Linked Lists

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CS 561

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Outline

- Insertion Description
- Deletion Description
- Basic Node Implementation

Insertion Description

- Insertion at the top of the list

- Insertion at the end of the list

- Insertion in the middle of the list

Insertion Description
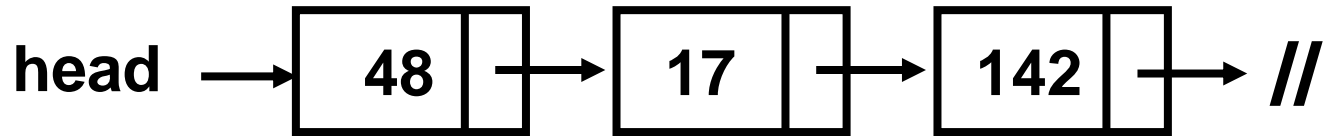
- Insertion at the top of the list
- Insertion at the end of the list
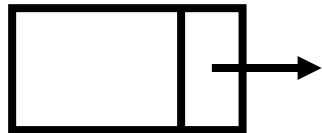- Insertion in the middle of the list

Insertion at the top

Steps:

- Create a Node
- Set the node data Values
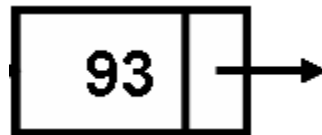- Connect the pointers

Insertion Description

head → | 48 | → | 17 | → | 142 | → //

- Follow the previous steps and we get

Step 1

Step 2

| 93 | →

Step 3

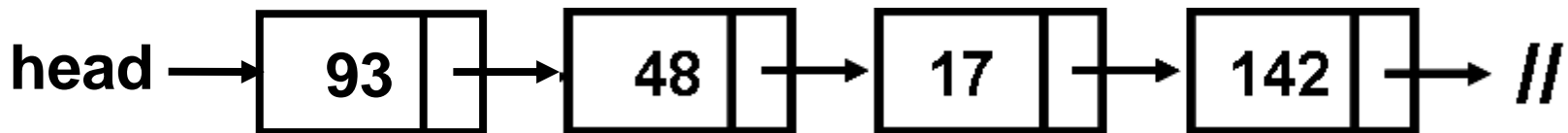head → | 93 | → | 48 | → | 17 | → | 142 | → //

Insertion Description
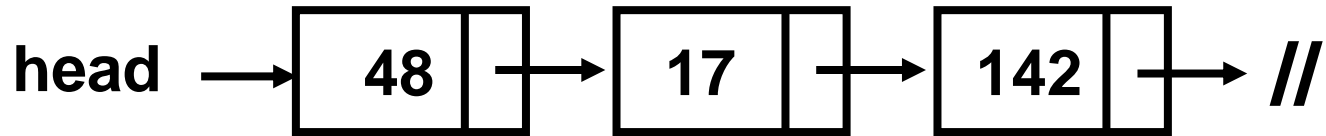
- Insertion at the top of the list
- Insertion at the end of the list
- Insertion in the middle of the list

Insertion at the end

Steps:

- Create a Node
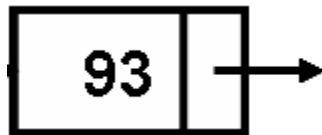- Set the node data Values
- Connect the pointers

Insertion Description

head → | **48** | → | **17** | → | **142** | → //

- Follow the previous steps and we get

Step 1

Step 2

| | 93 | →

Step 3

head → | 48 | → | 17 | → | 142 | → | 93 | → //

Insertion Description
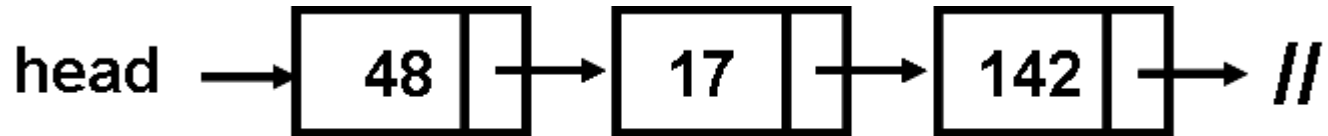
- Insertion at the top of the list
- Insertion at the end of the list
- Insertion in the middle of the list

Insertion in the middle

Steps:

