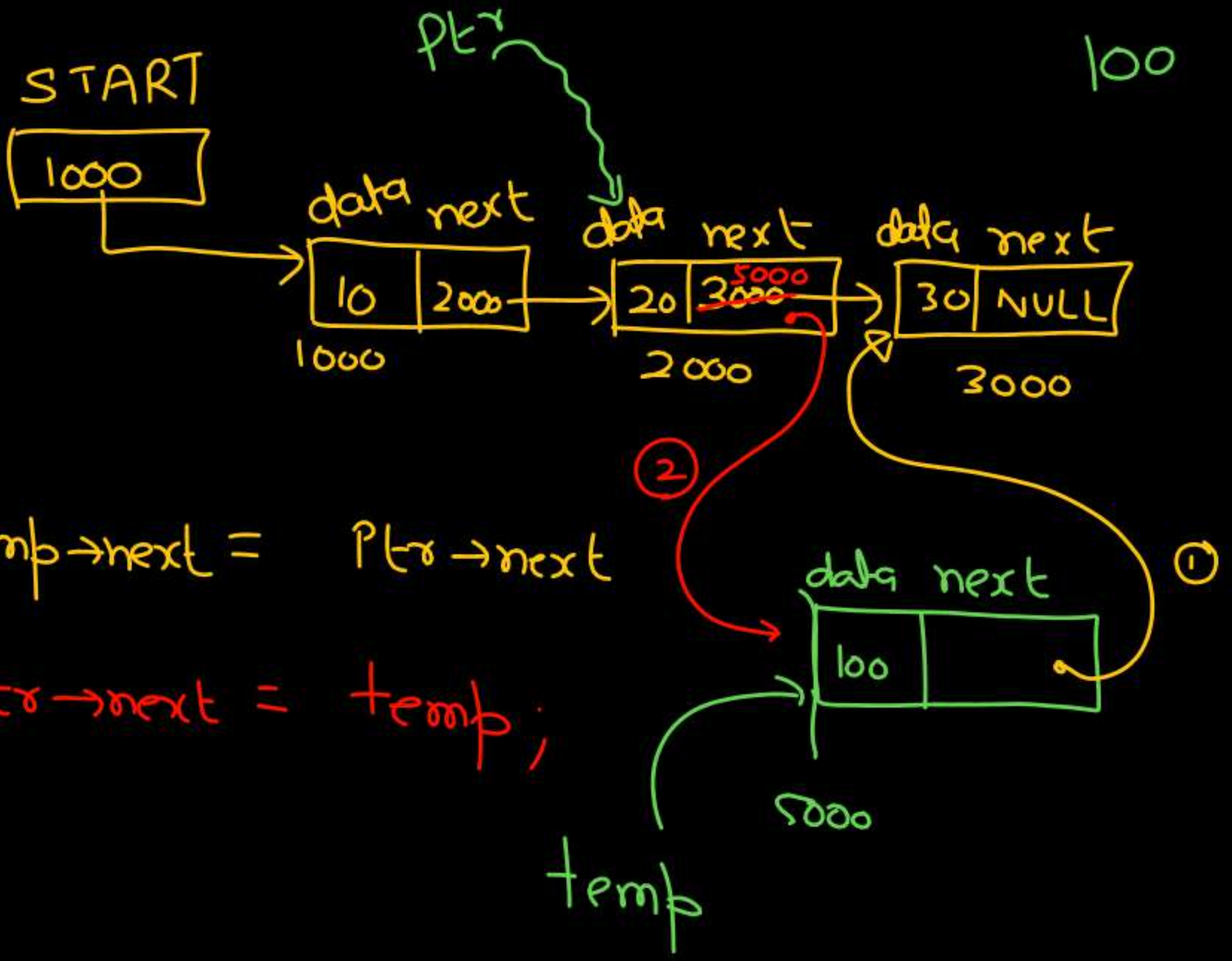


```
void Insert_at_end ( int key)
 {
struct Node *temp, *ptr;
temp = malloc(sizeof(struct Node));
  if (temp) {
          temp -> data = key;
          temp -> next = NULL;
          if( START = = NULL)
               {
               START = temp;
               return;
               }
                    ptr = START;
                    While( ptr -> next != NULL)
                        ptr = ptr -> next;

                    ptr -> next = temp;

                    }
```

