

A Ring of Structures

ESC101: Fundamentals of Computing

Purushottam Kar

Announcements

- This Wednesday (07 Nov, 2018) is an institute holiday
 - No lectures, no labs
 - We have already compensated for this day last Saturday
- Tutorial will be held on Friday 09 Nov as usual
- Course feedback survey has started
<http://oars2.cc.iitk.ac.in:9090/survey2/survey.php>
 - Survey Date : 05 Nov – 16 Nov
 - Can give the survey from halls, CC, NCL, CSE dept



Linked Lists

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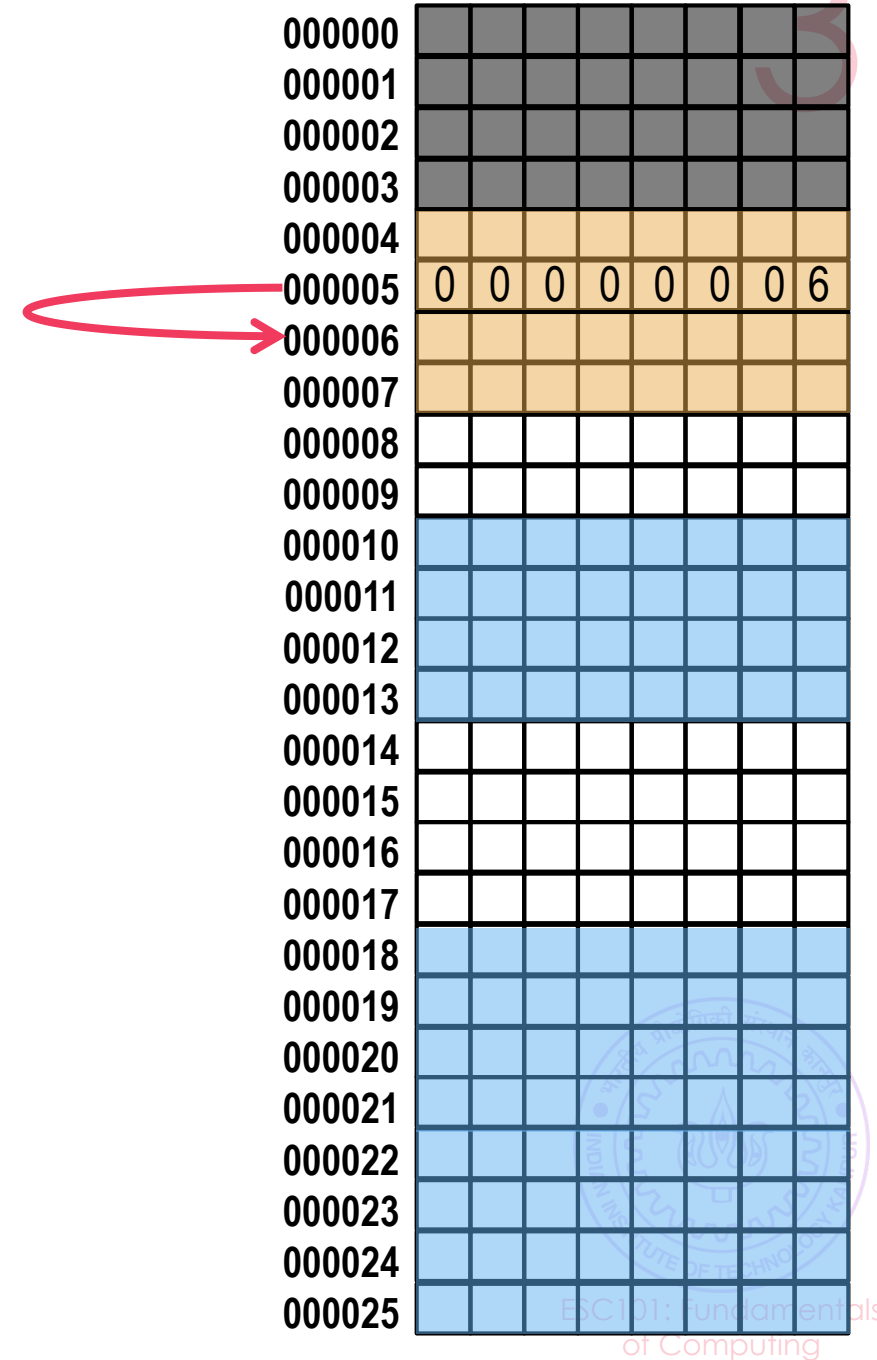
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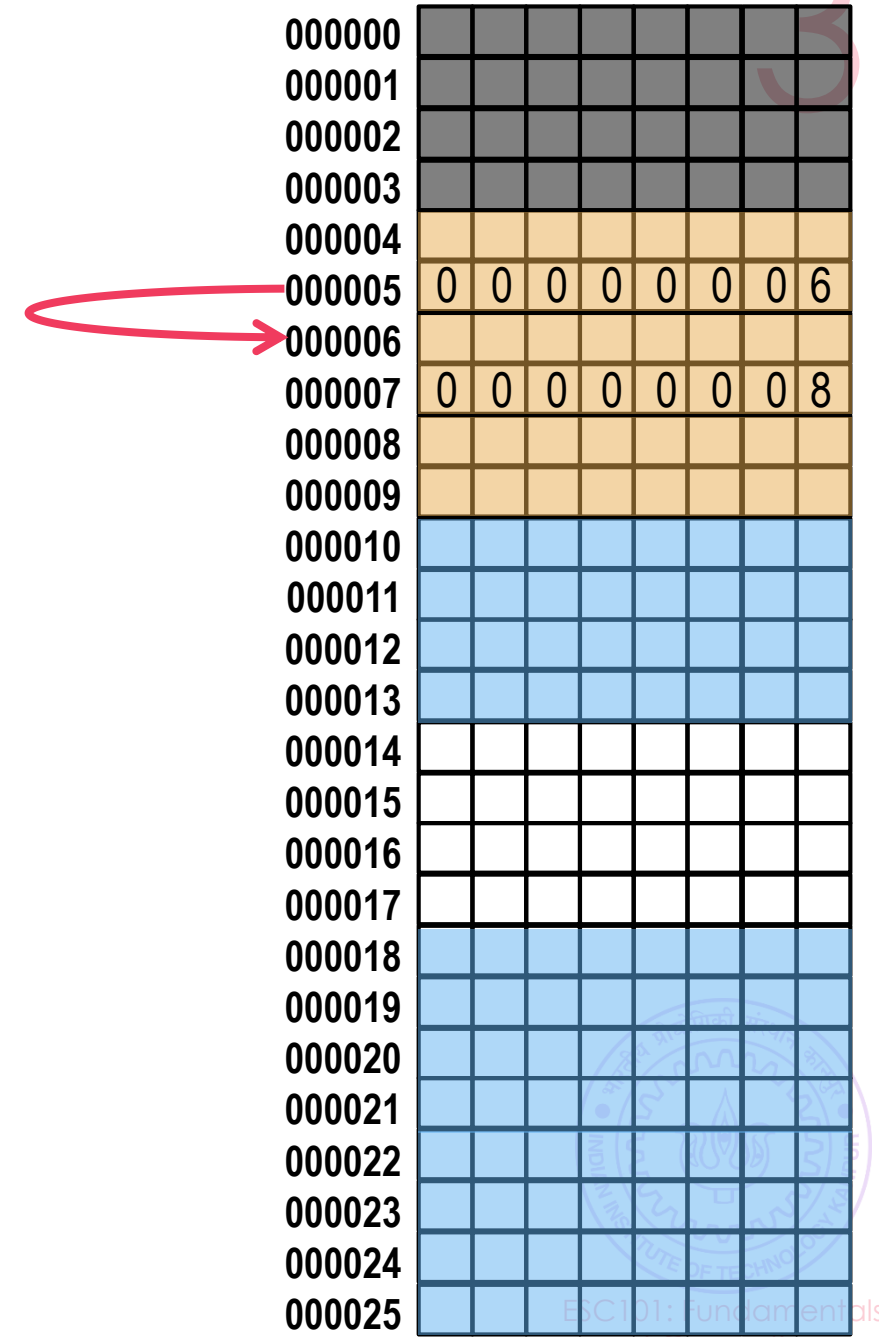


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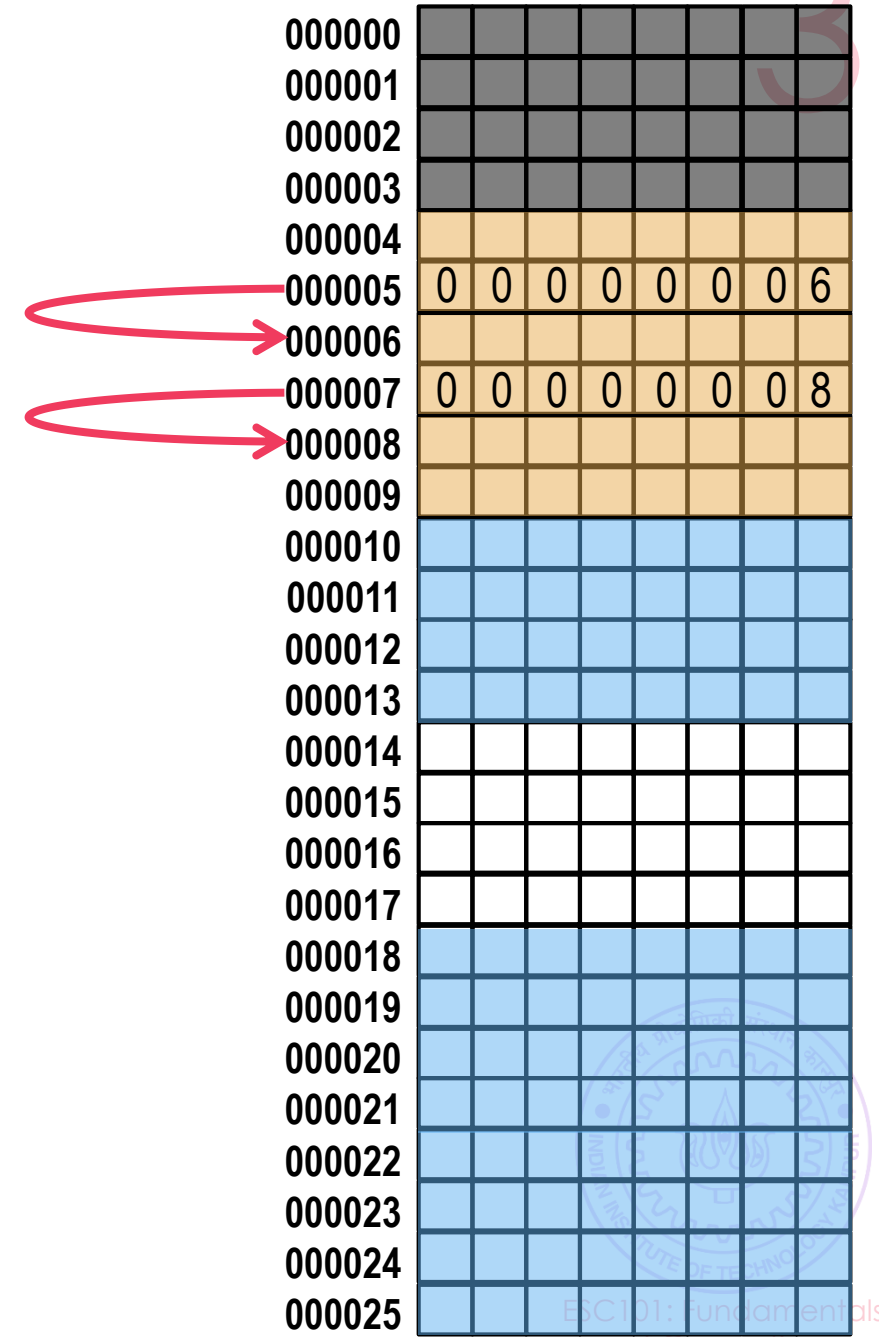
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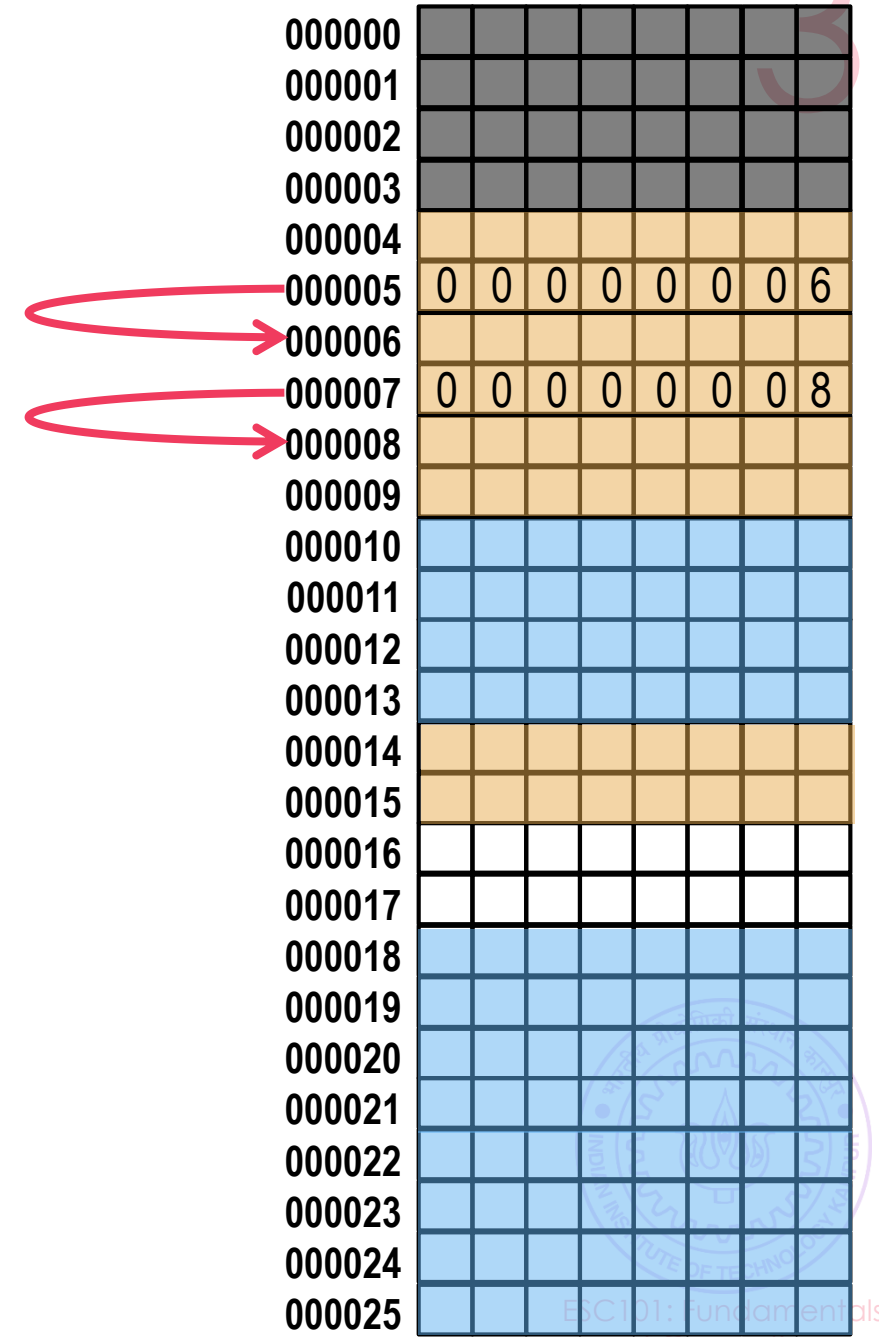