- Create a Node
- Set the node data Values
- Break pointer connection
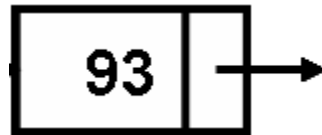- Re-connect the pointers
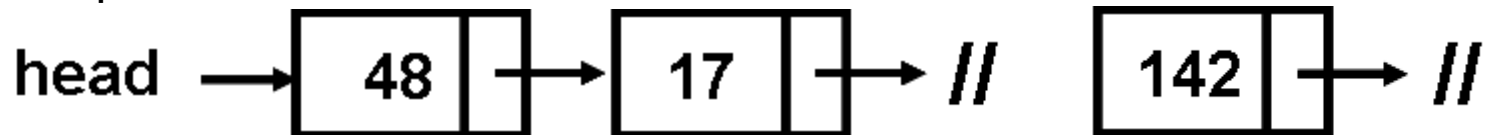
Insertion Description

Step 1

Step 2

Step 3

Step 4

Outline

- Insertion Description
- Deletion Description
- Basic Node Implementation

Deletion Description

- Deleting from the top of the list
- Deleting from the end of the list
- Deleting from the middle of the list

Deletion Description
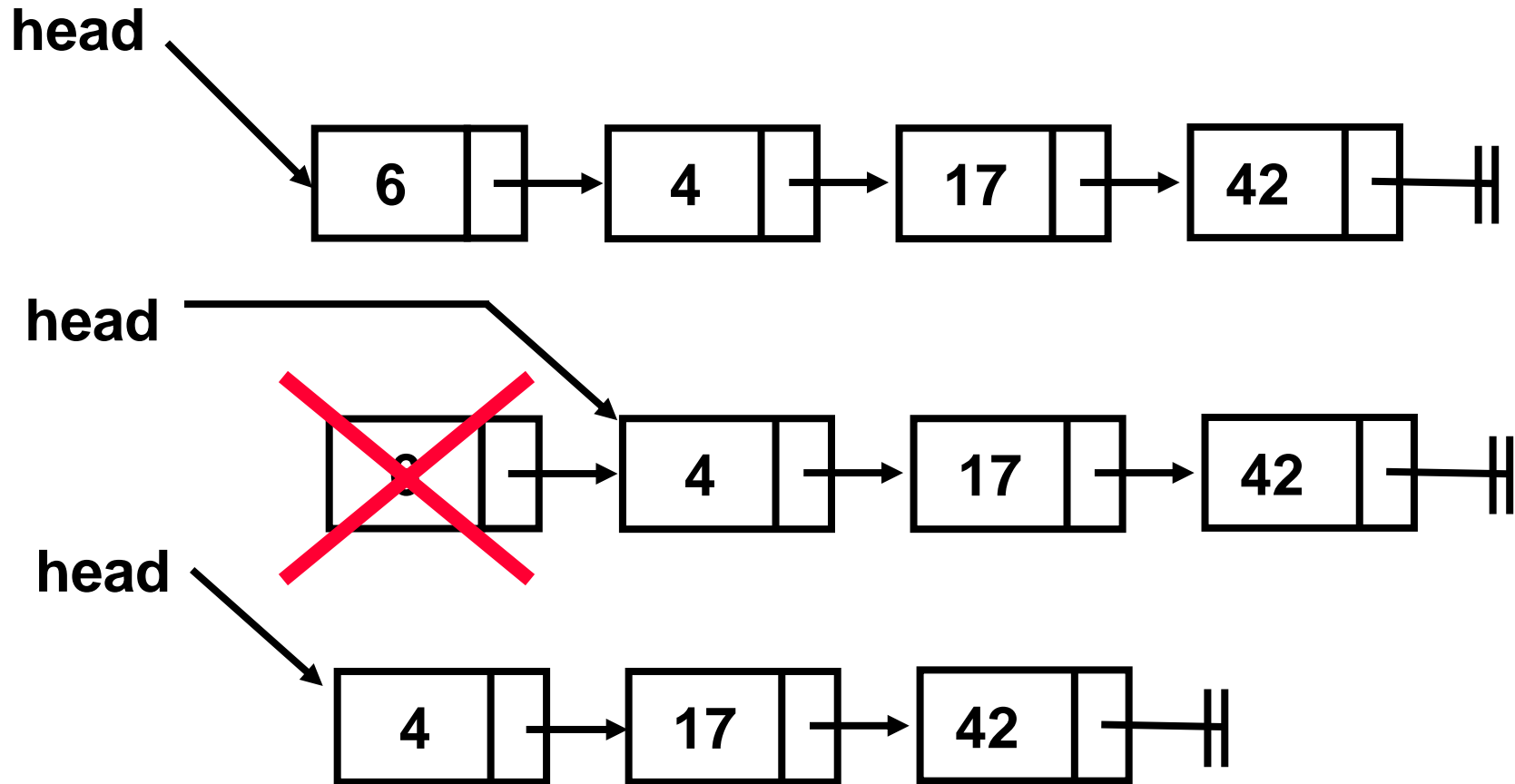
- Deleting from the top of the list
- Deleting from the end of the list
- Deleting from the middle of the list