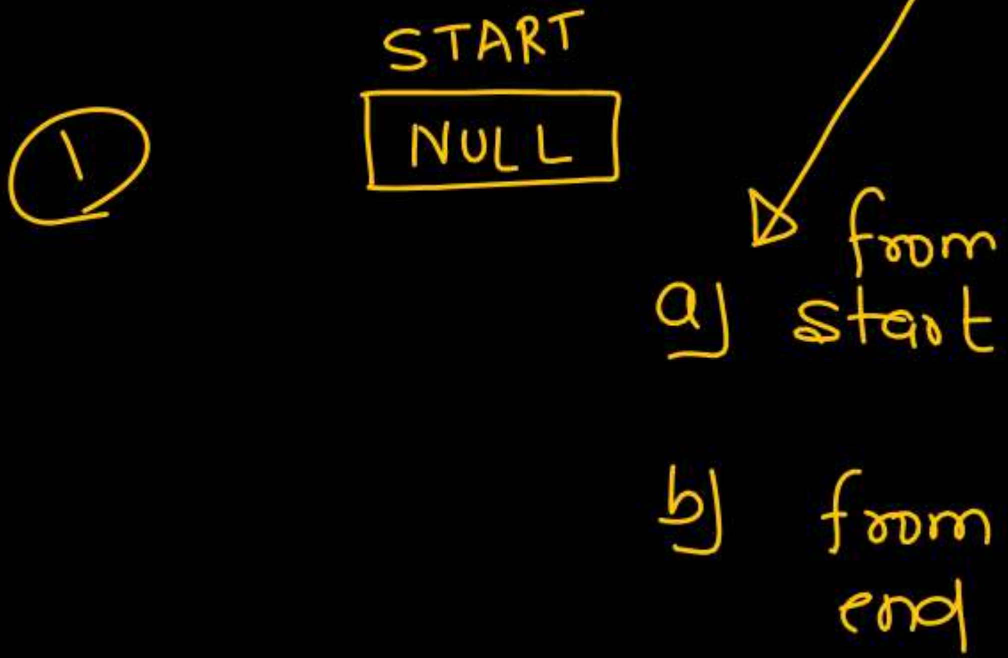
Q. Given a pointer to a node, insert an element after that node