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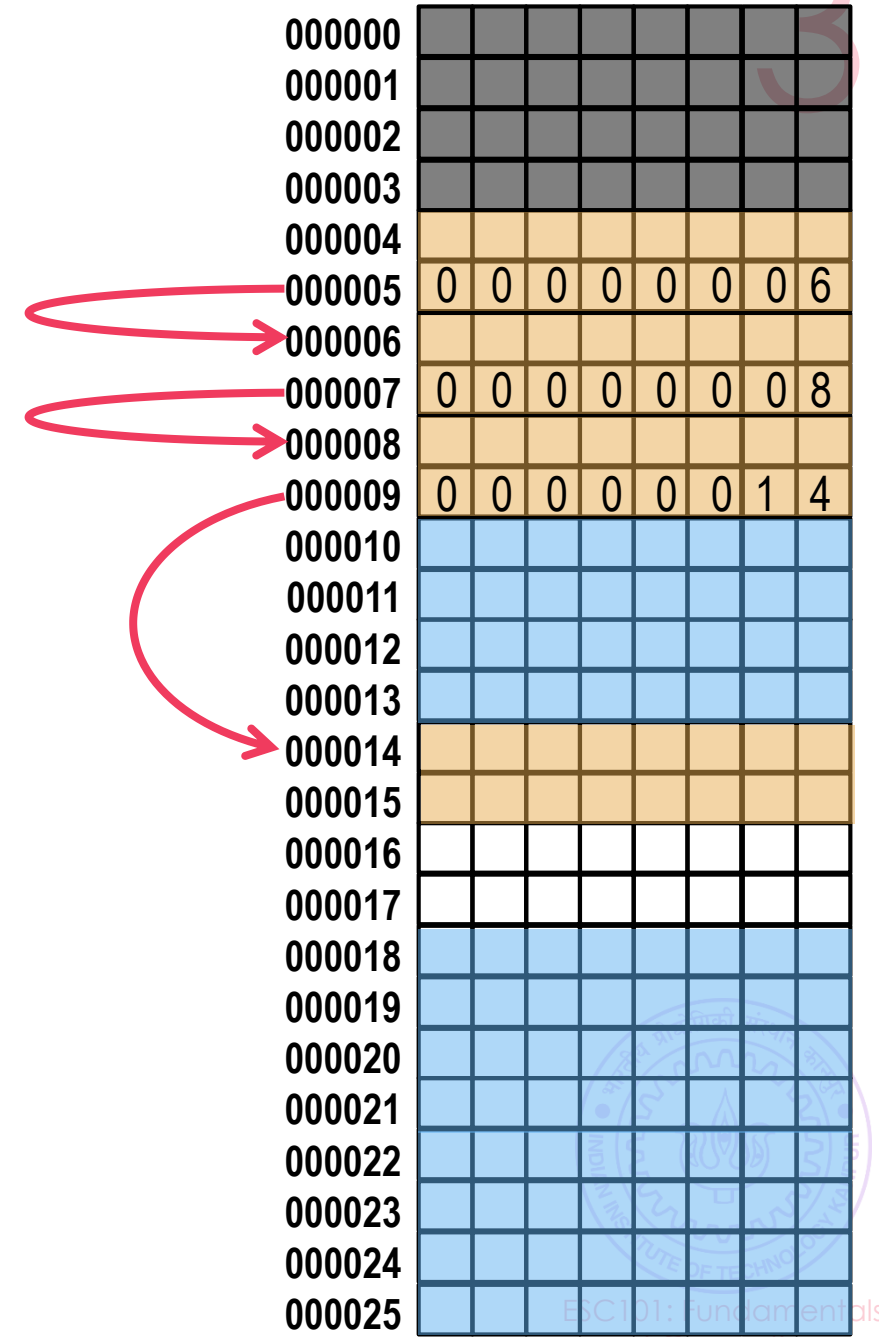
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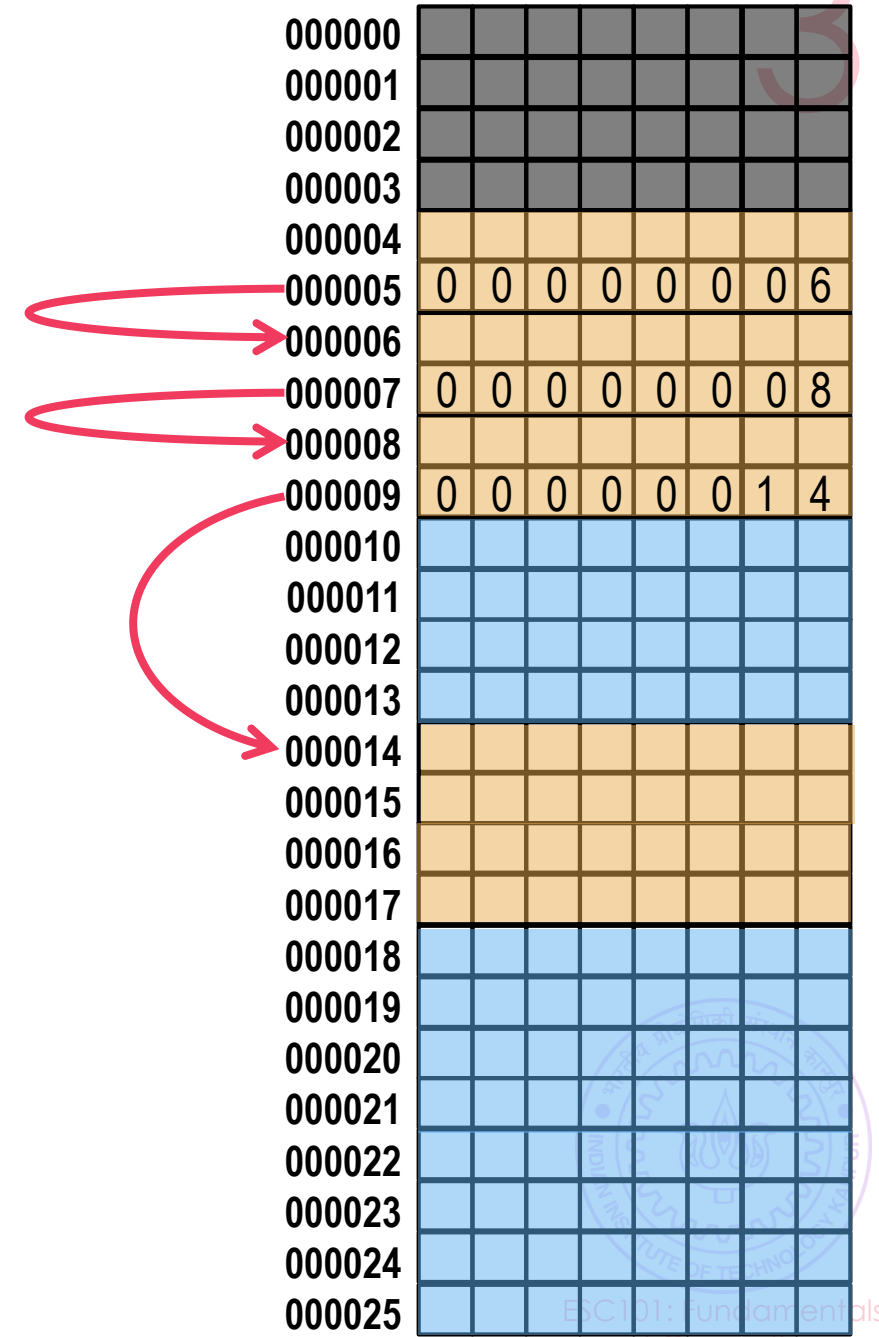
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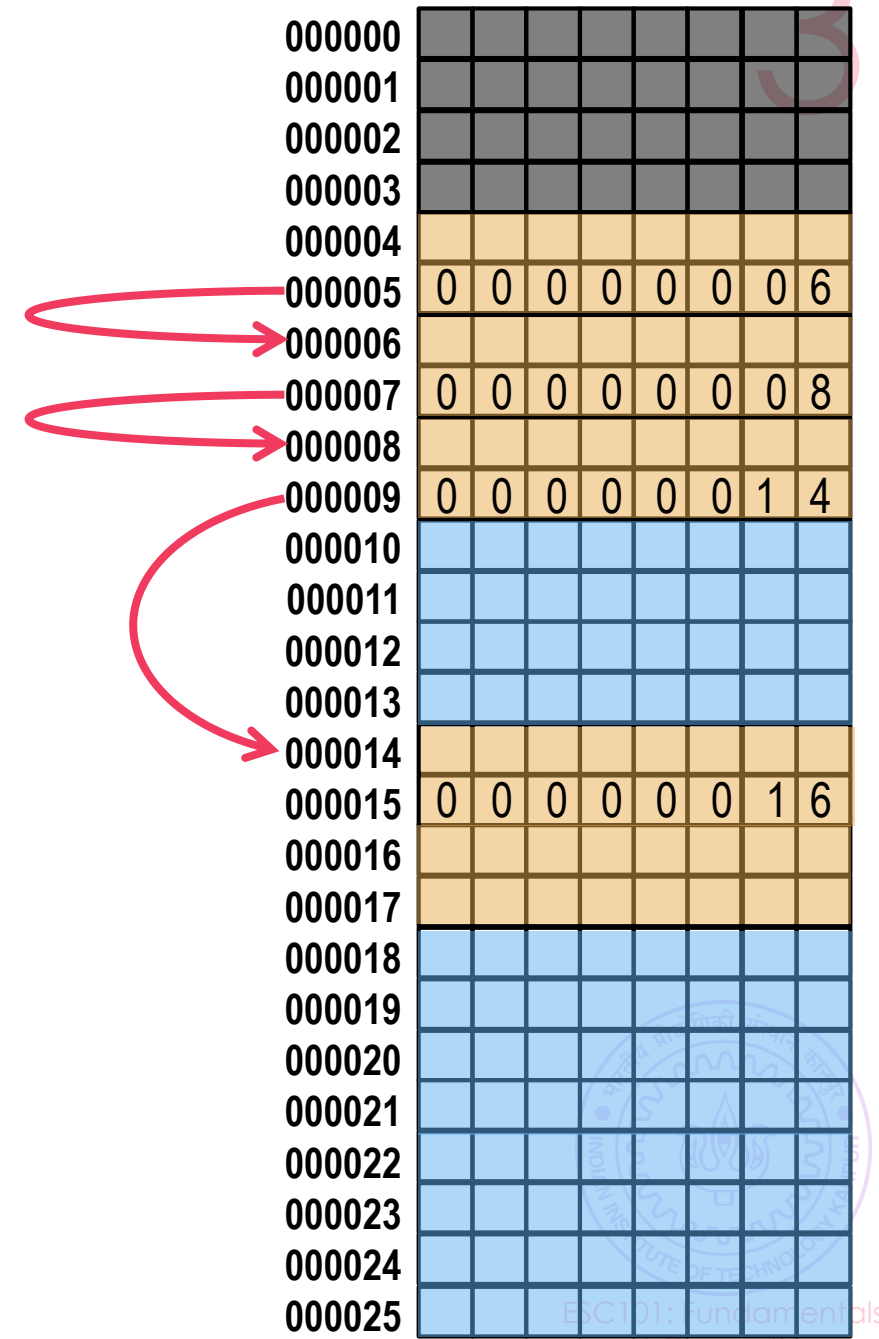
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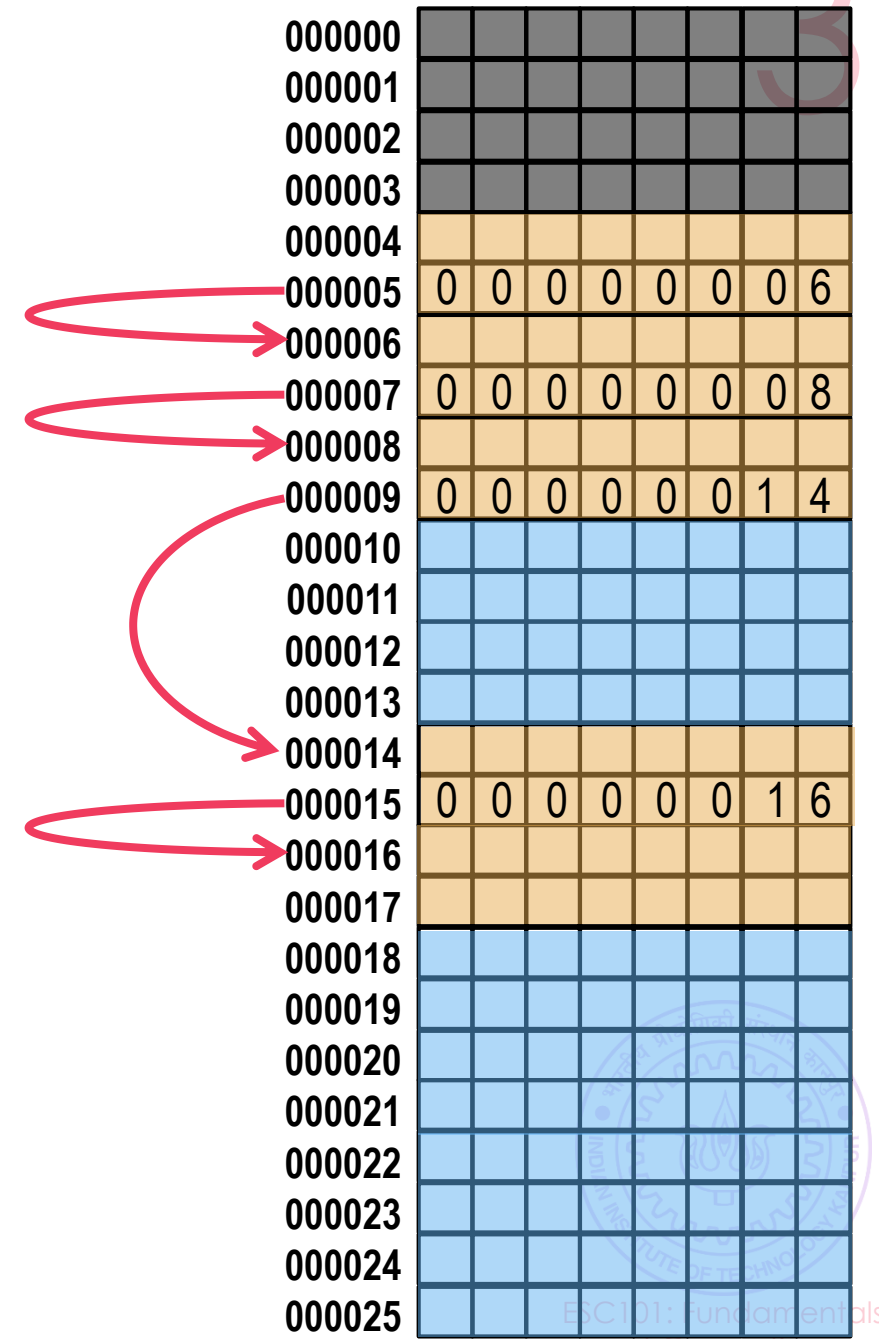
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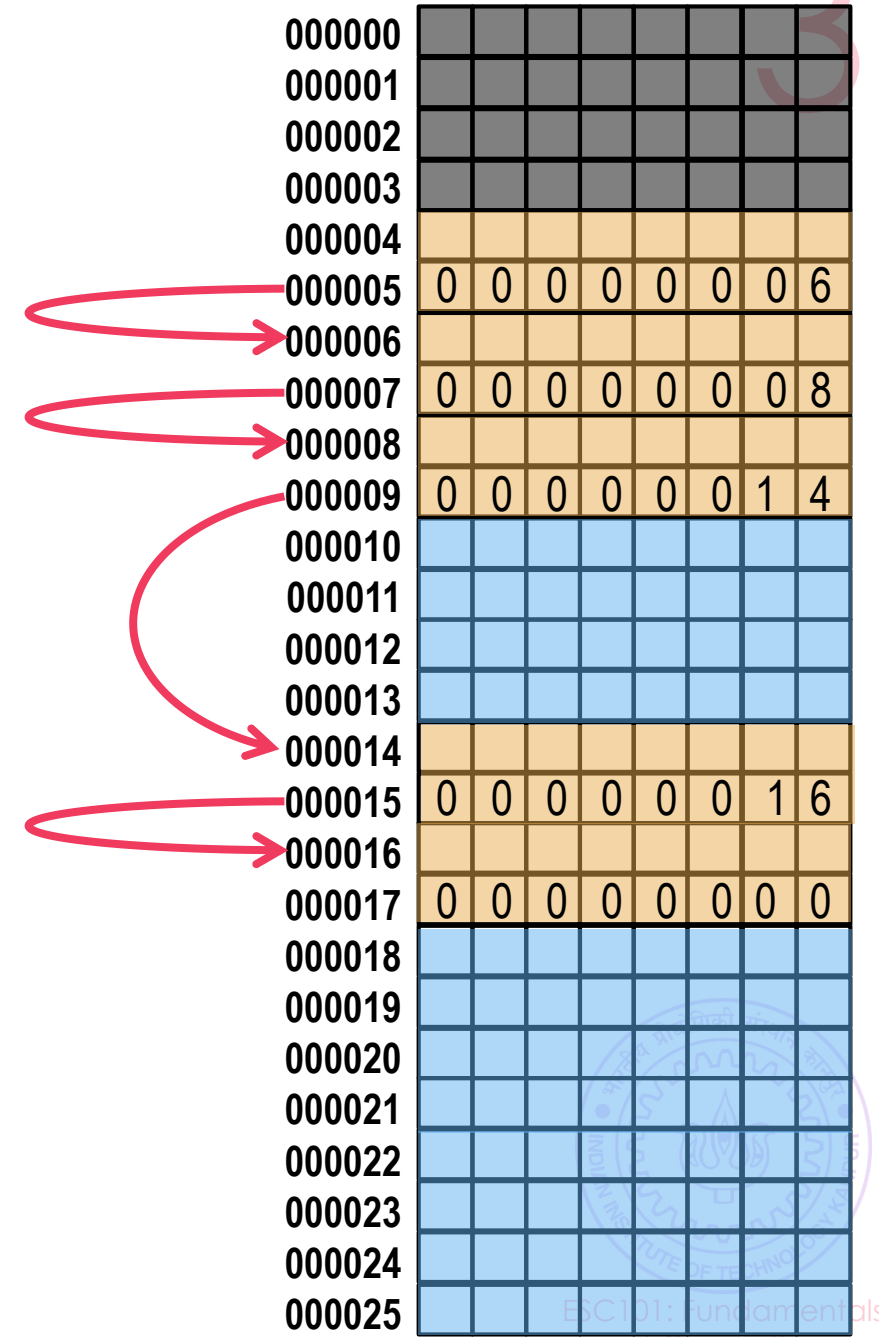
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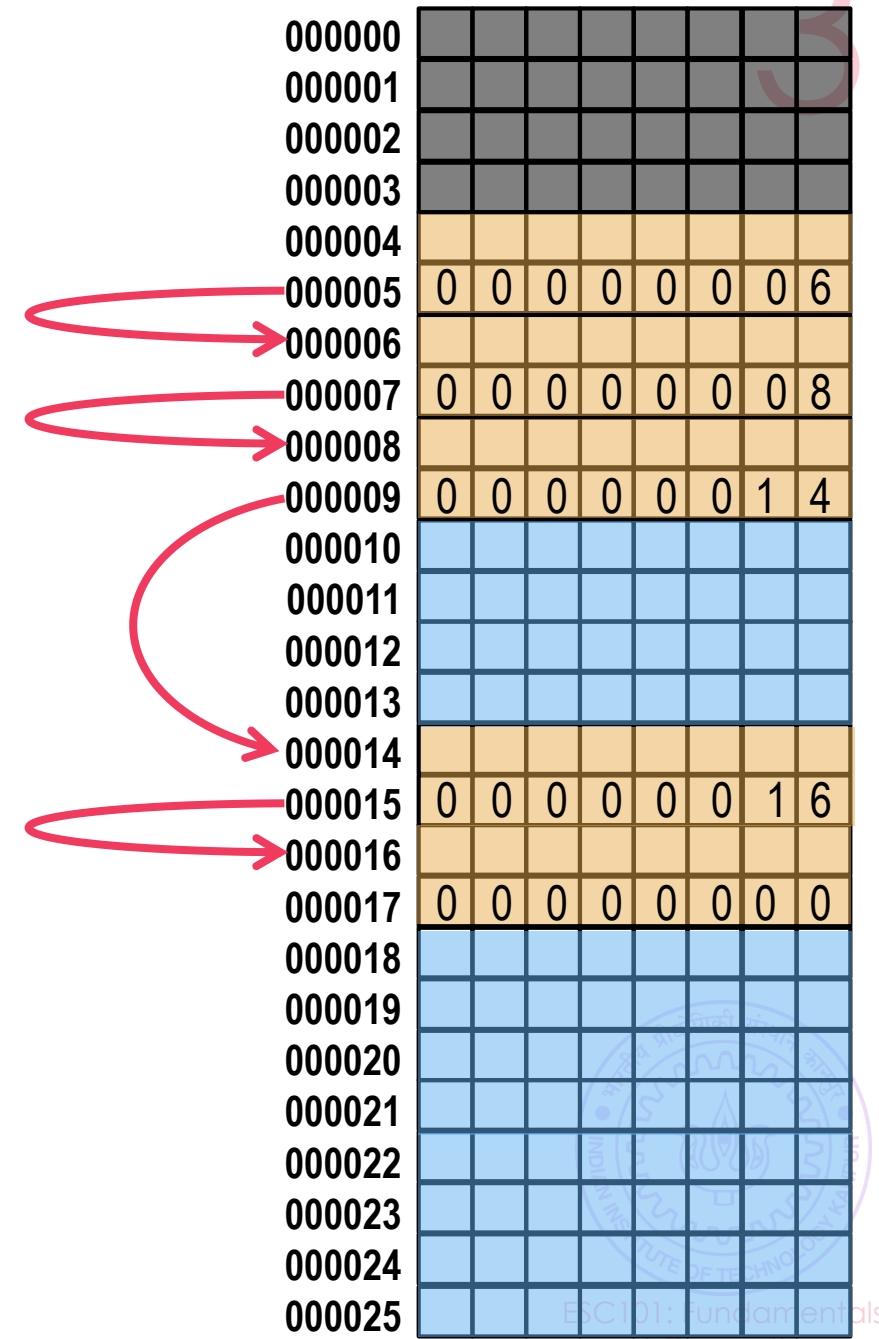


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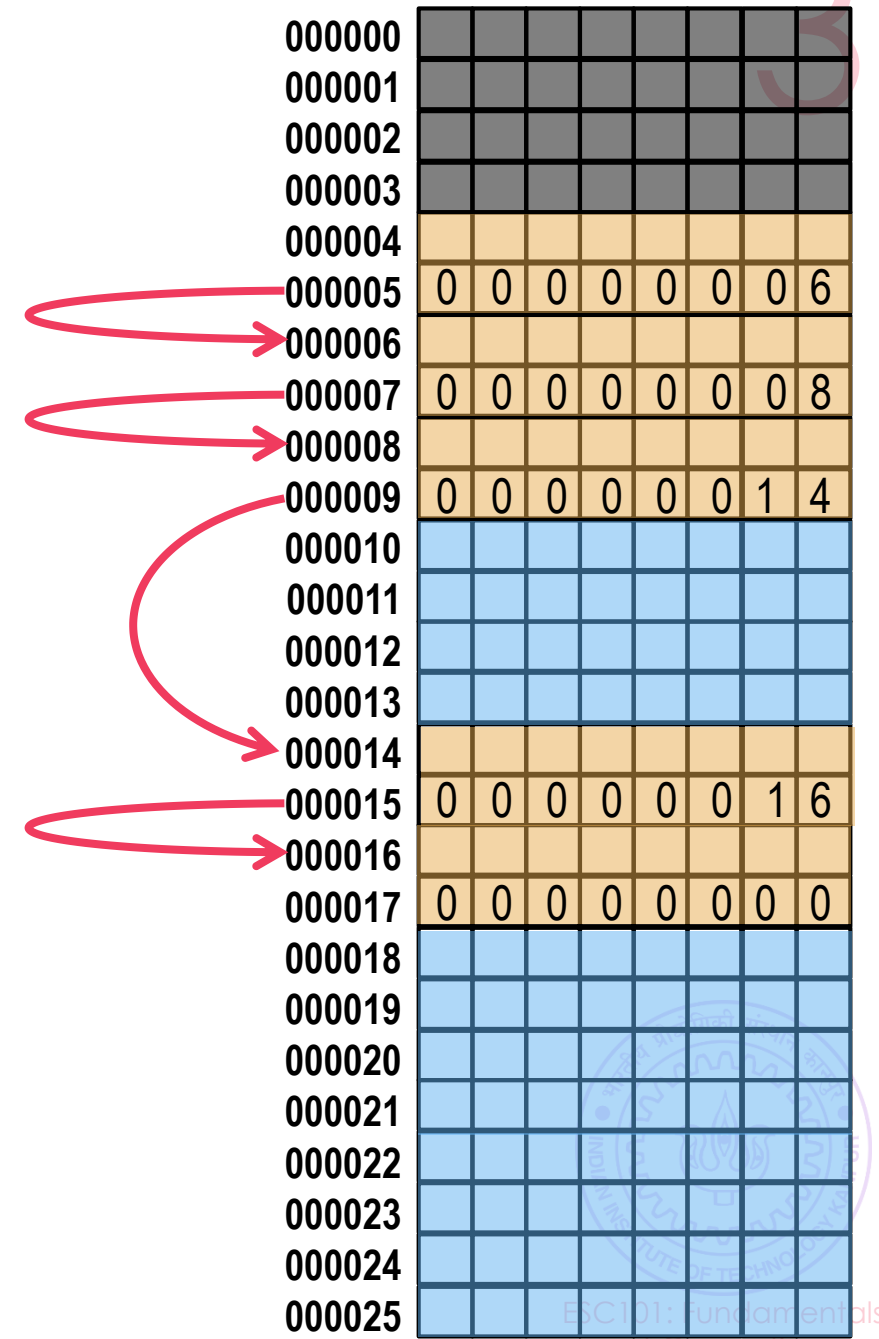
Allow for more efficient
usage of space