Deleting from the top

Steps

- Break the pointer connection

- Re-connect the nodes

- Delete the node

Deletion Description
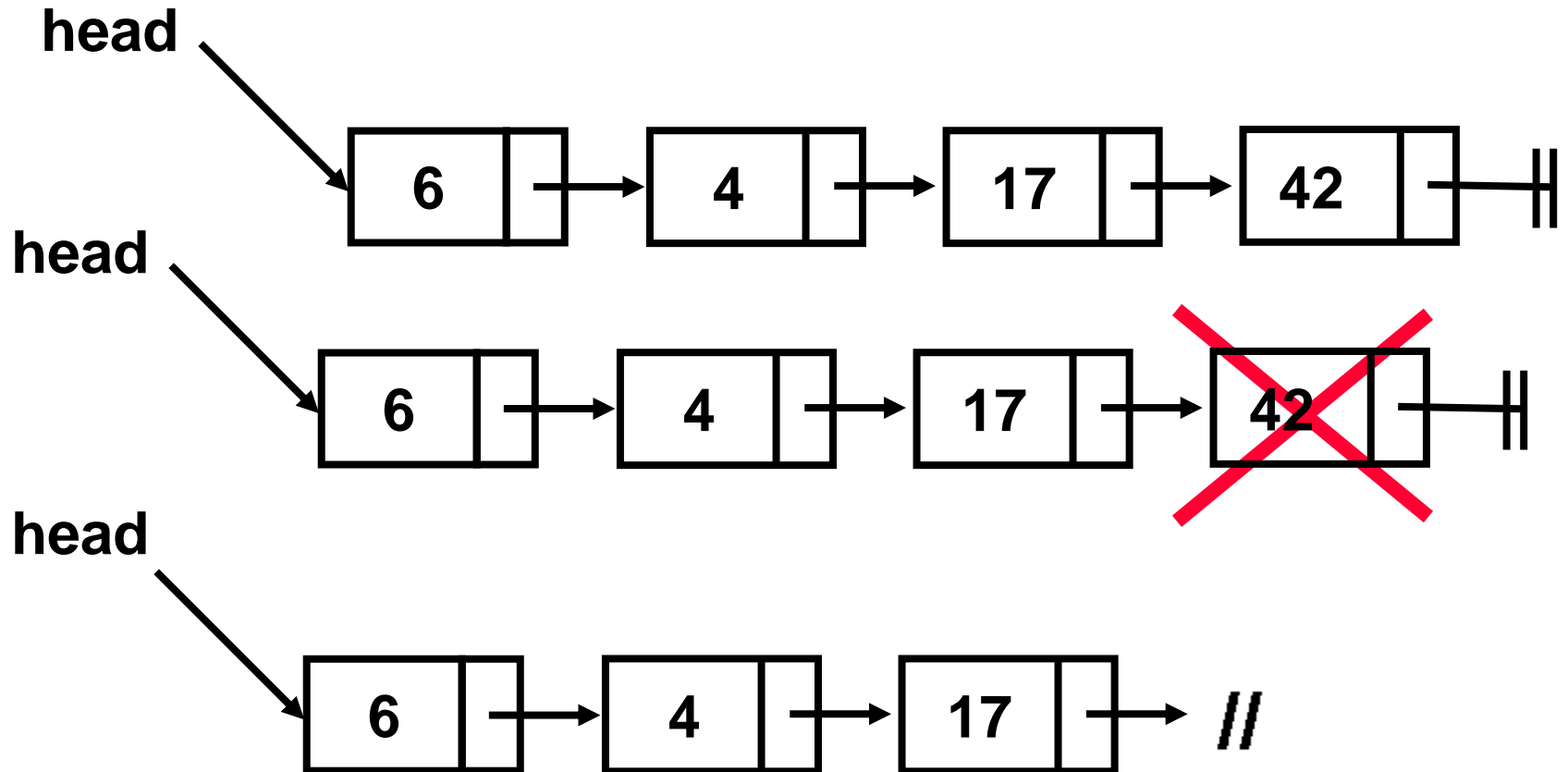
Deletion Description

- Deleting from the top of the list
- Deleting from the end of the list
- Deleting from the middle of the list