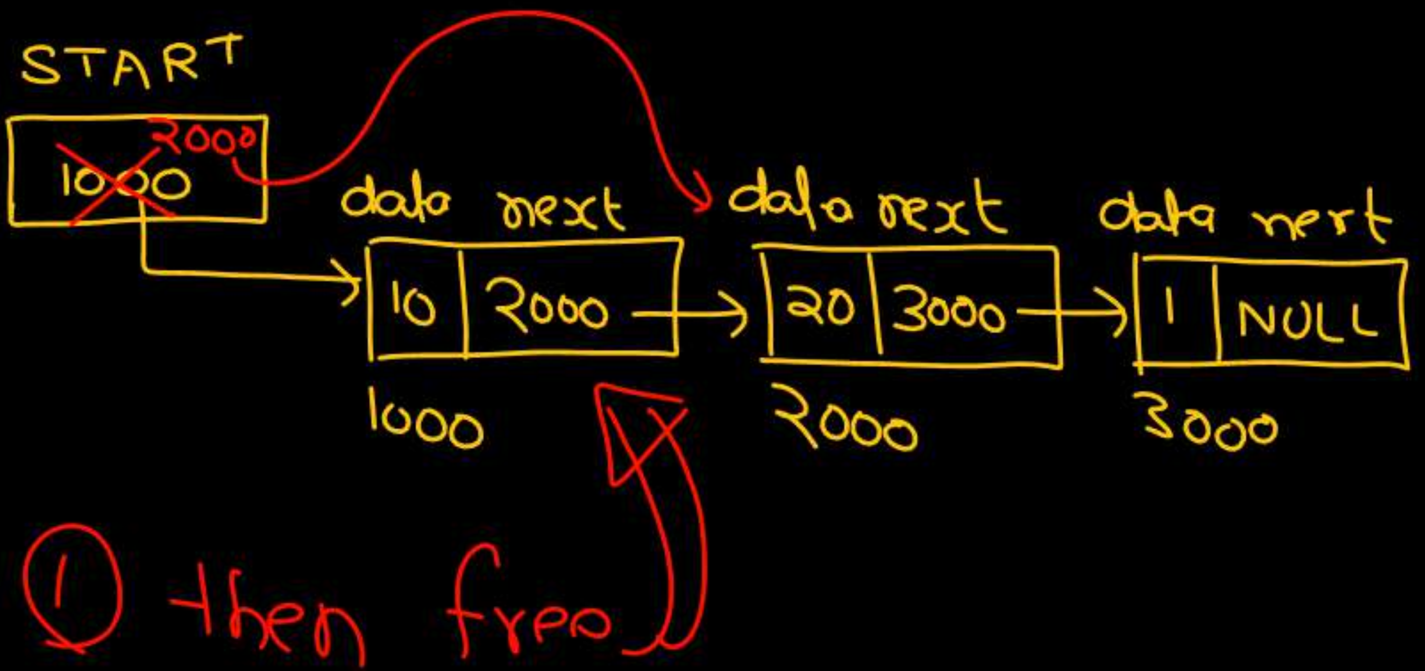


① temp→next = ptr→next

ptr→next = temp;

Deletion of an element (Node)