Linked Lists

Allow for more efficient
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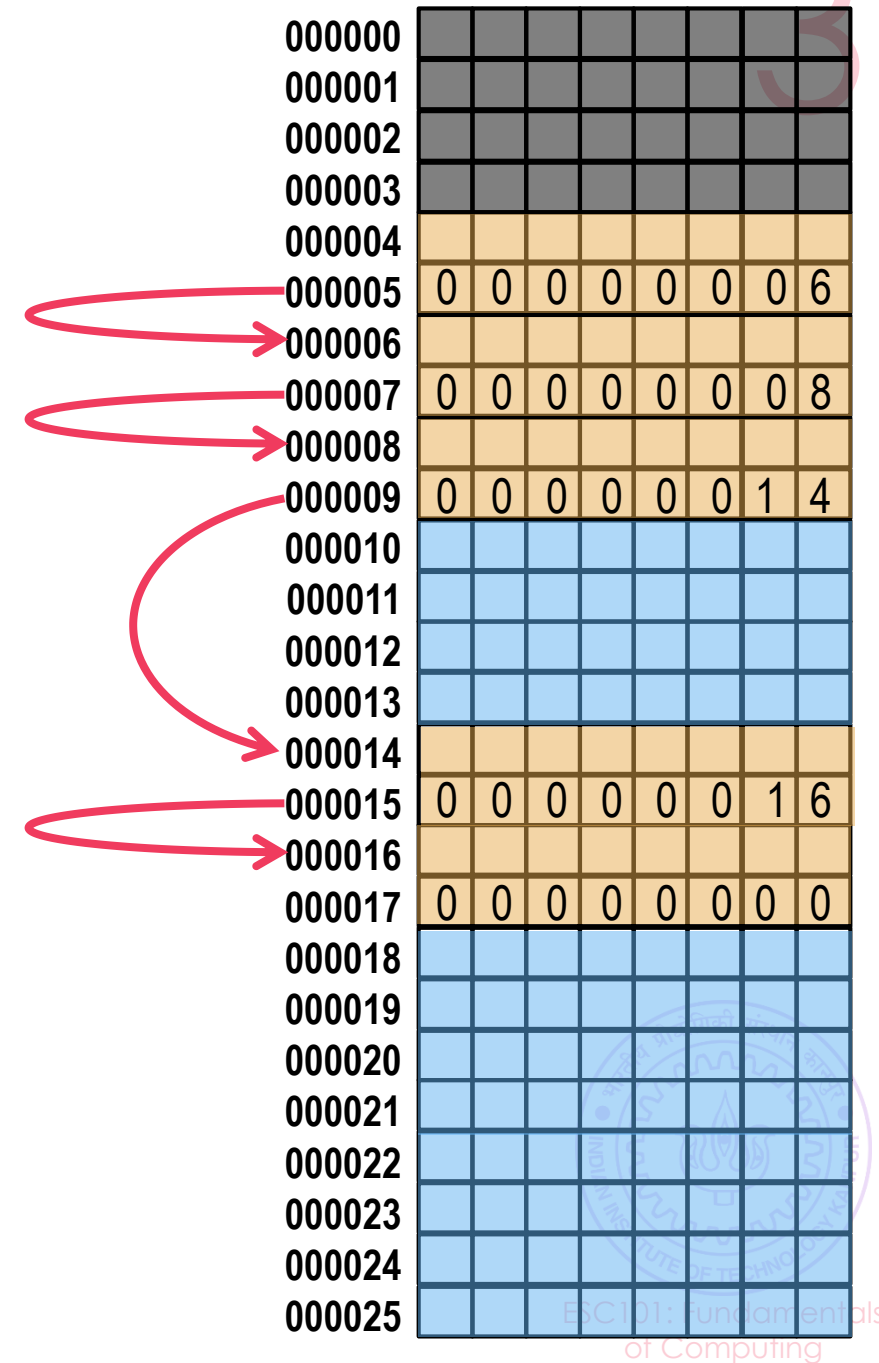


Linked Lists

Allow for more efficient
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ADVANTAGES

Allow as many elements as you want

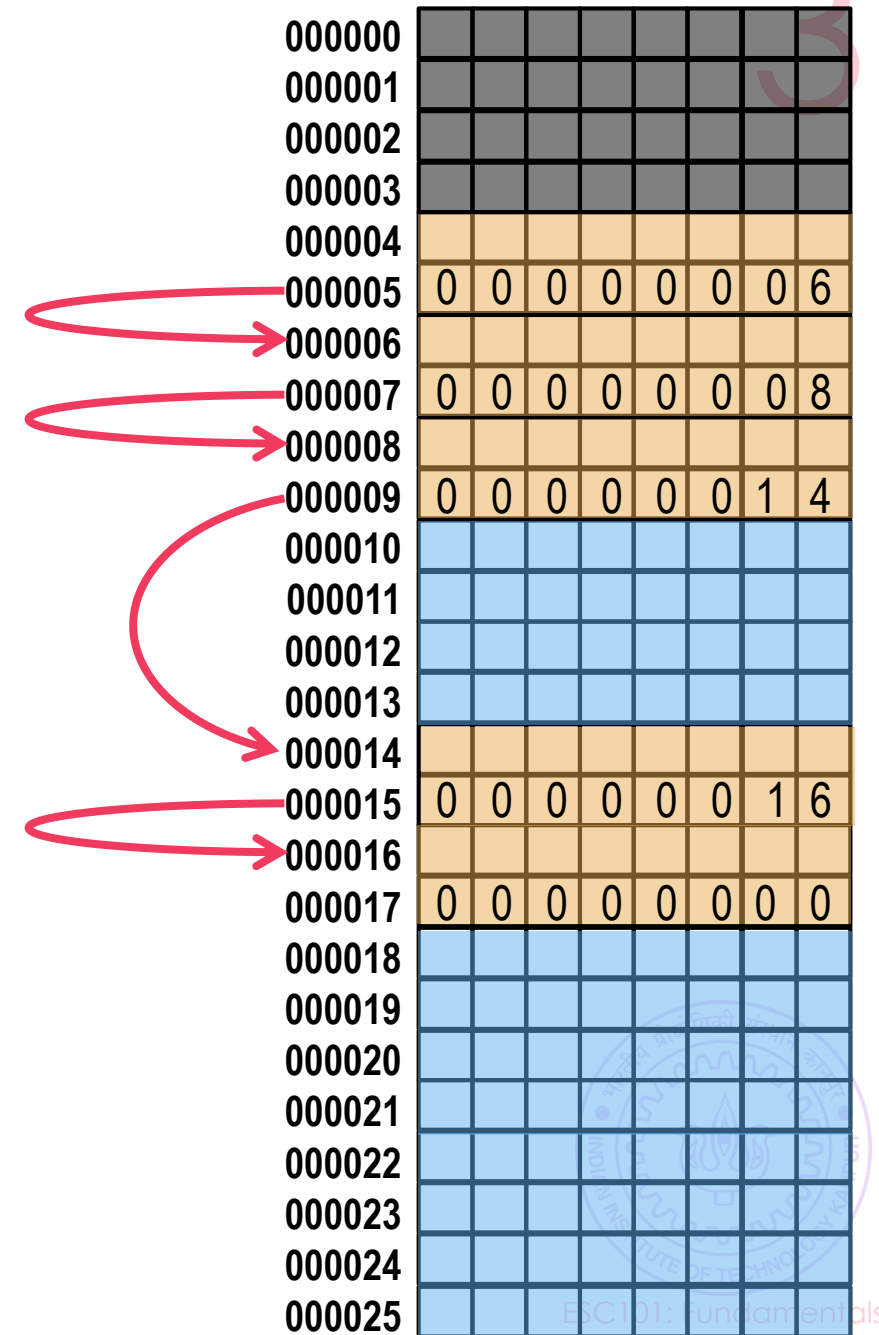


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Allow for more efficient
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ADVANTAGES

Allow as many elements as you want
Do not require contiguous space to
be available – pack things better

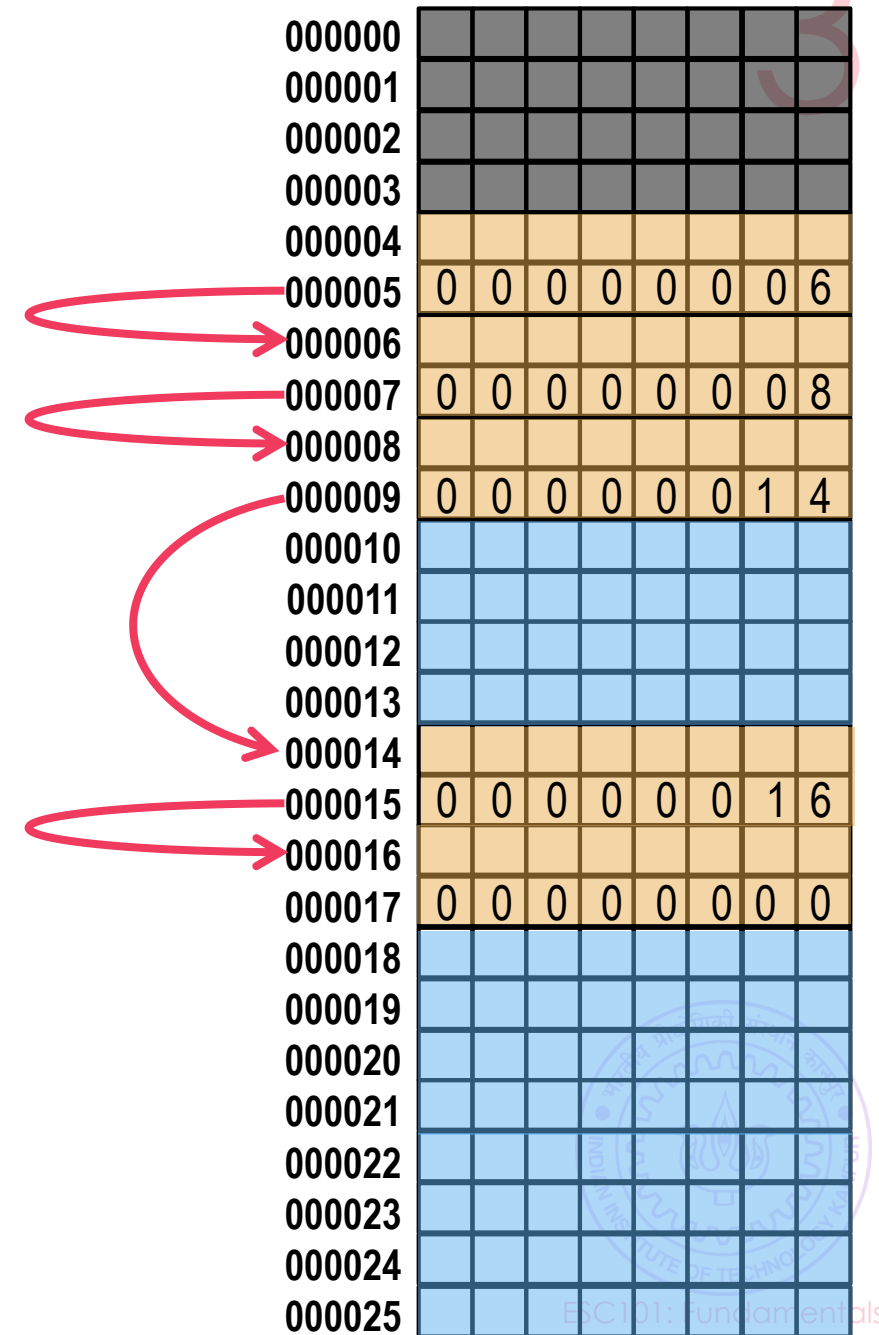


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Allow for more efficient
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ADVANTAGES

- Allow as many elements as you want
- Do not require contiguous space to be available – pack things better
- Can expand without calling realloc

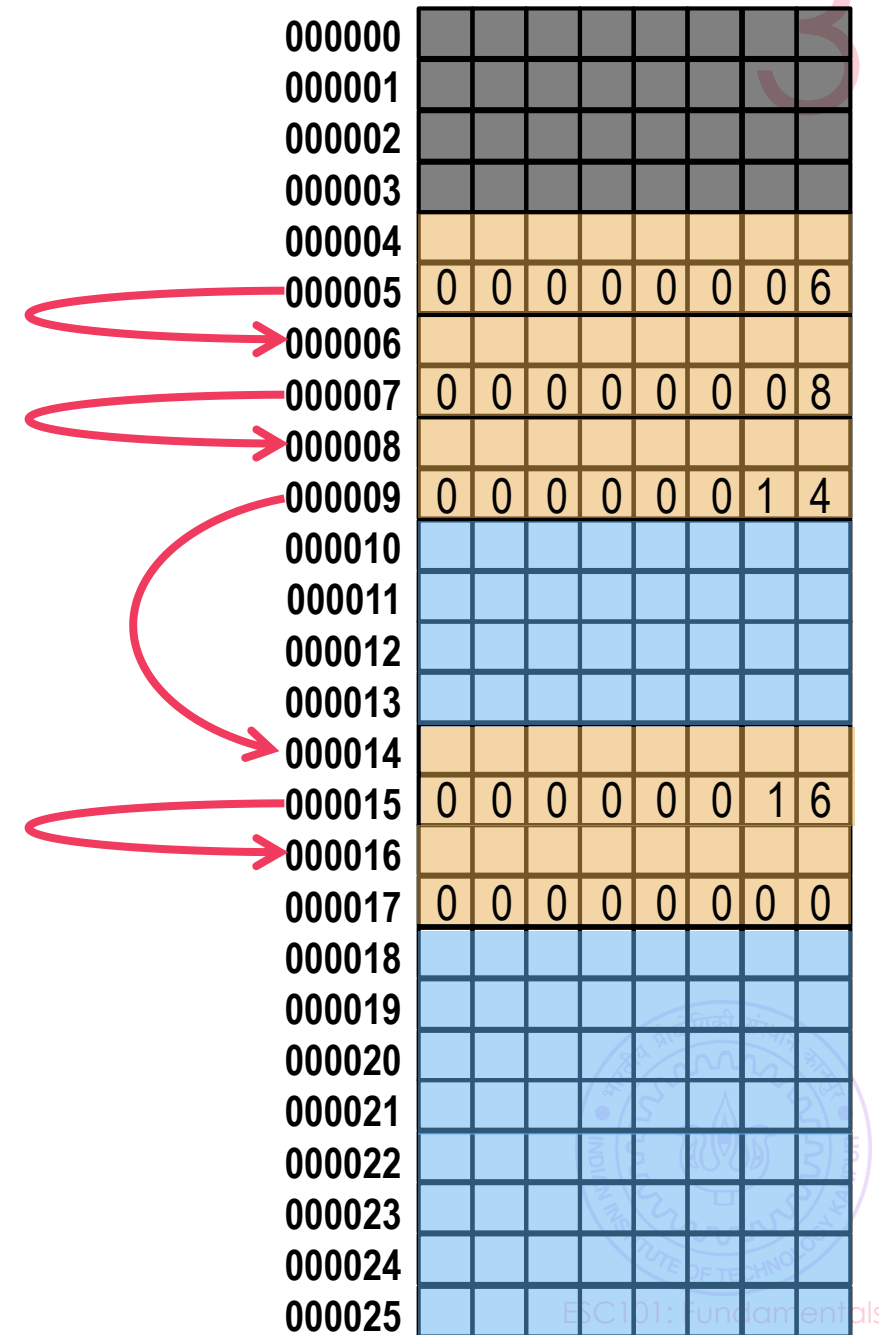


Linked Lists

Allow for more efficient usage of space

ADVANTAGES

- Allow as many elements as you want
- Do not require contiguous space to be available – pack things better
- Can expand without calling realloc
- Inserting in the middle very simple



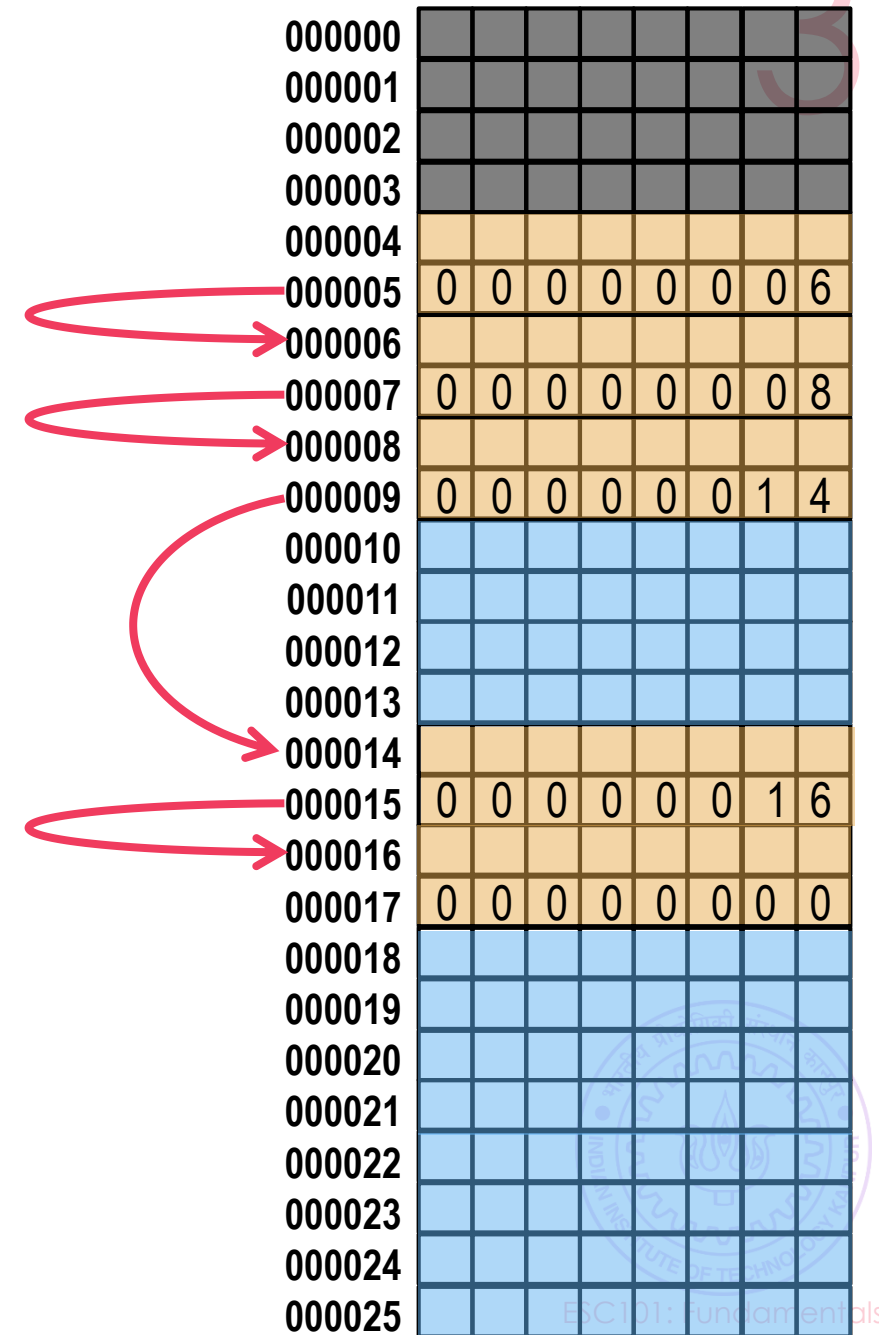
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Allow for more efficient usage of space

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DISADVANTAGES



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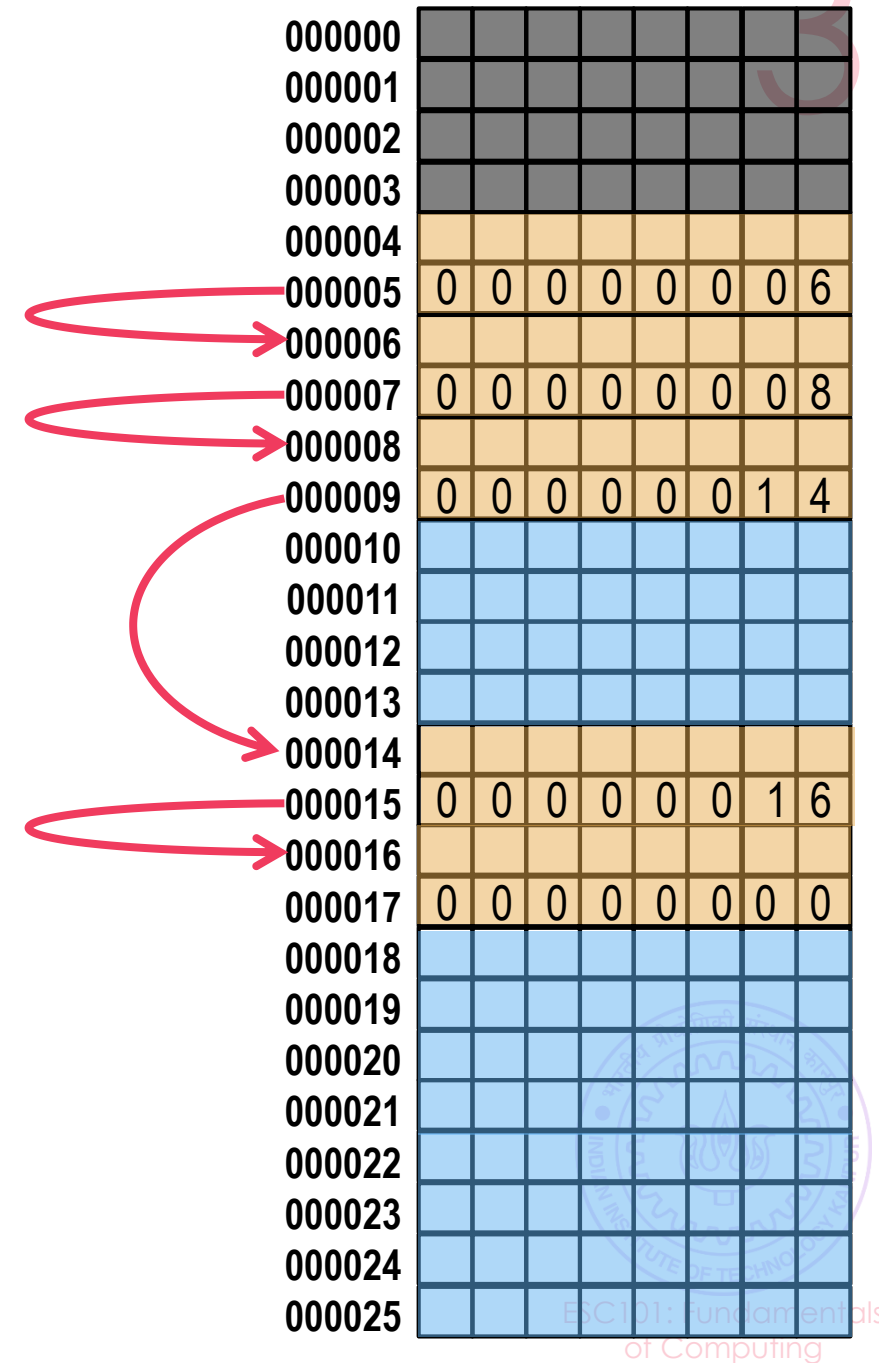
Allow for more efficient usage of space