Deleting from the end

Steps

- Break the pointer connection
- Set previous node pointer to NULL
- Delete the node

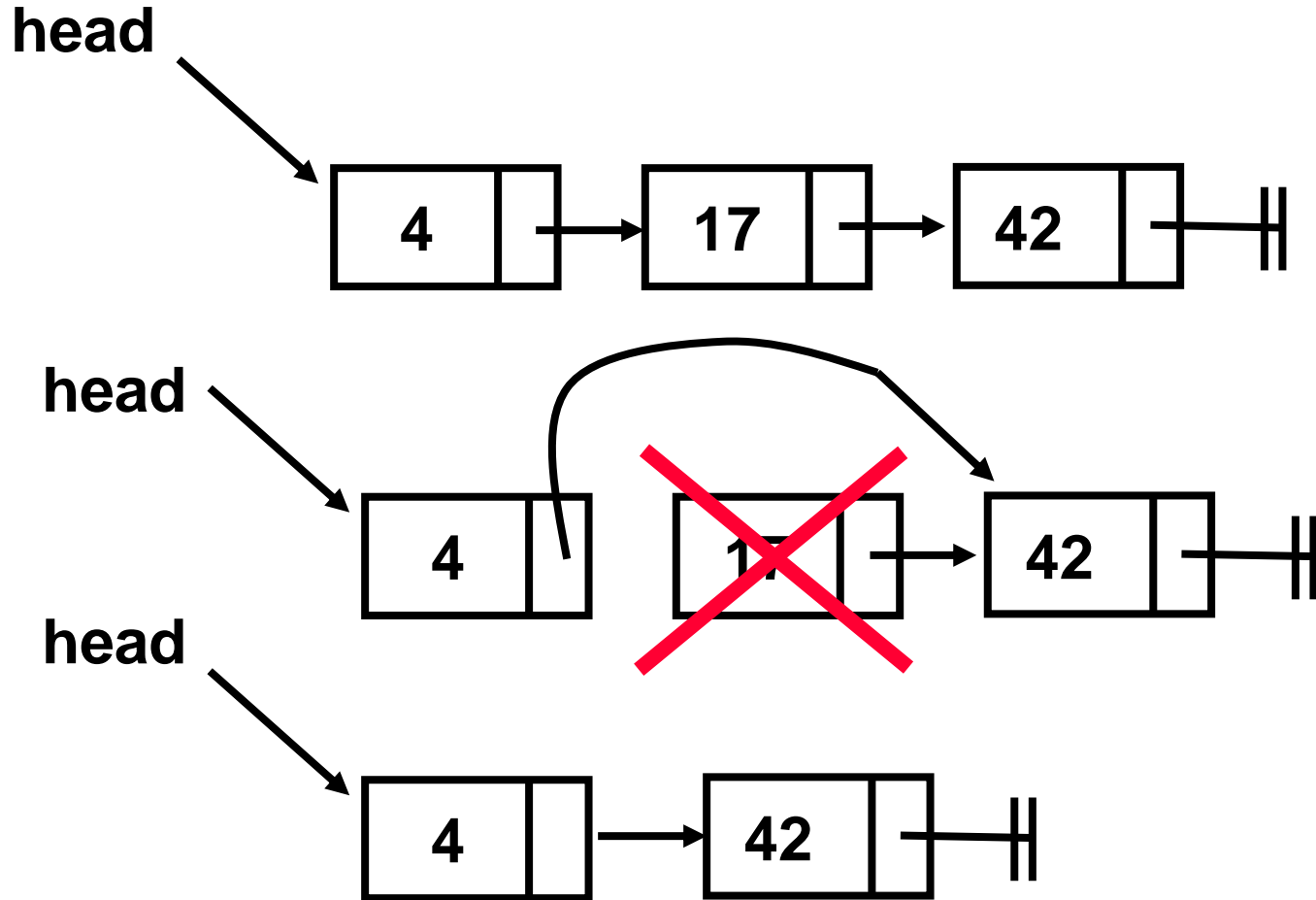# Deletion Description

Deletion Description

- Deleting from the top of the list
- Deleting from the end of the list
- Deleting from the middle of the list

Deleting from the Middle

Steps

- Set previous Node pointer to next node
- Break Node pointer connection
- Delete the node

Deletion Description

Outline

- Insertion Description

- Deletion Description

- Basic Node Implementation

Basic Node Implementation

The following code is written in C++:

```
Struct Node
{
    int data;              //any type of data could be another struct
    Node *next;            //this is an important piece of code "pointer"
};
```