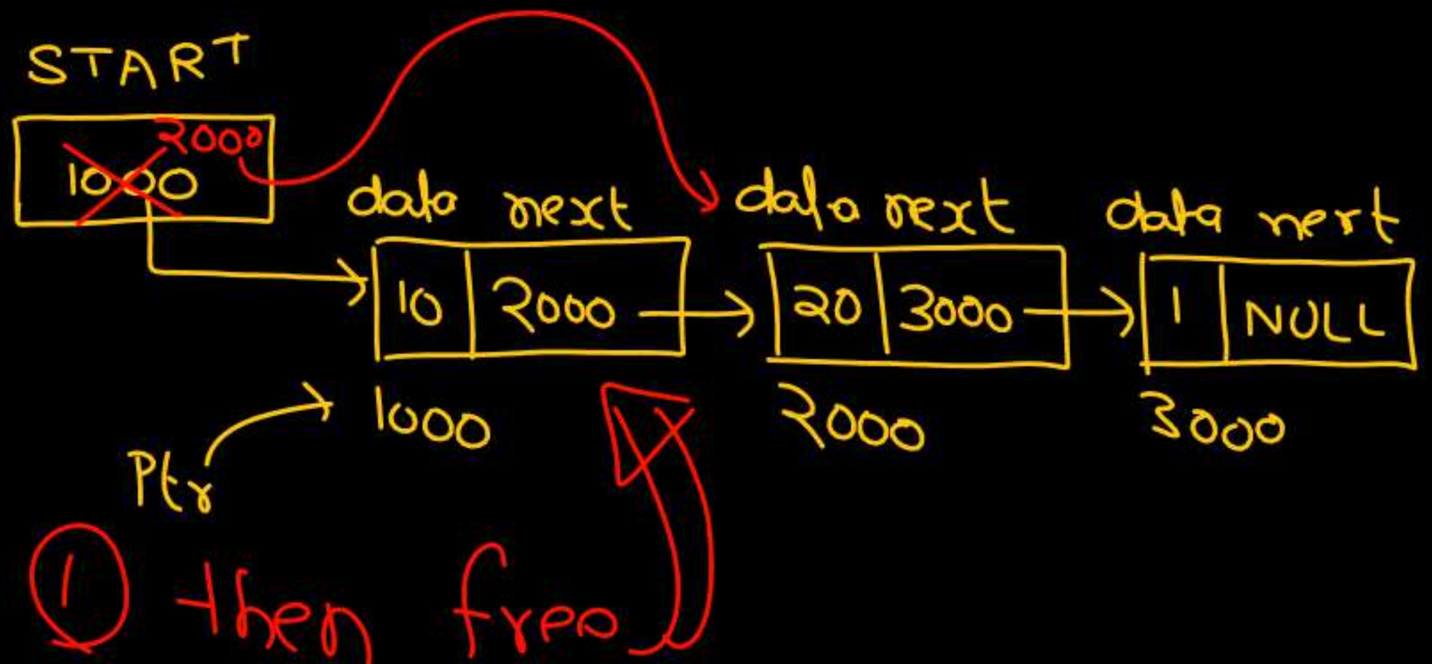


After deletion of 1st Node START will contain address of 2nd node

When we know, L.L is not Empty

```
struct Node *ptr;
    ptr = START;
    START = START->next;
    free(ptr)
```

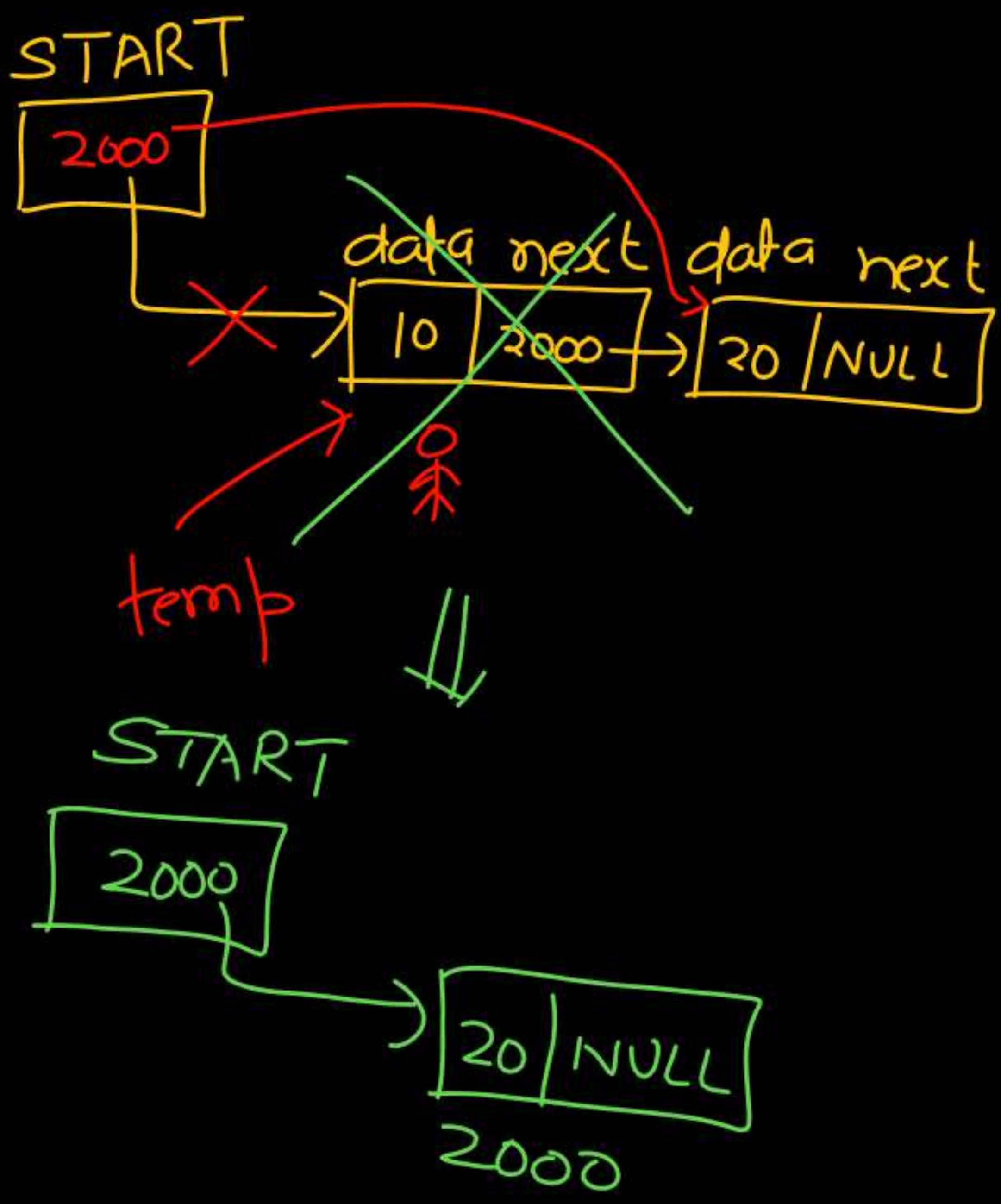
After deletion of 1st Node START will contain address of 2nd node