ADVANTAGES

- Allow as many elements as you want
- Do not require contiguous space to be available – pack things better
- Can expand without calling realloc
- Inserting in the middle very simple

DISADVANTAGES

- No convenient “names” for elements



Linked Lists

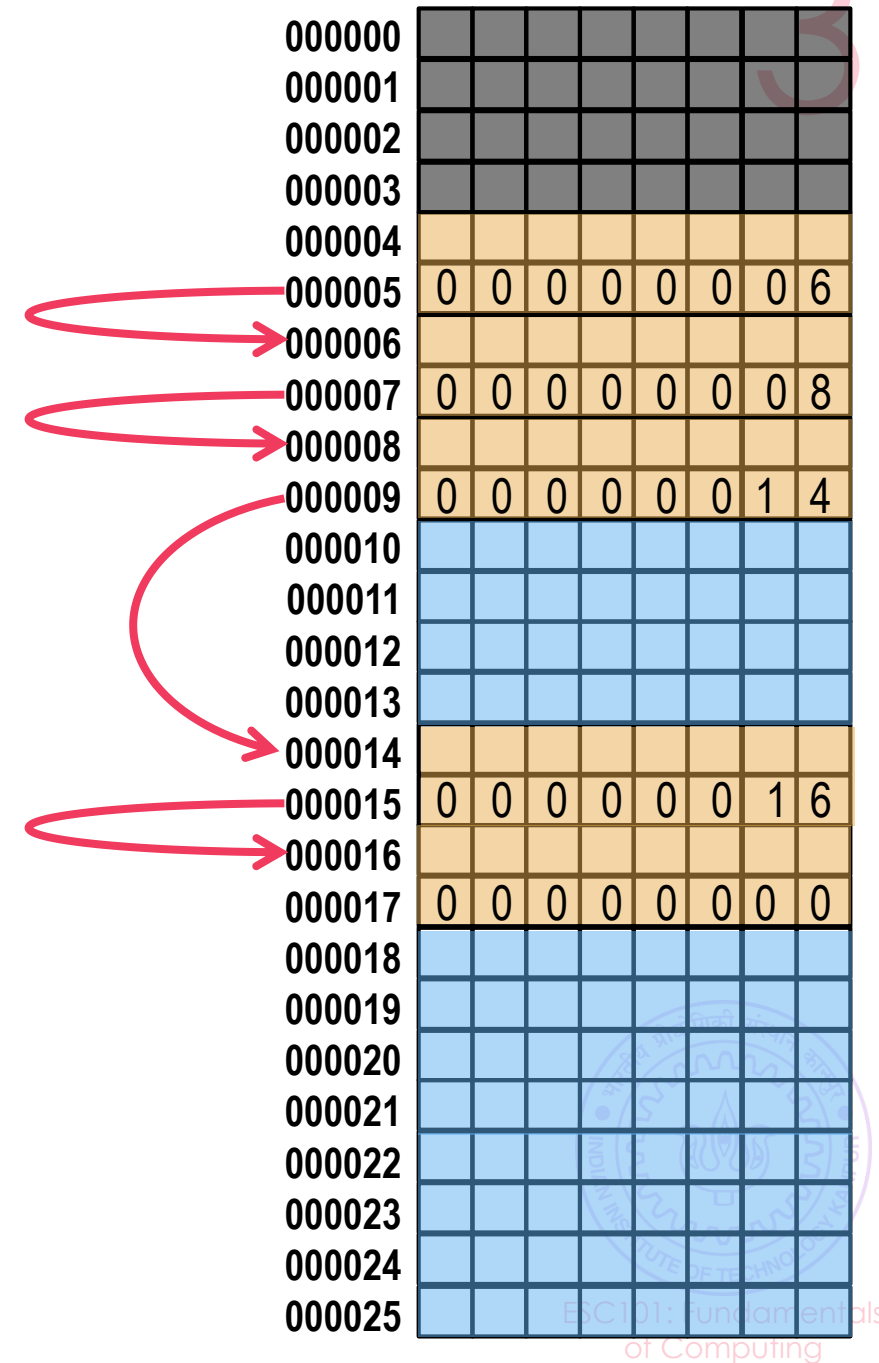
Allow for more efficient usage of space

ADVANTAGES

- Allow as many elements as you want
- Do not require contiguous space to be available – pack things better
- Can expand without calling realloc
- Inserting in the middle very simple

DISADVANTAGES

- No convenient “names” for elements
- Accessing n-th element slow – require going through first n-1 elements



Linked Lists

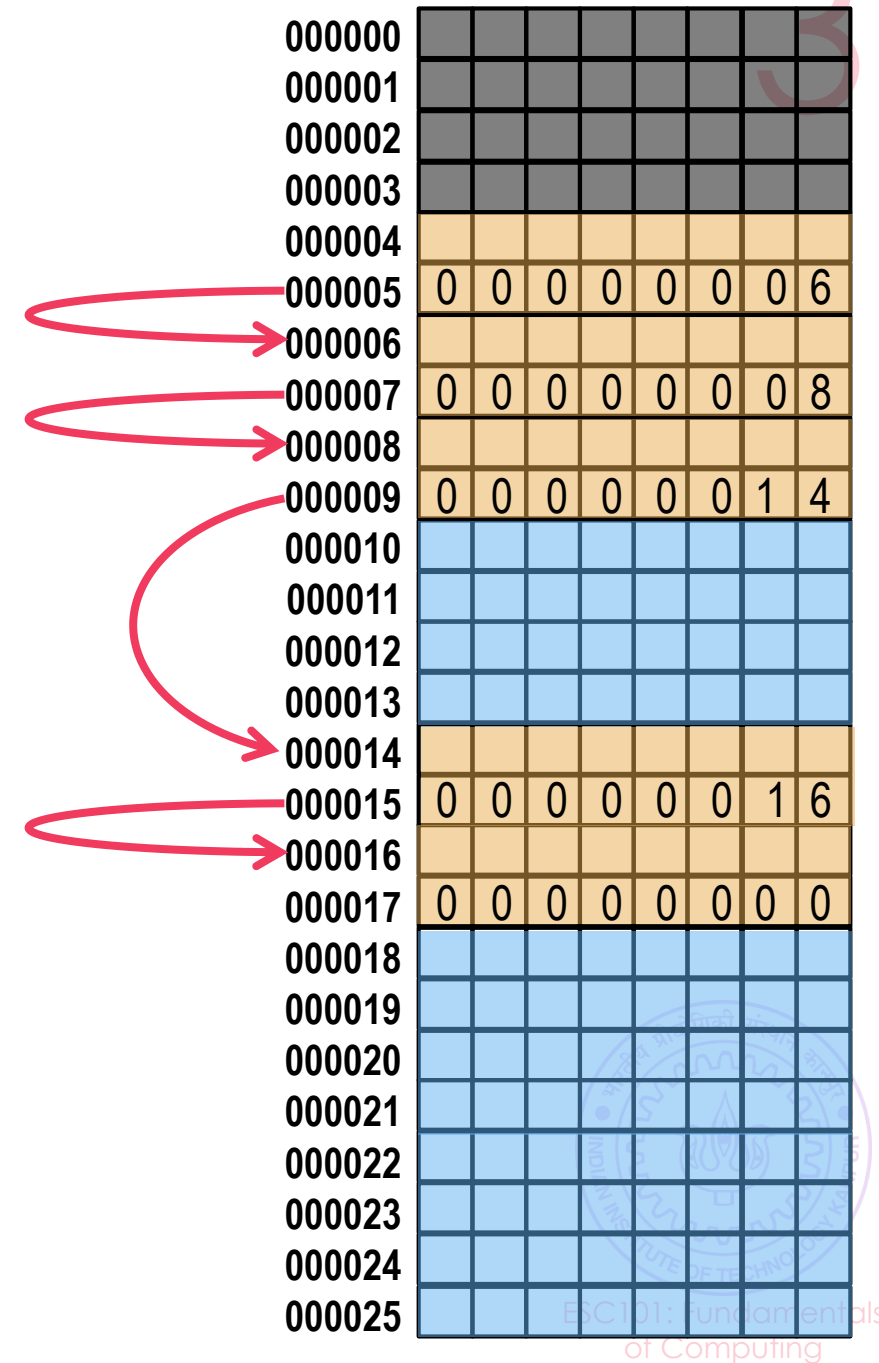
Allow for more efficient usage of space

ADVANTAGES

- Allow as many elements as you want
- Do not require contiguous space to be available – pack things better
- Can expand without calling realloc
- Inserting in the middle very simple

DISADVANTAGES

- No convenient “names” for elements
- Accessing n-th element slow – require going through first n-1 elements
- Setting them up requires more work



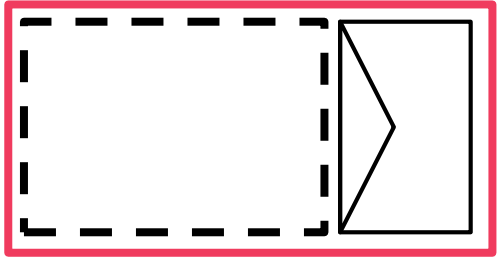
A Cartoon of Linked Lists

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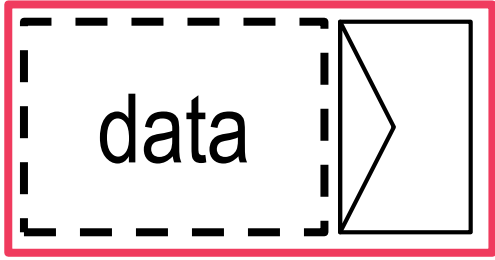
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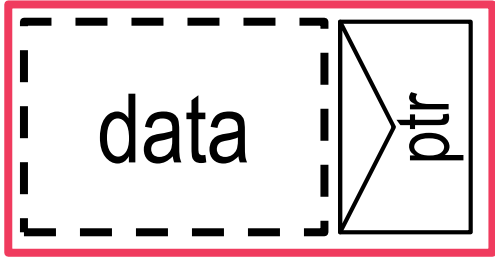
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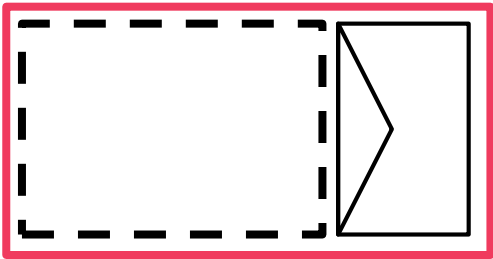
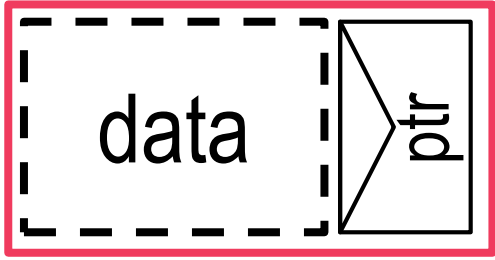
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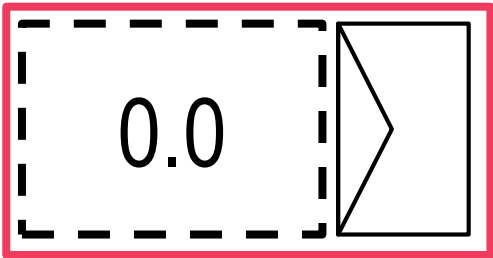
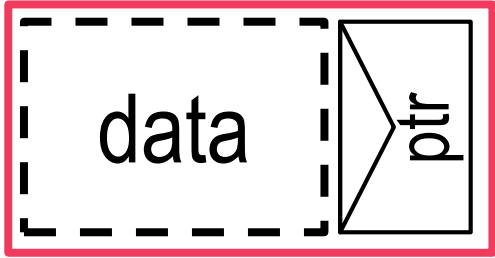
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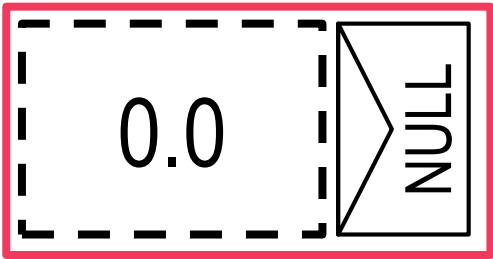
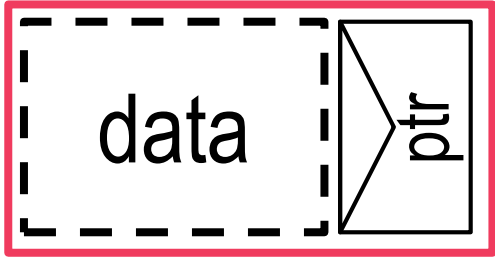
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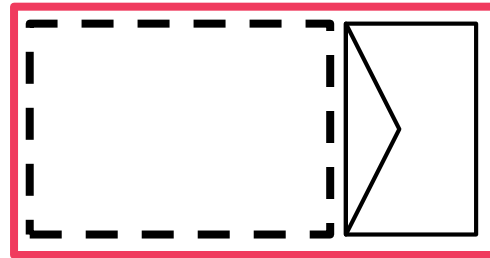
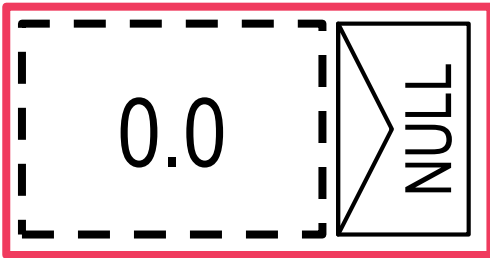
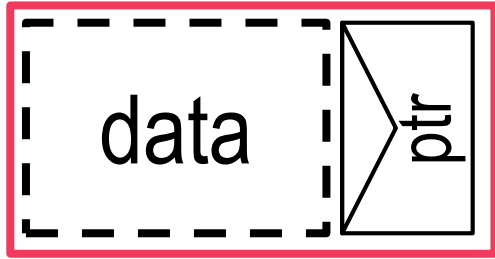
A Cartoon of Linked Lists

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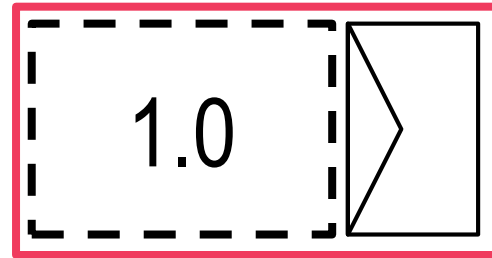
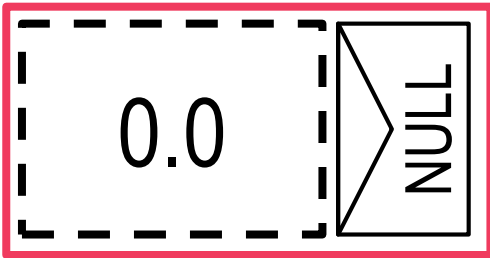
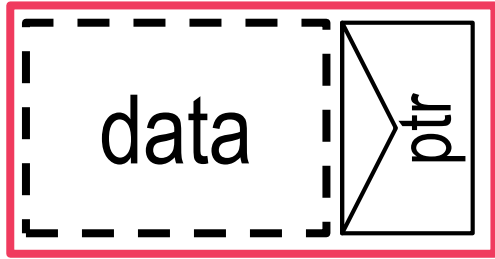
A Cartoon of Linked Lists

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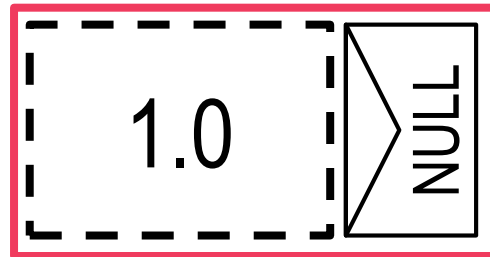
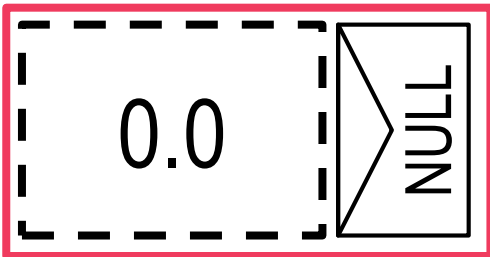
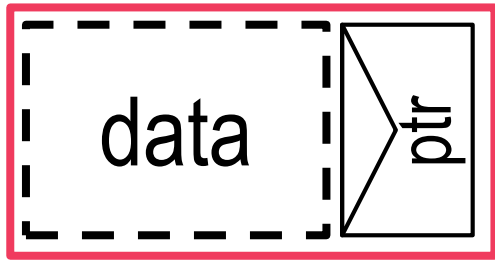
A Cartoon of Linked Lists

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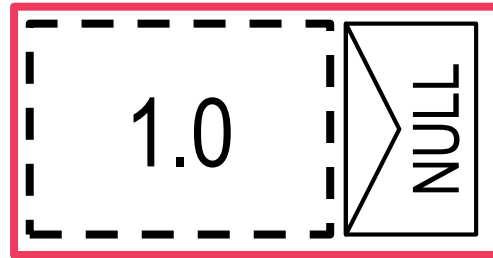
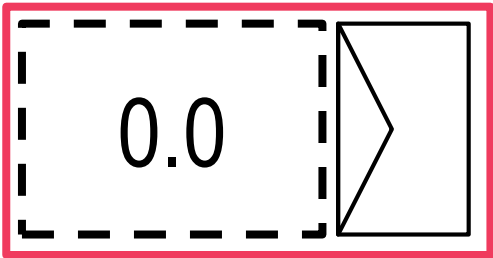
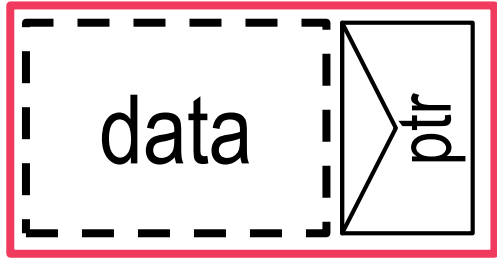
A Cartoon of Linked Lists

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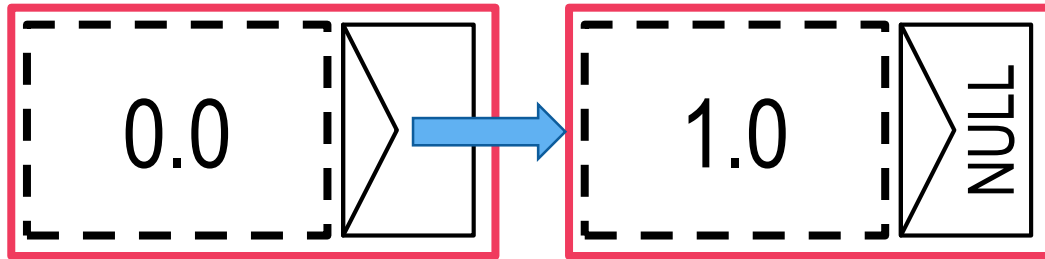
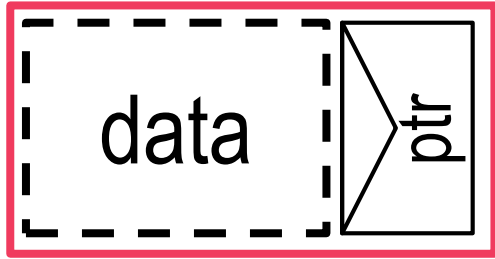
A Cartoon of Linked Lists

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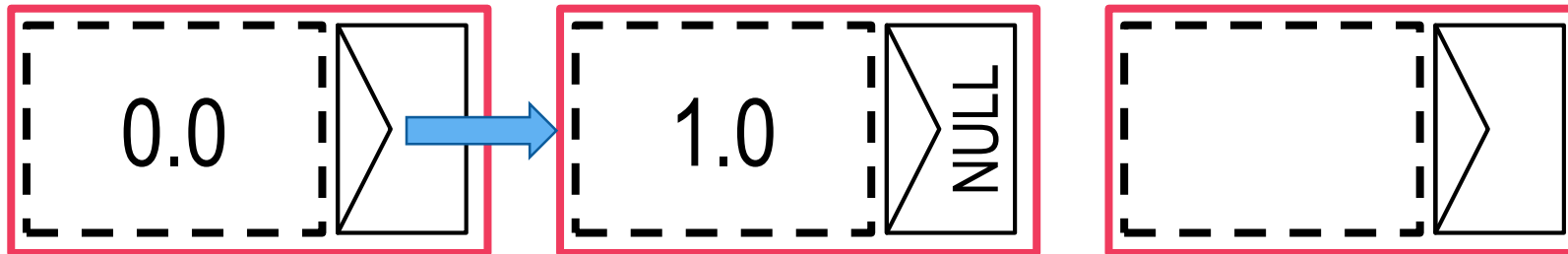
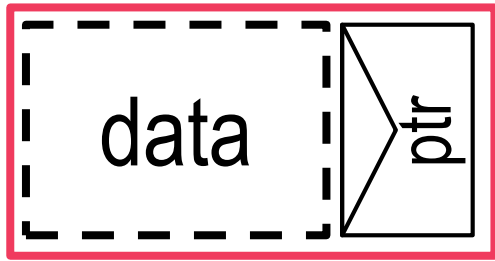
A Cartoon of Linked Lists