Q

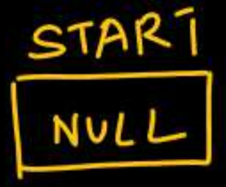
```
struct Node *temp ;
 if (START == NULL)
        return ;

 temp = START ;
 START = START -> next ;
 free(temp);
```

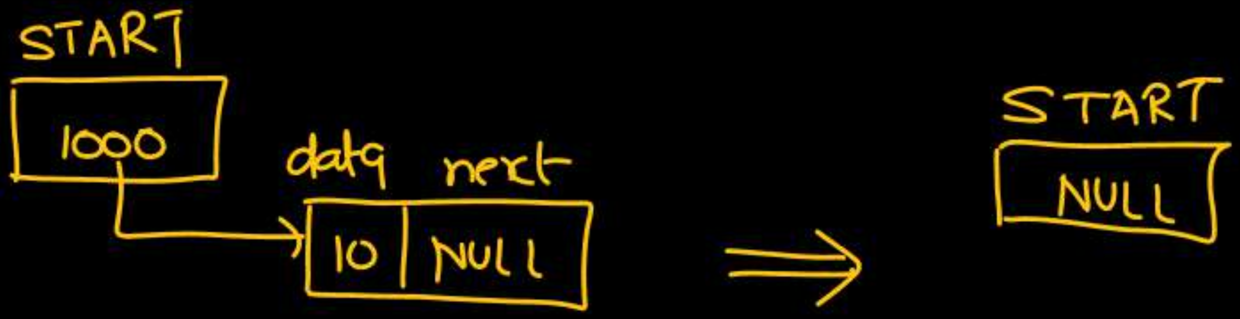


deletion from End

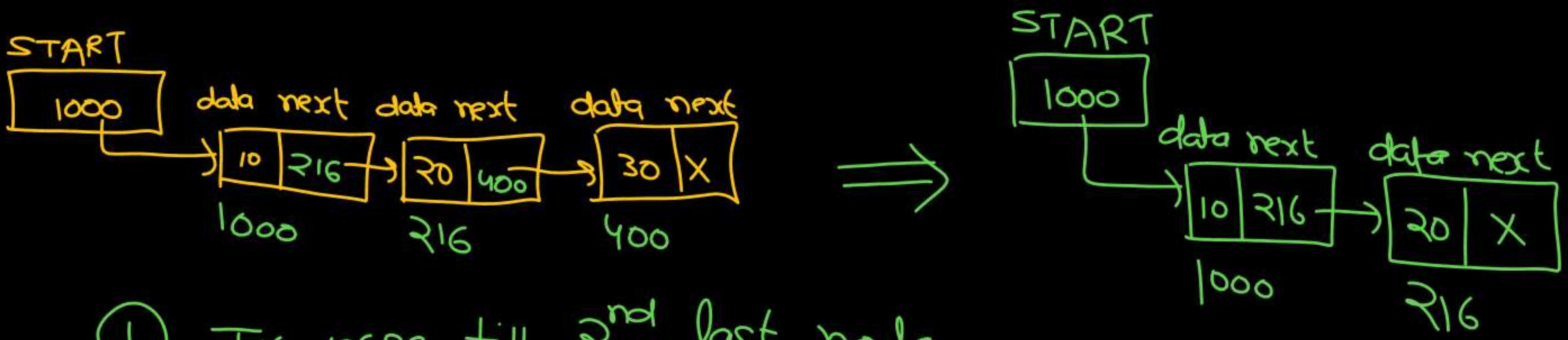
I.



II.