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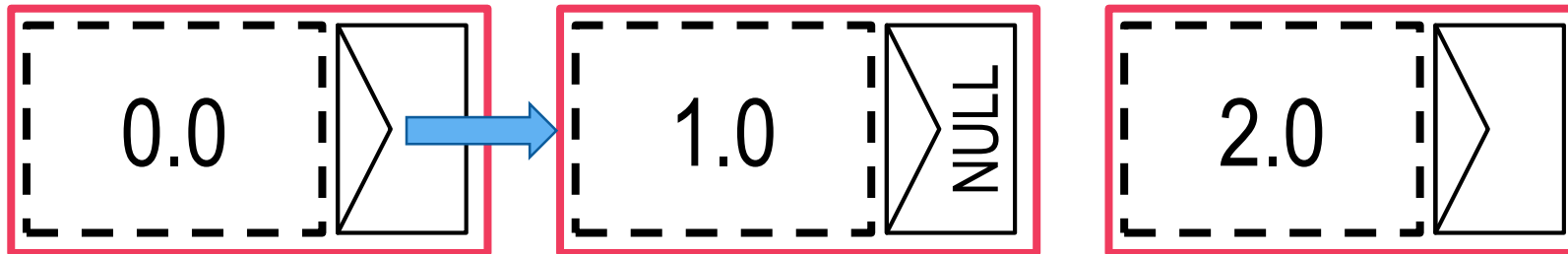
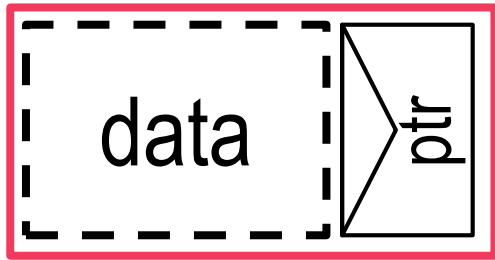
A Cartoon of Linked Lists

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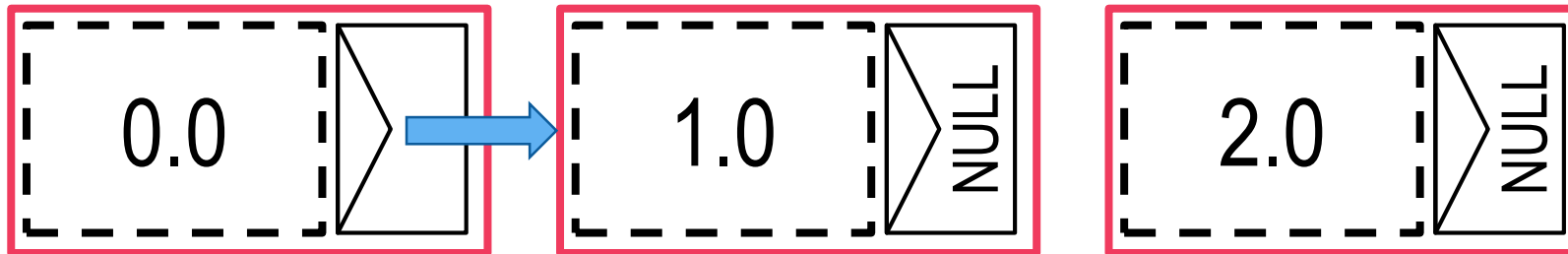
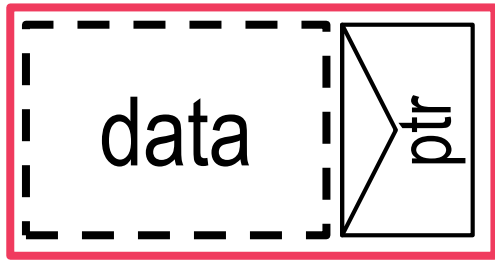
A Cartoon of Linked Lists

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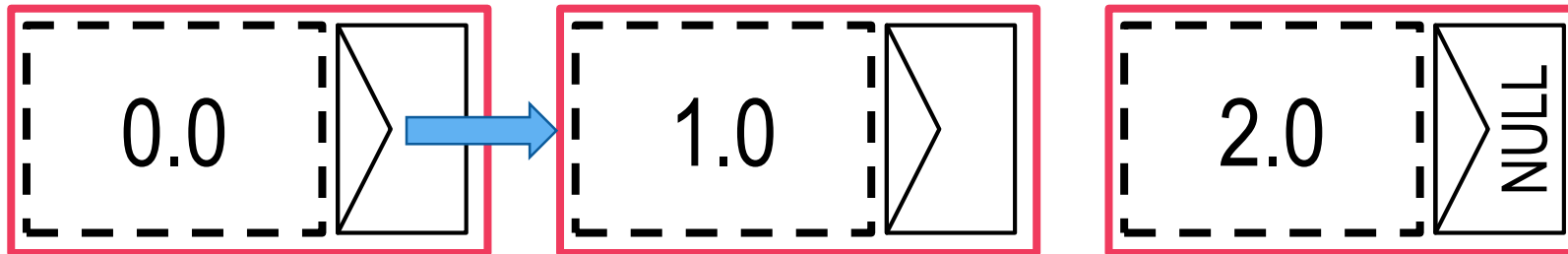
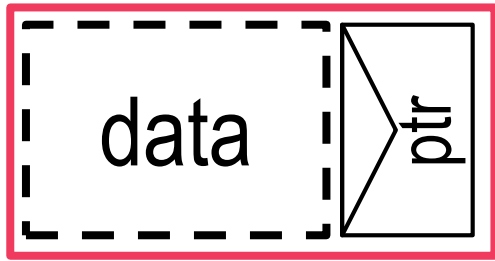
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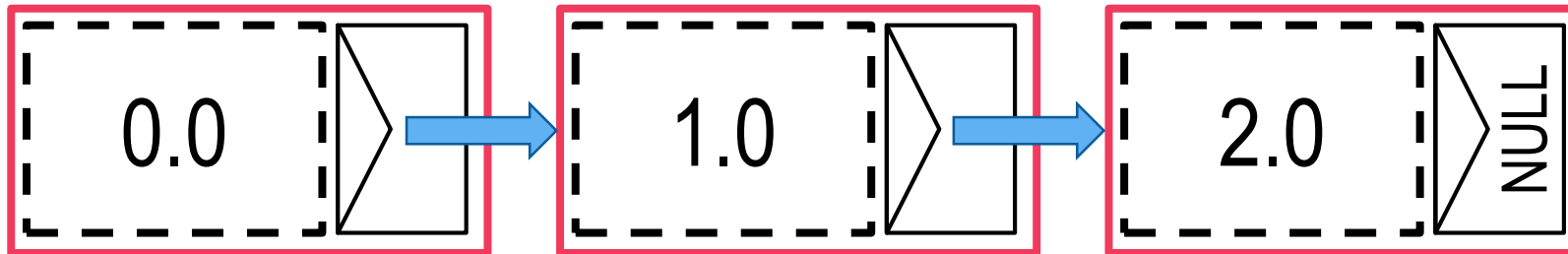
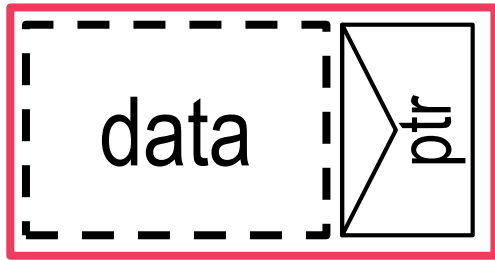
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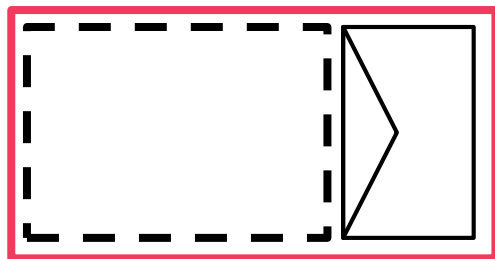
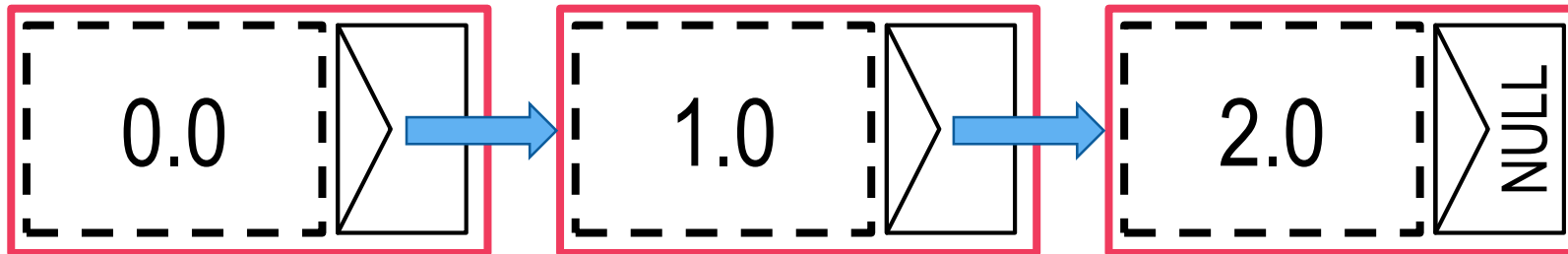
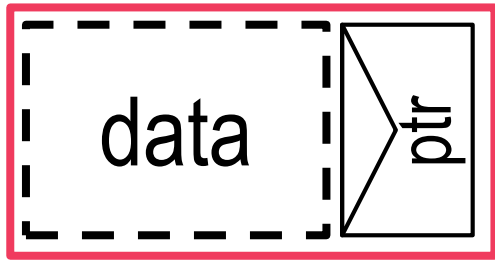
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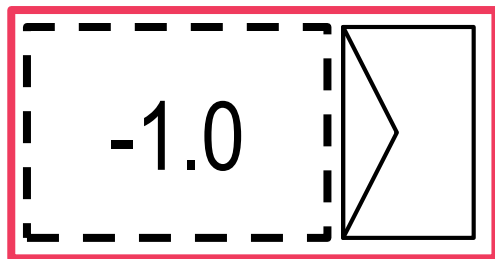
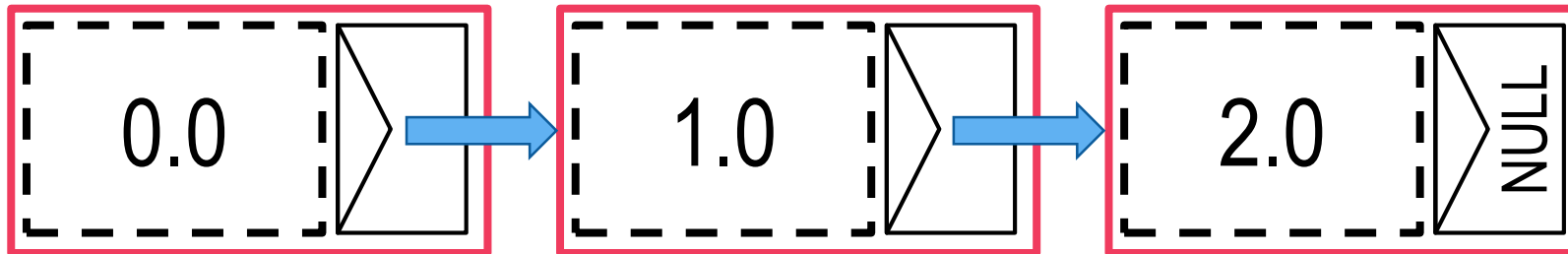
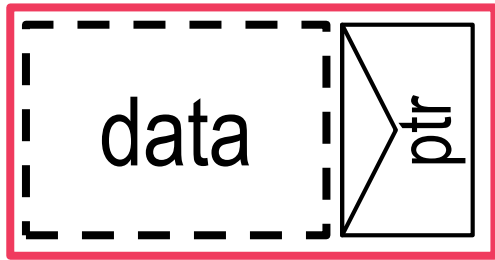
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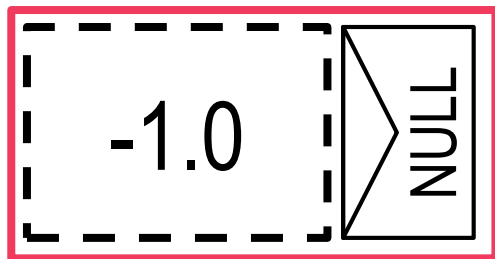
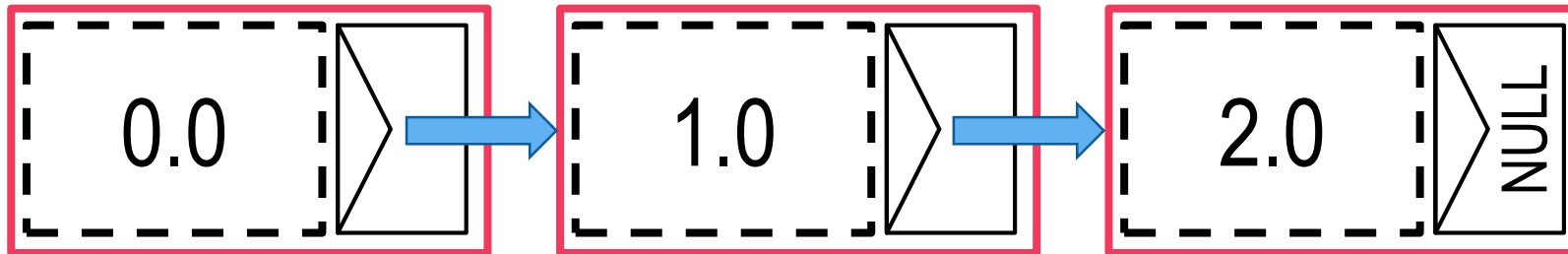
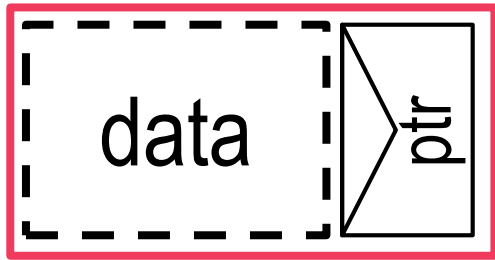
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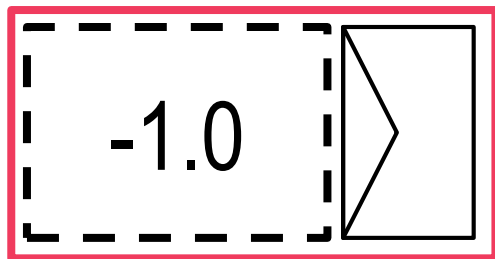
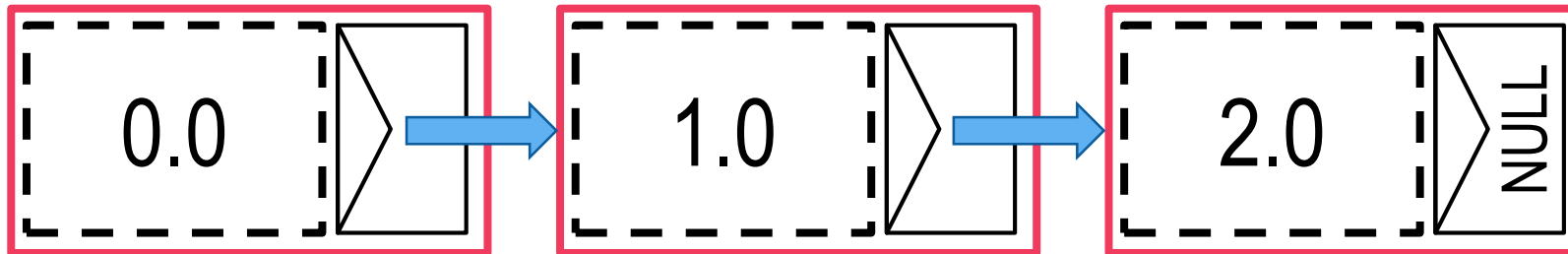
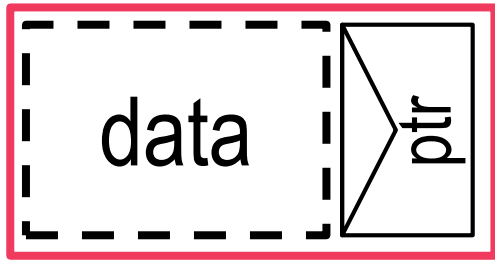
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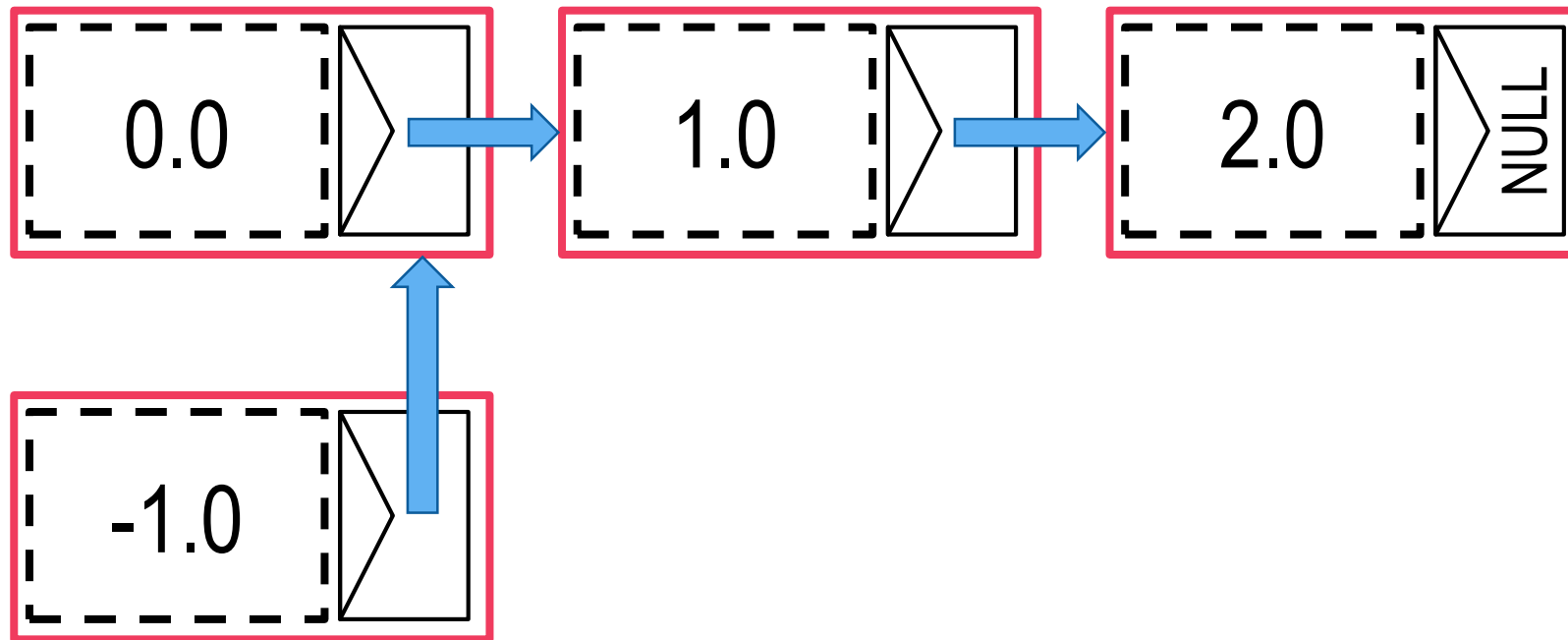
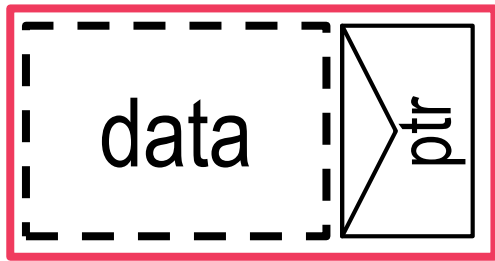
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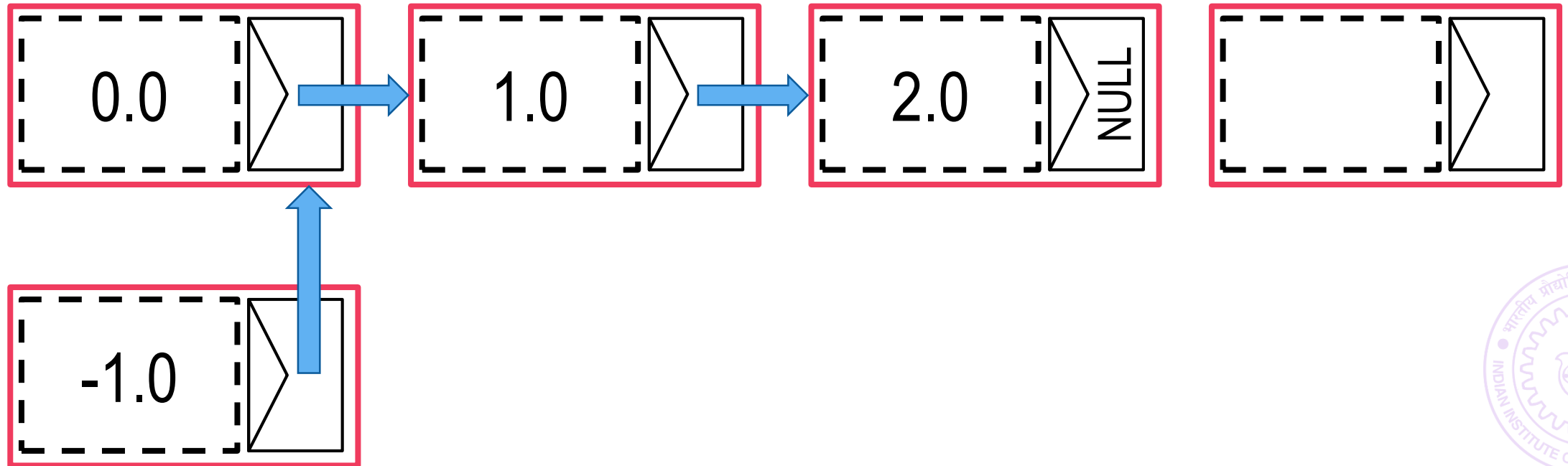
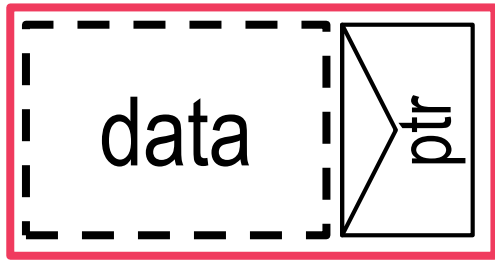
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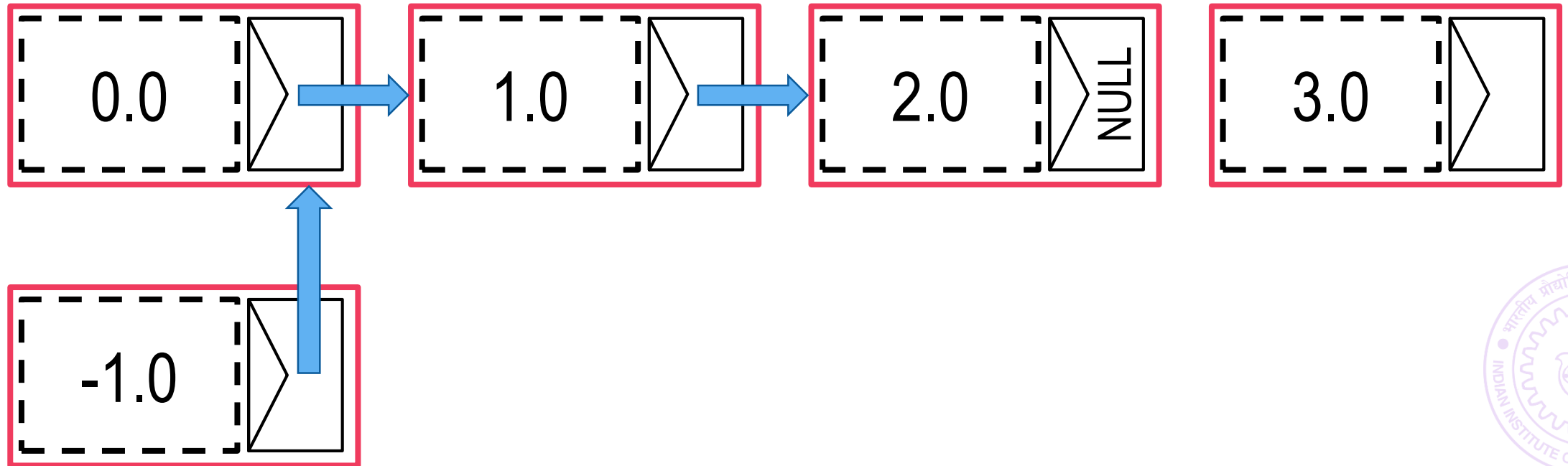
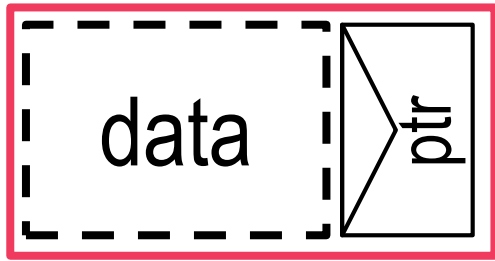
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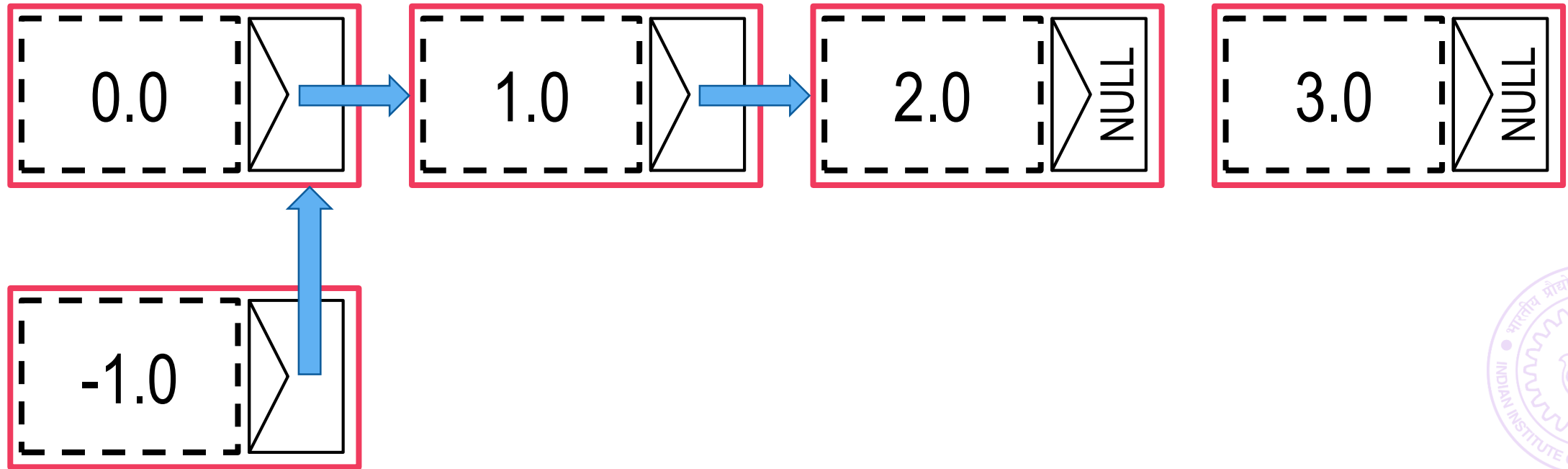
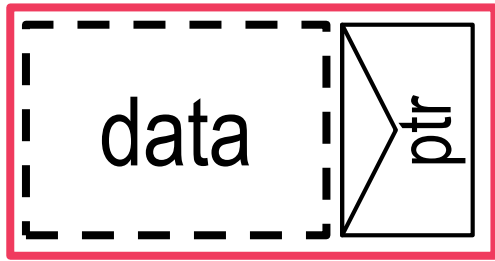
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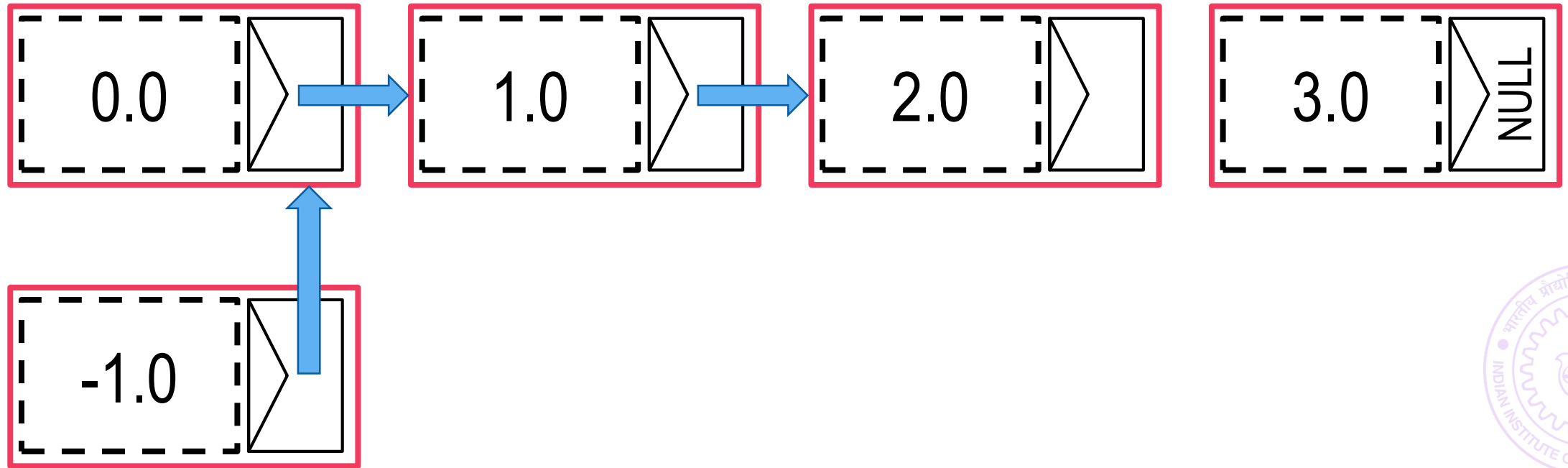
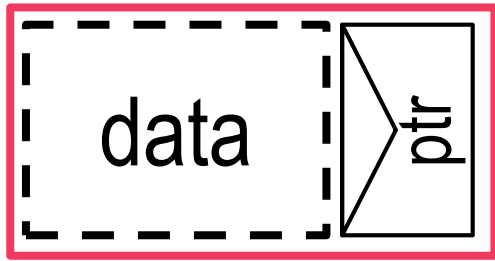
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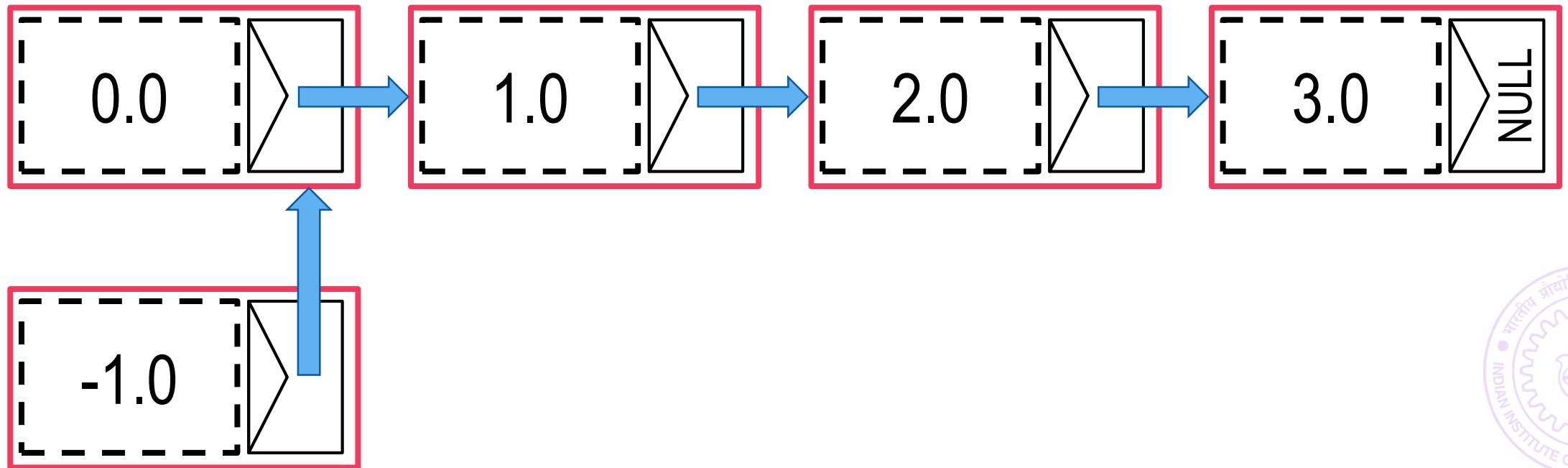
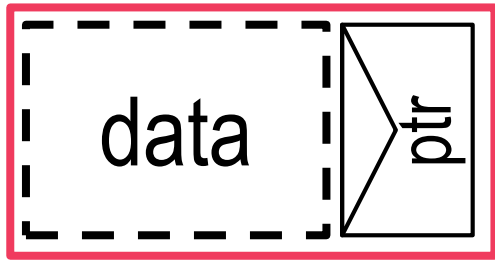
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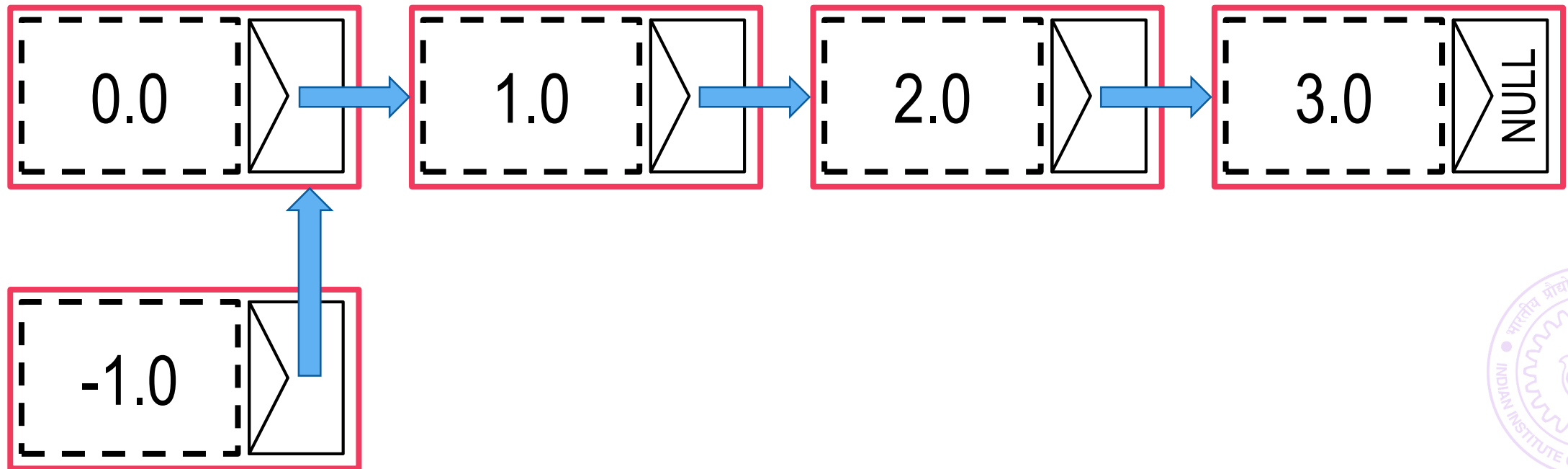
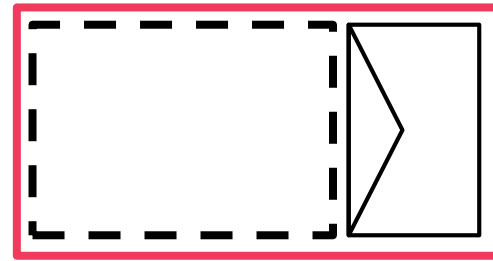
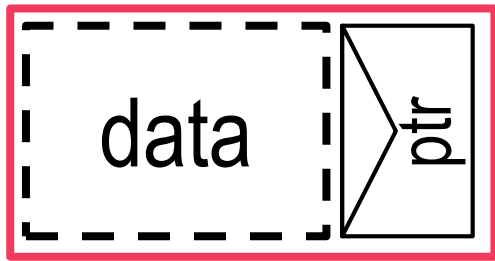
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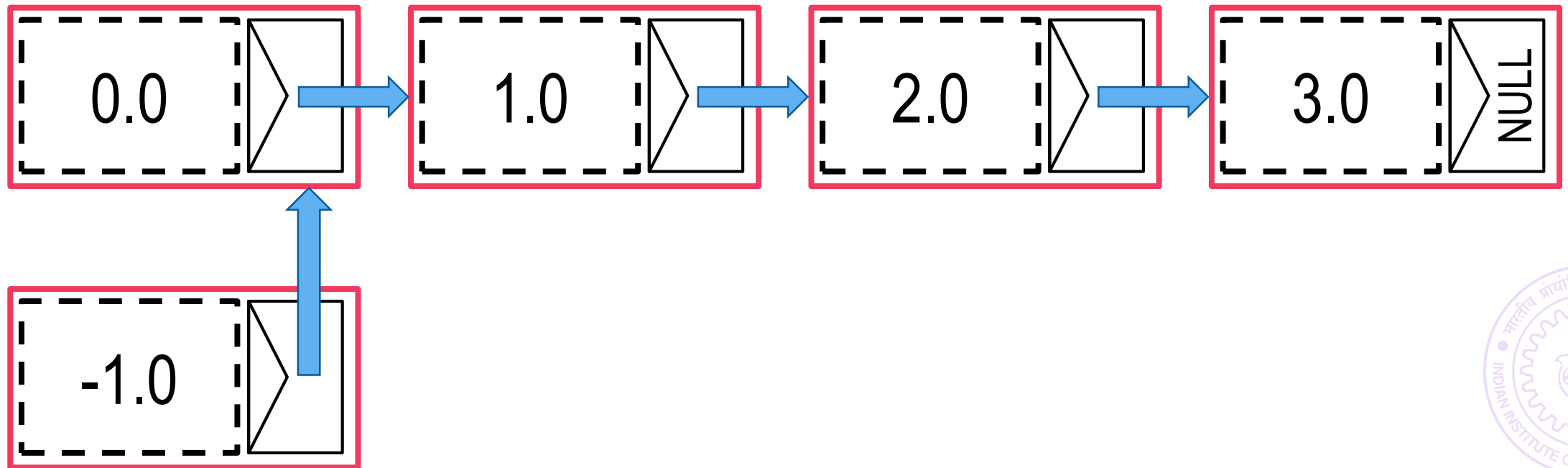
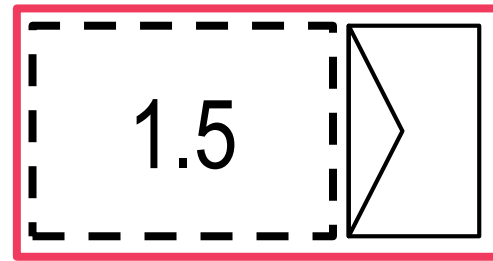
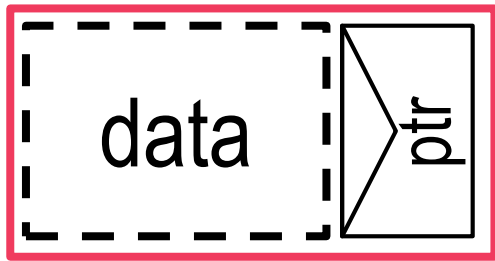
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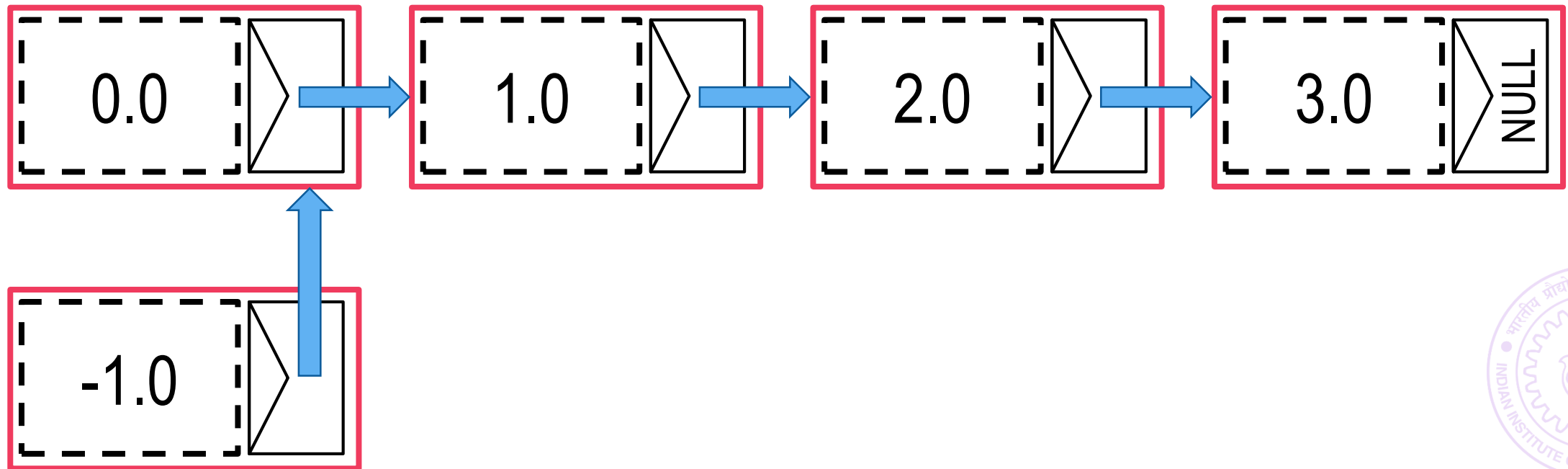
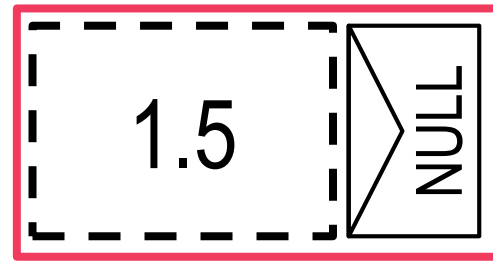
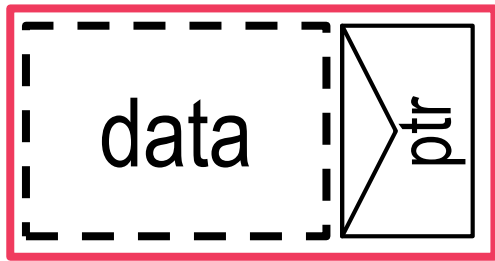
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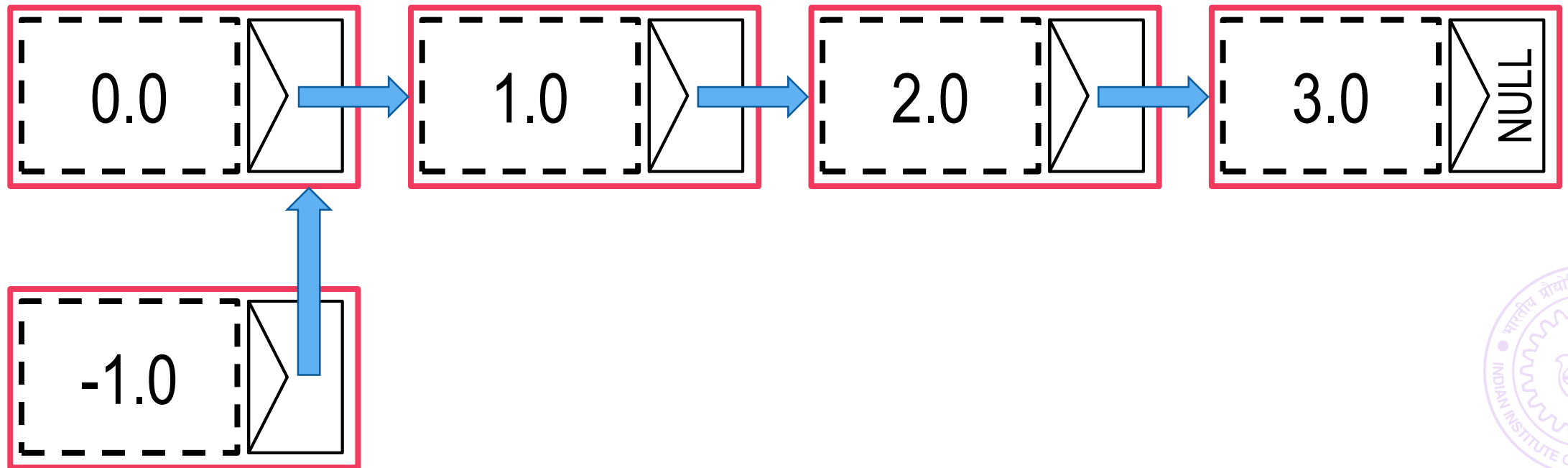
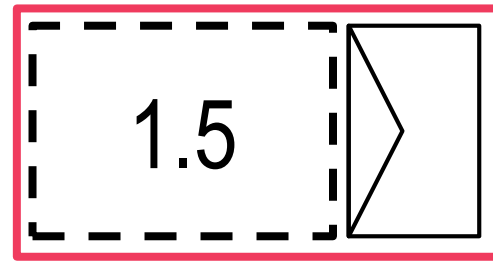
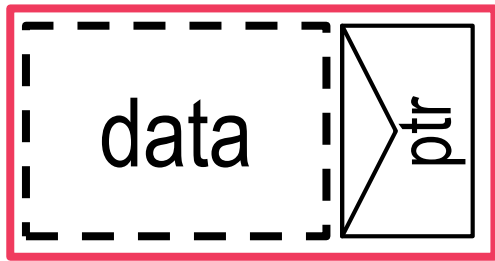
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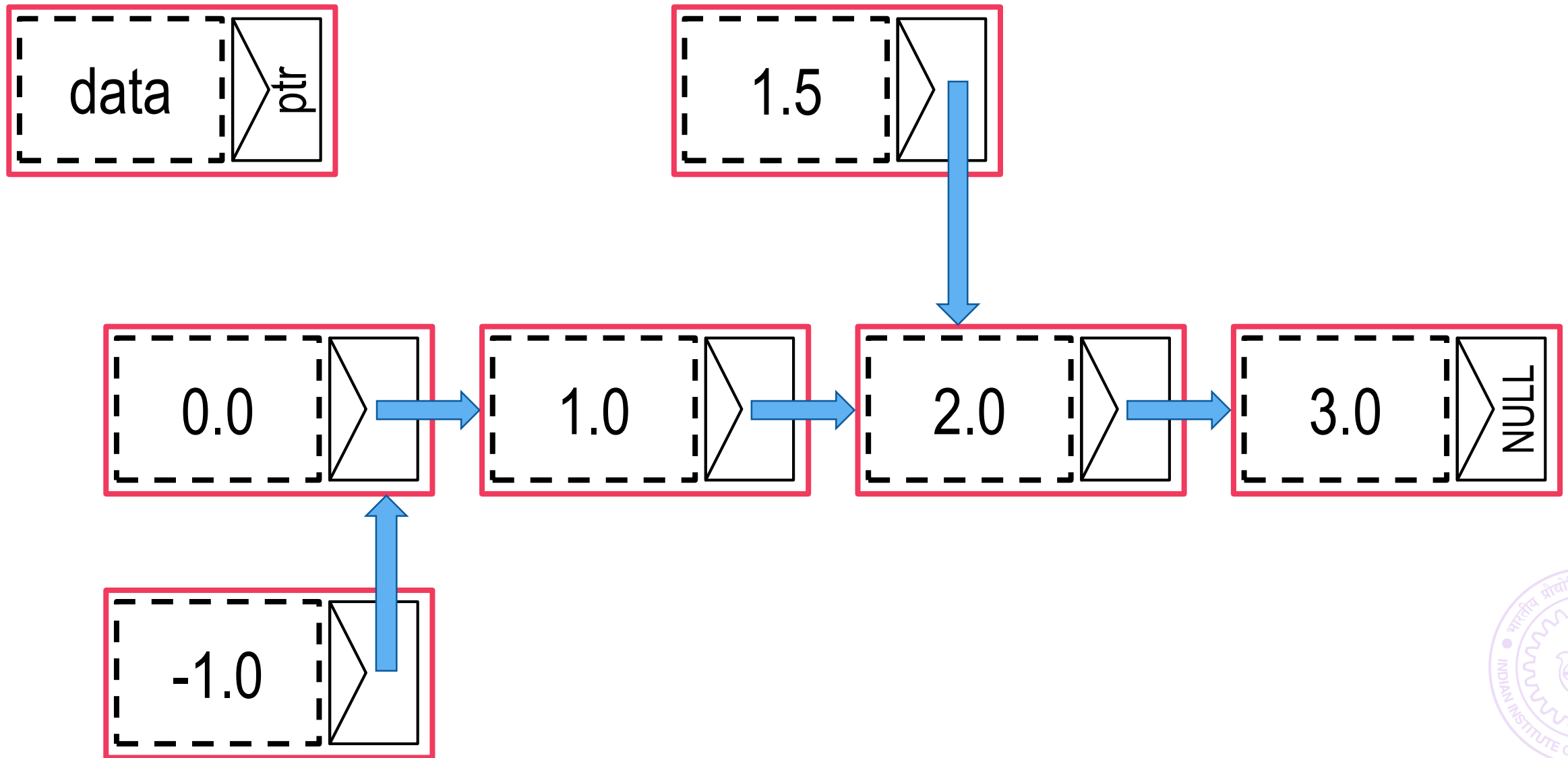
A Cartoon of Linked Lists