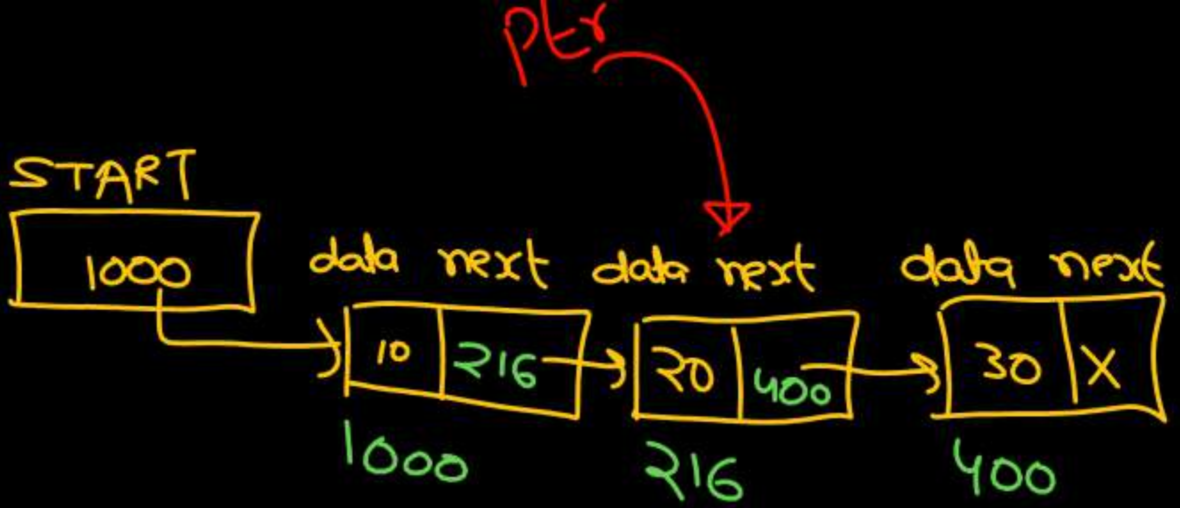
III



① Traverse till 2nd last node

Ptr ⇒ 2nd last node

III



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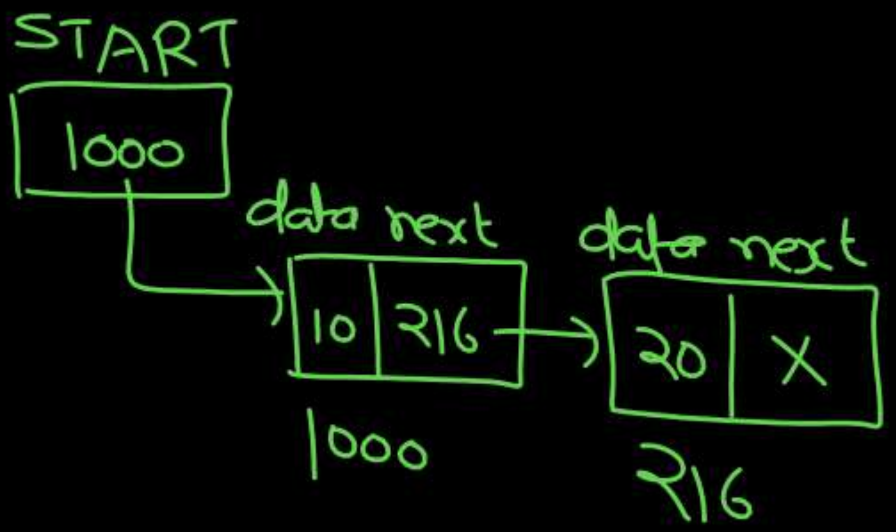

① Traverse till 2nd last node

Ptr ⇒ 2nd last node

free(Ptr → next);

Ptr → next = NULL

gfg

4 to 6 PM

DS

1. count
2. Traversal
3. Insertion
4. Deletion
5. Search
6. last node ⇒ Print
7. first node ⇒ Print
8. reverse a linked list
9. Middle of a linked list
10. L.L. contains a loop
11. Intersection point of a Linked list.

THANK YOU GW SOLDIERS !