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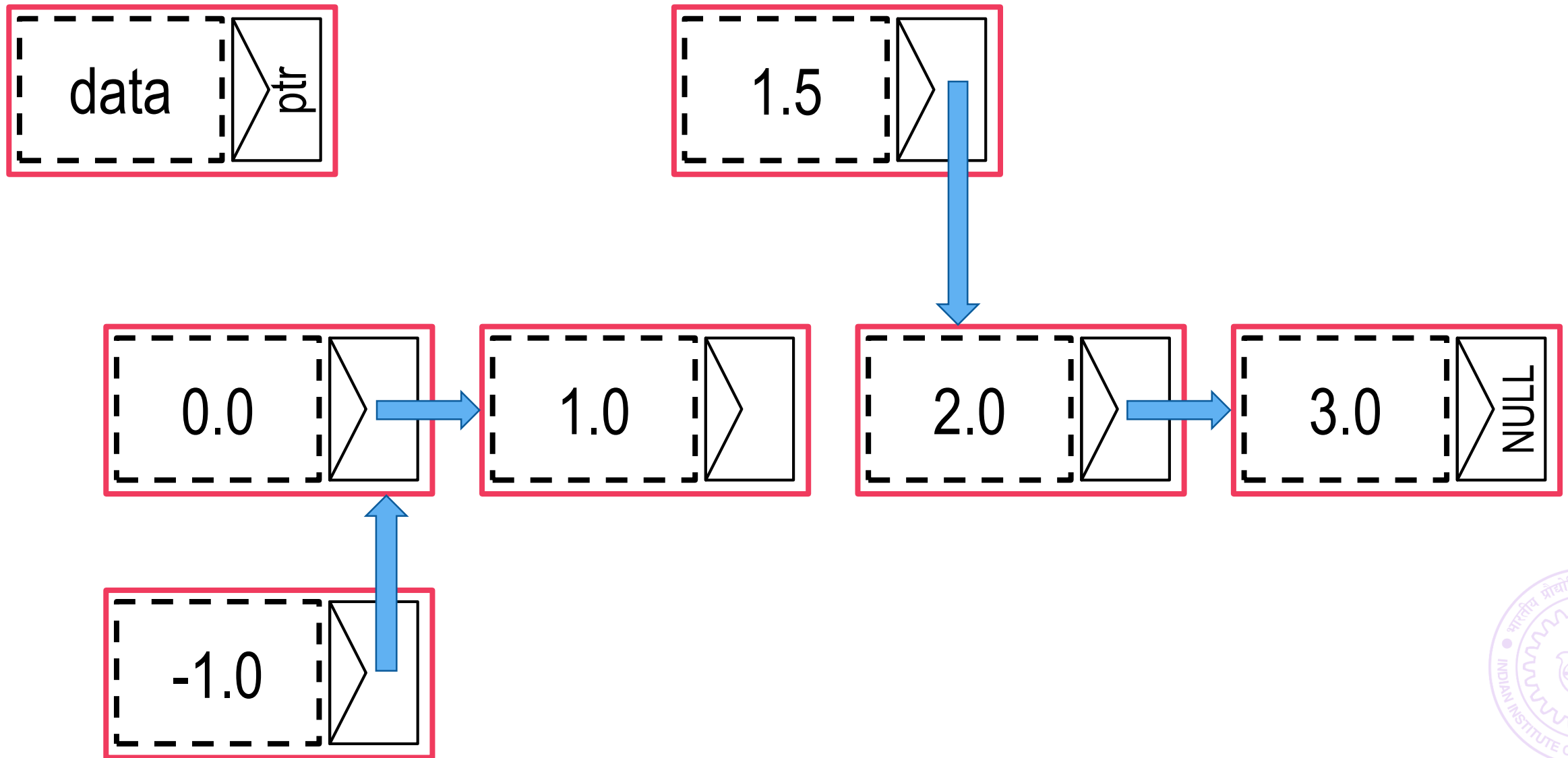
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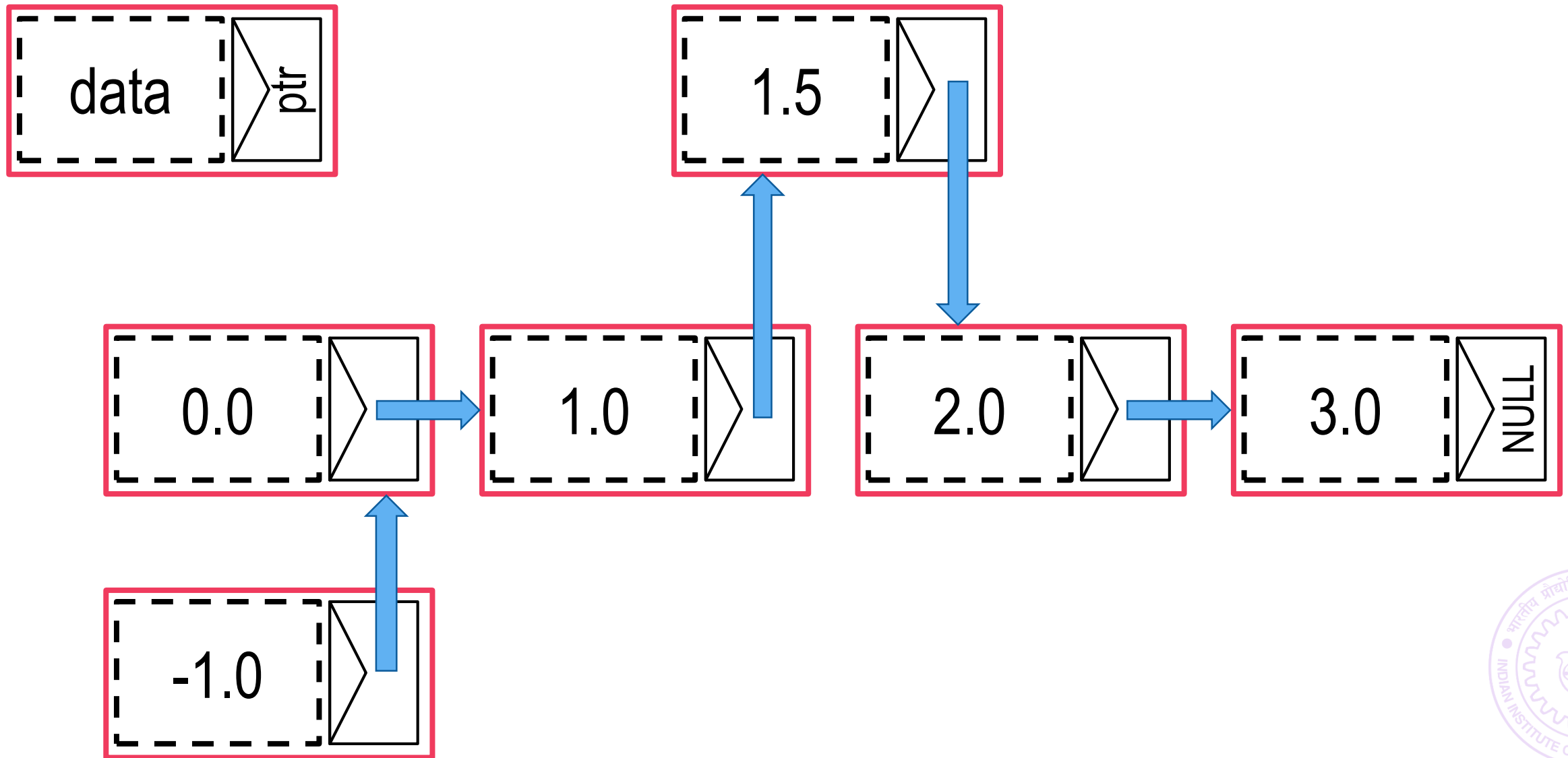
A Cartoon of Linked Lists

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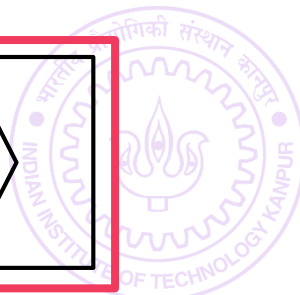
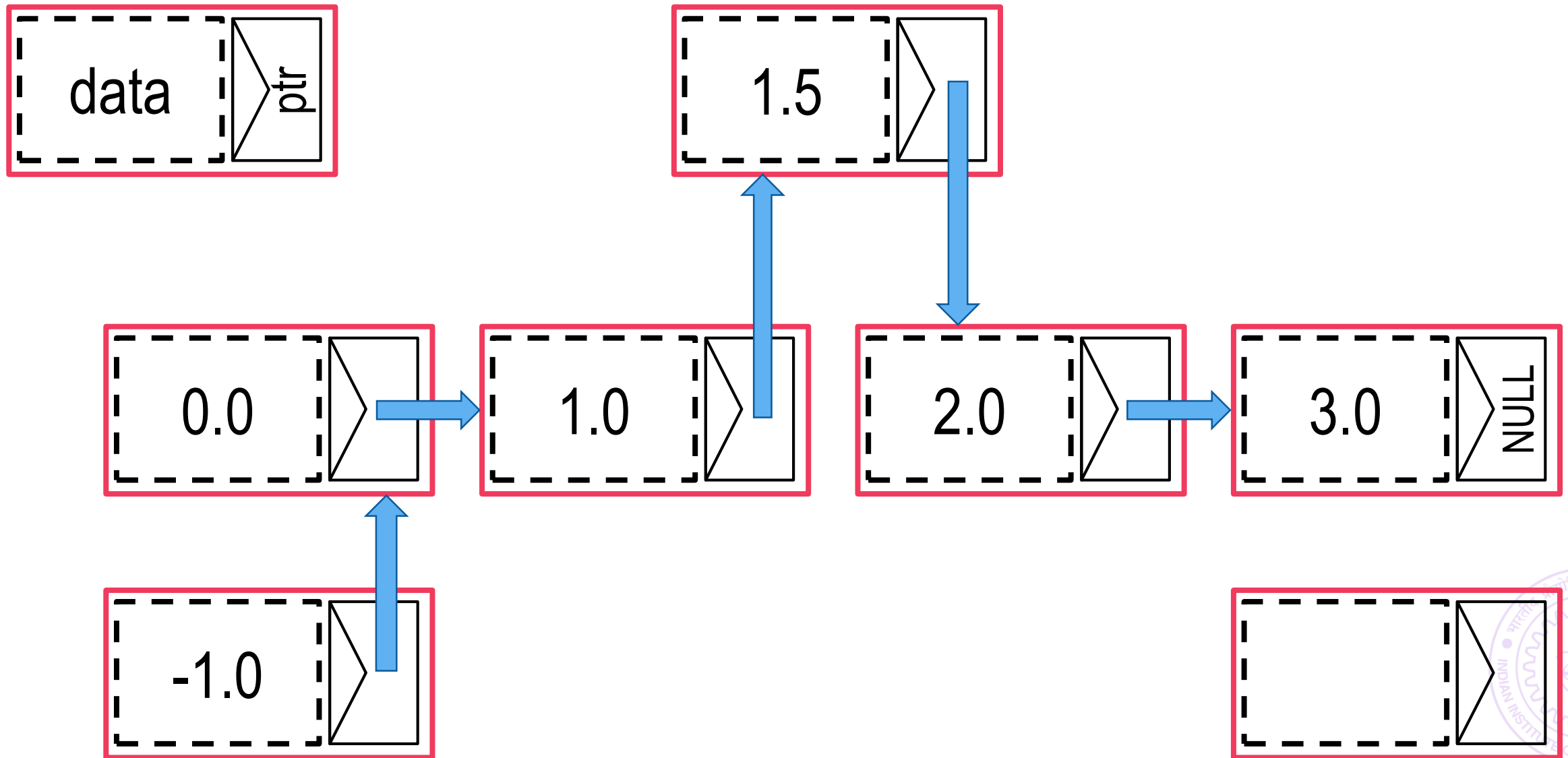
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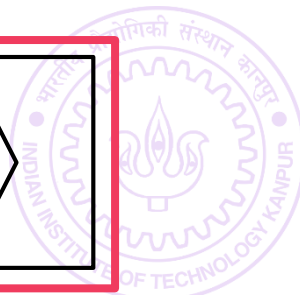
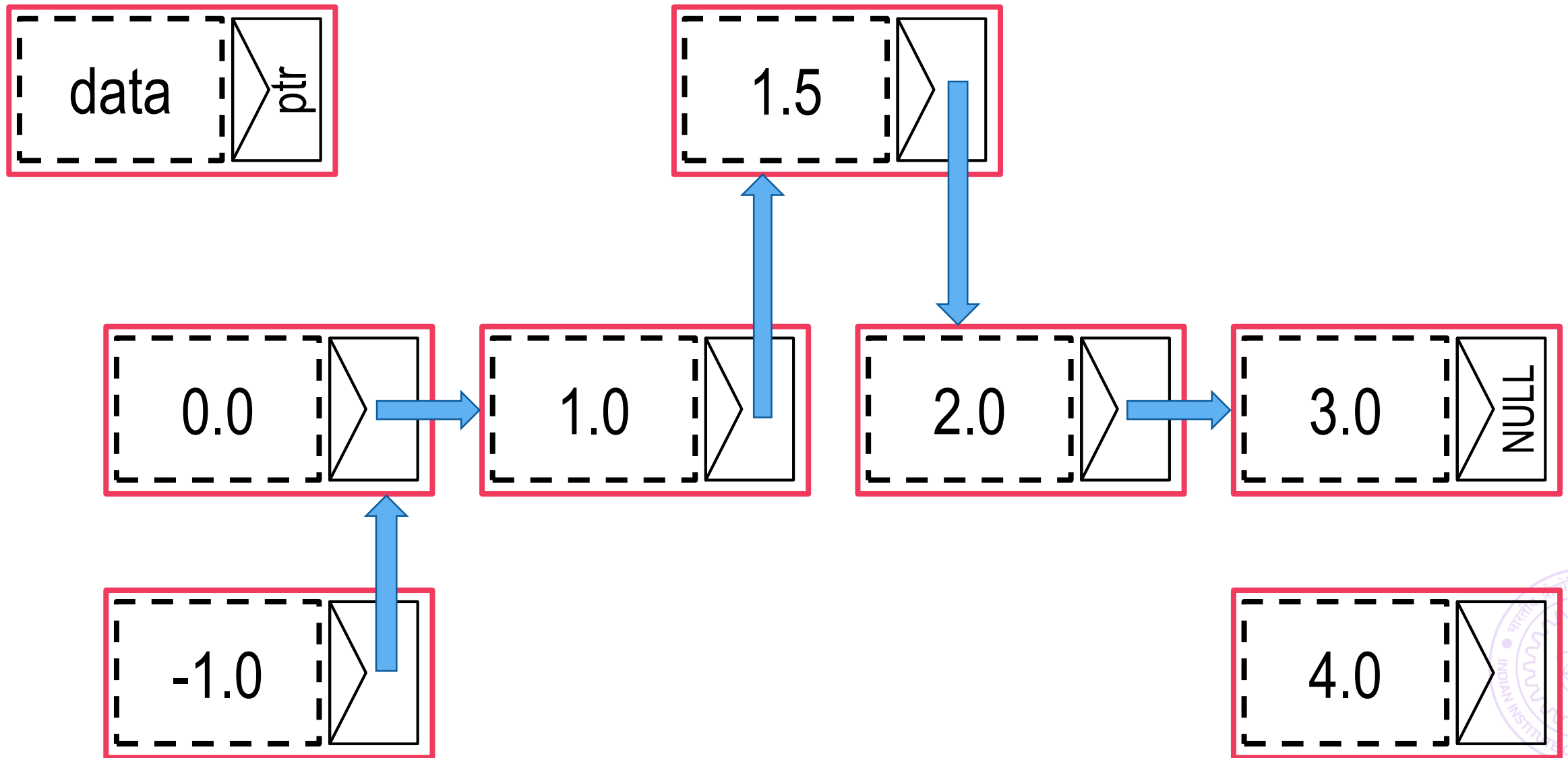
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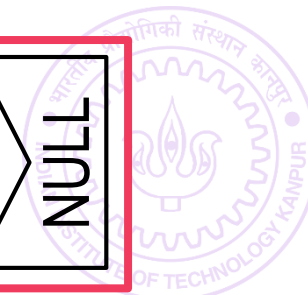
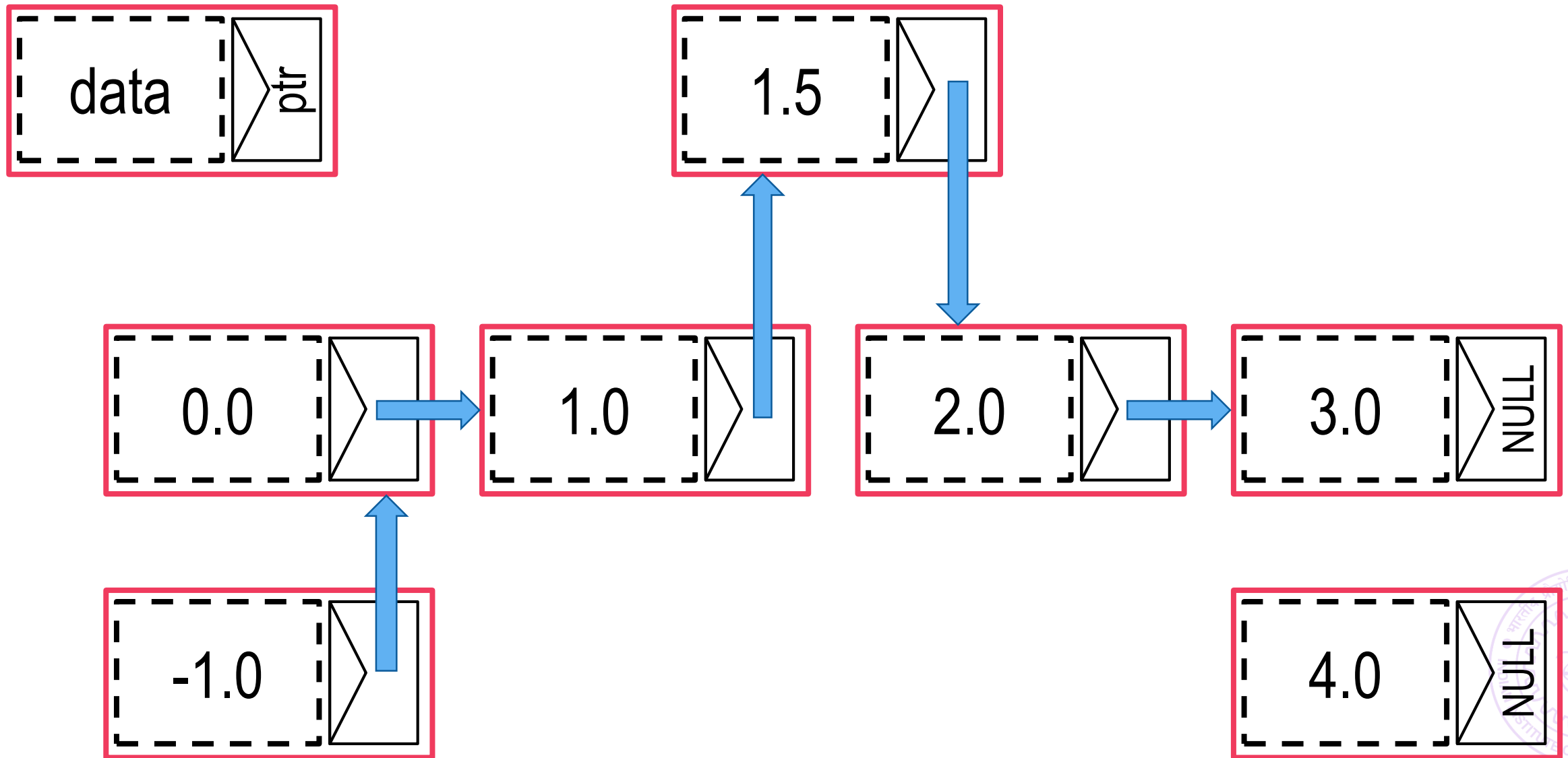
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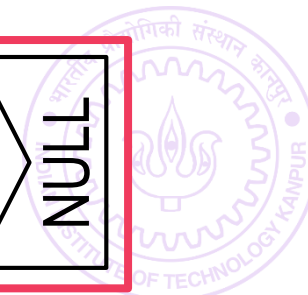
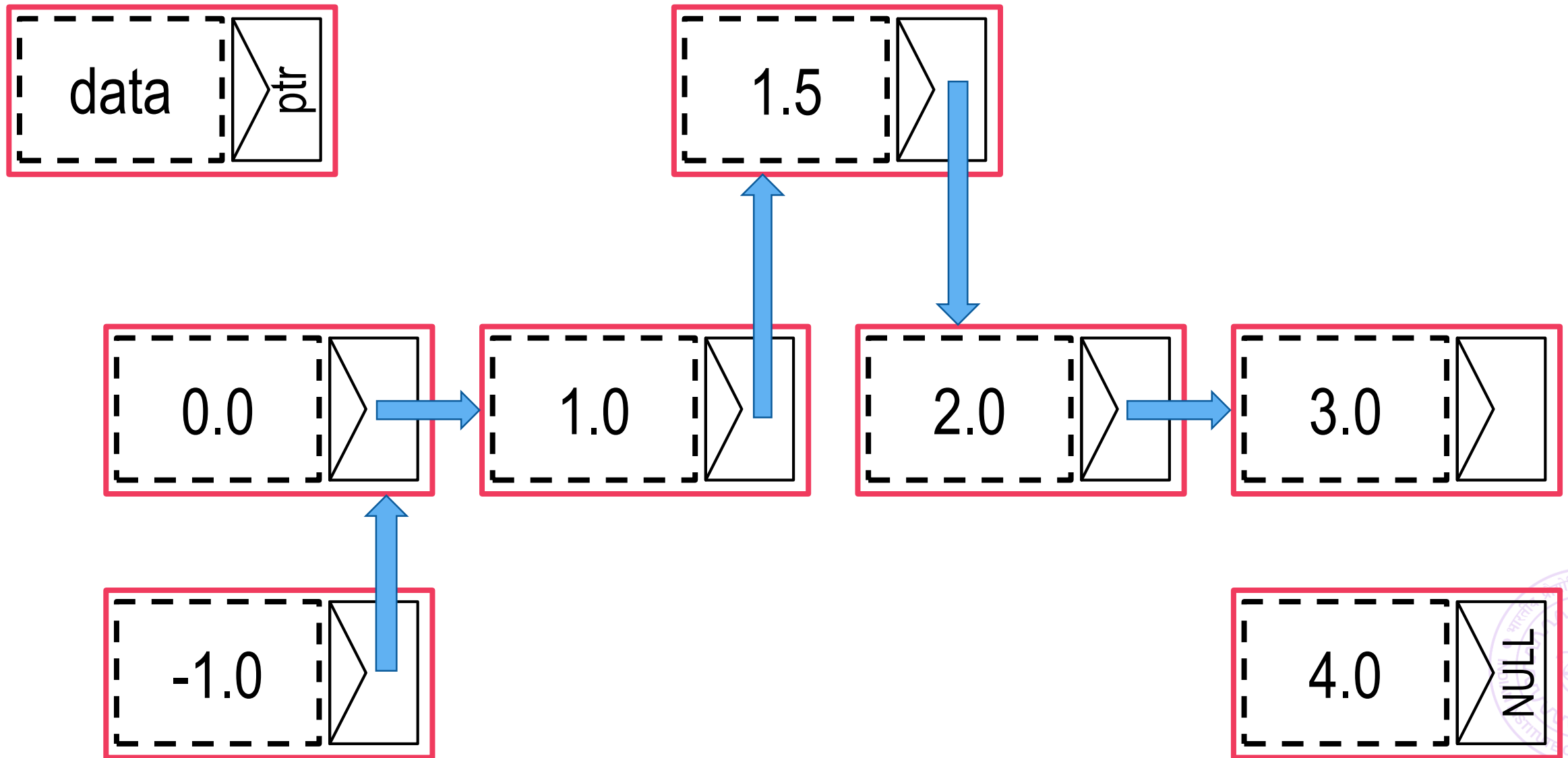
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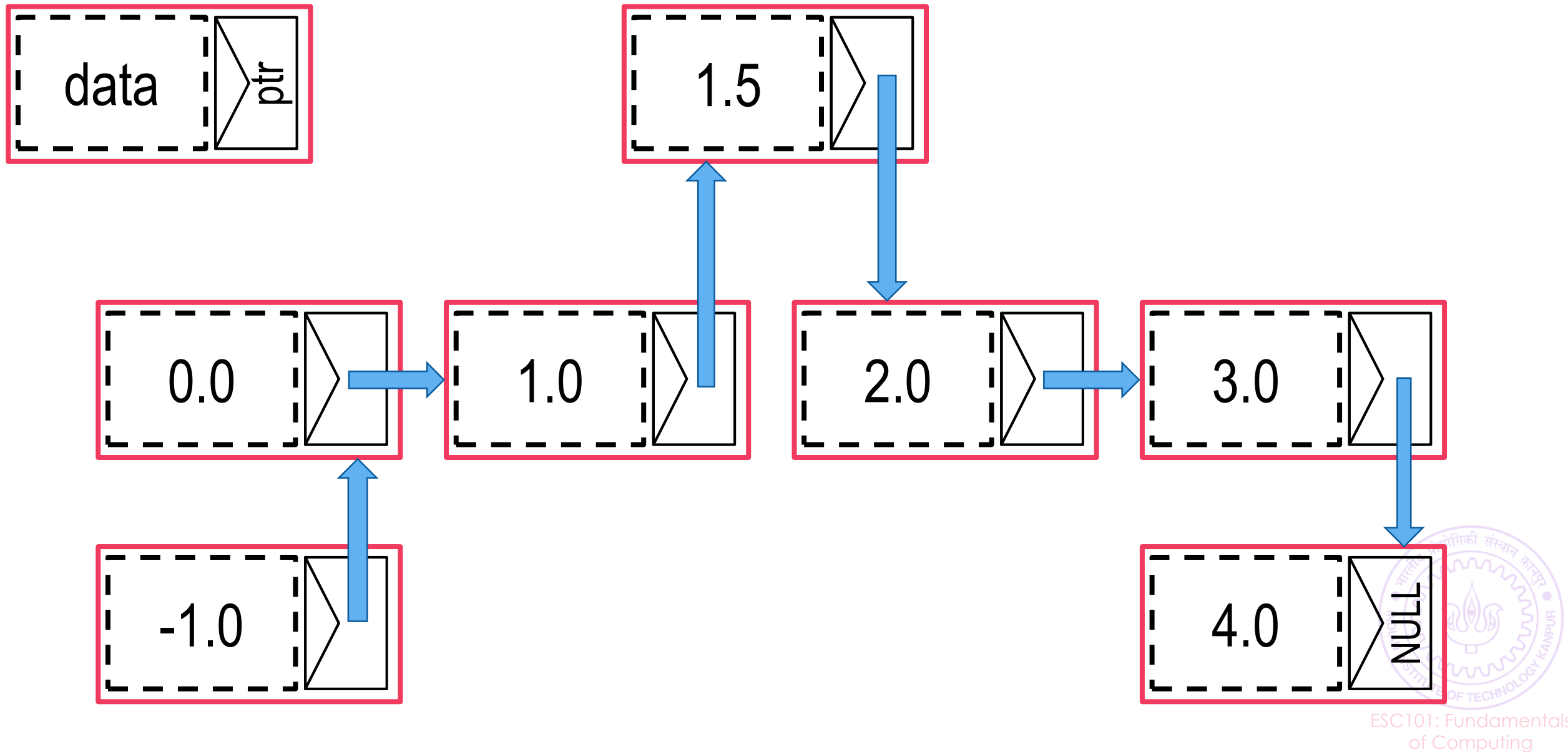
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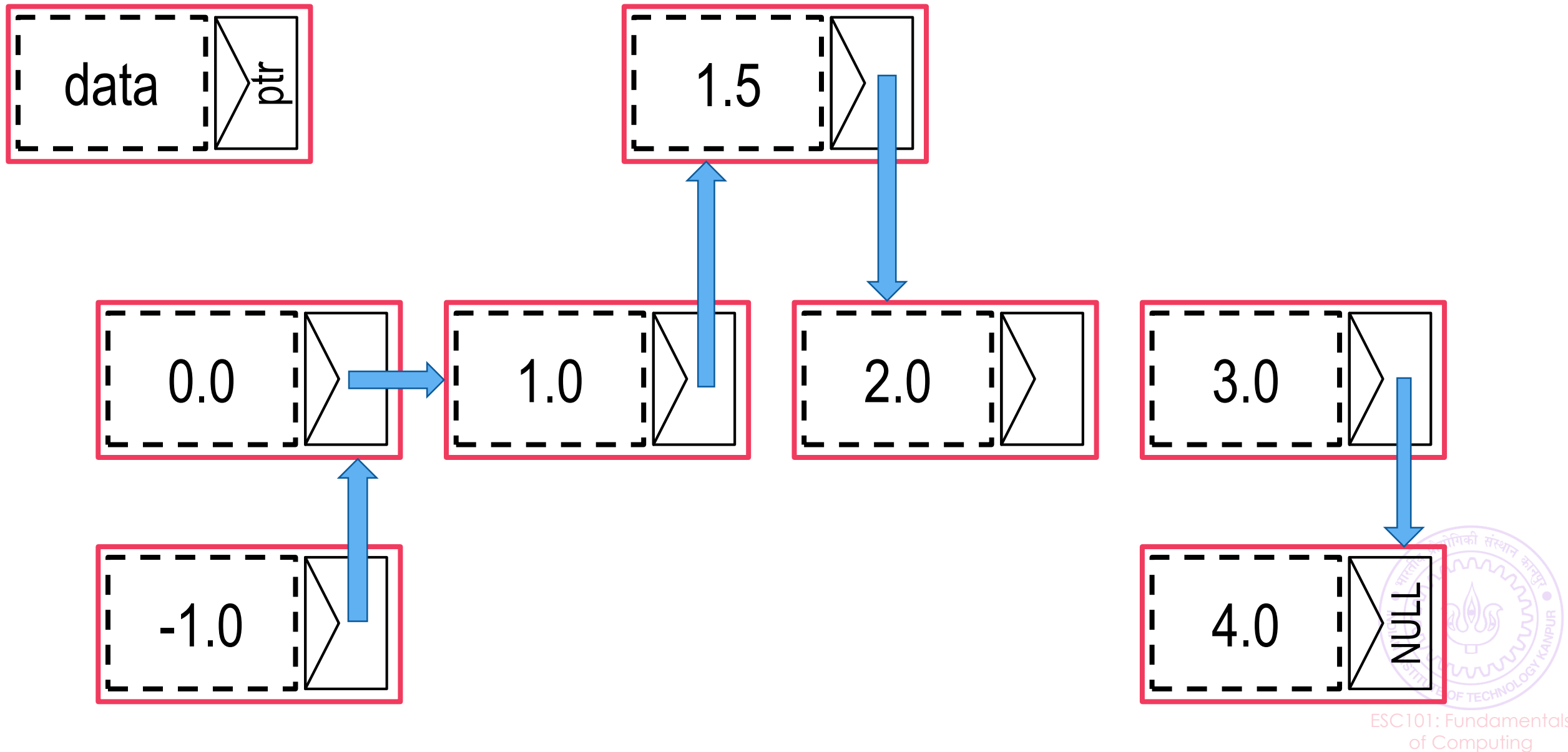
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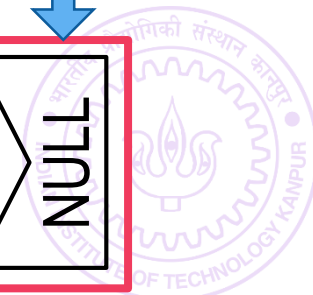
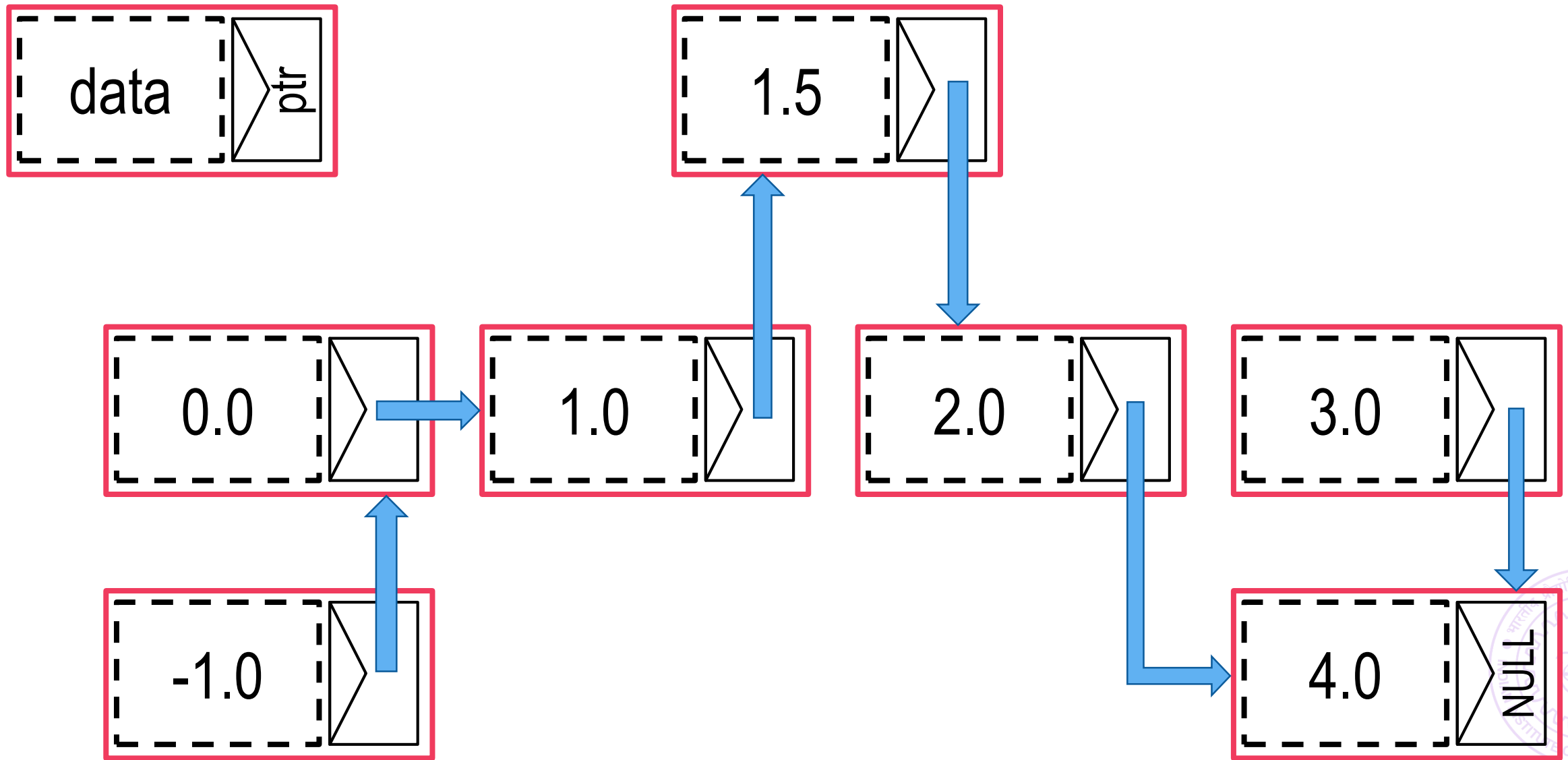
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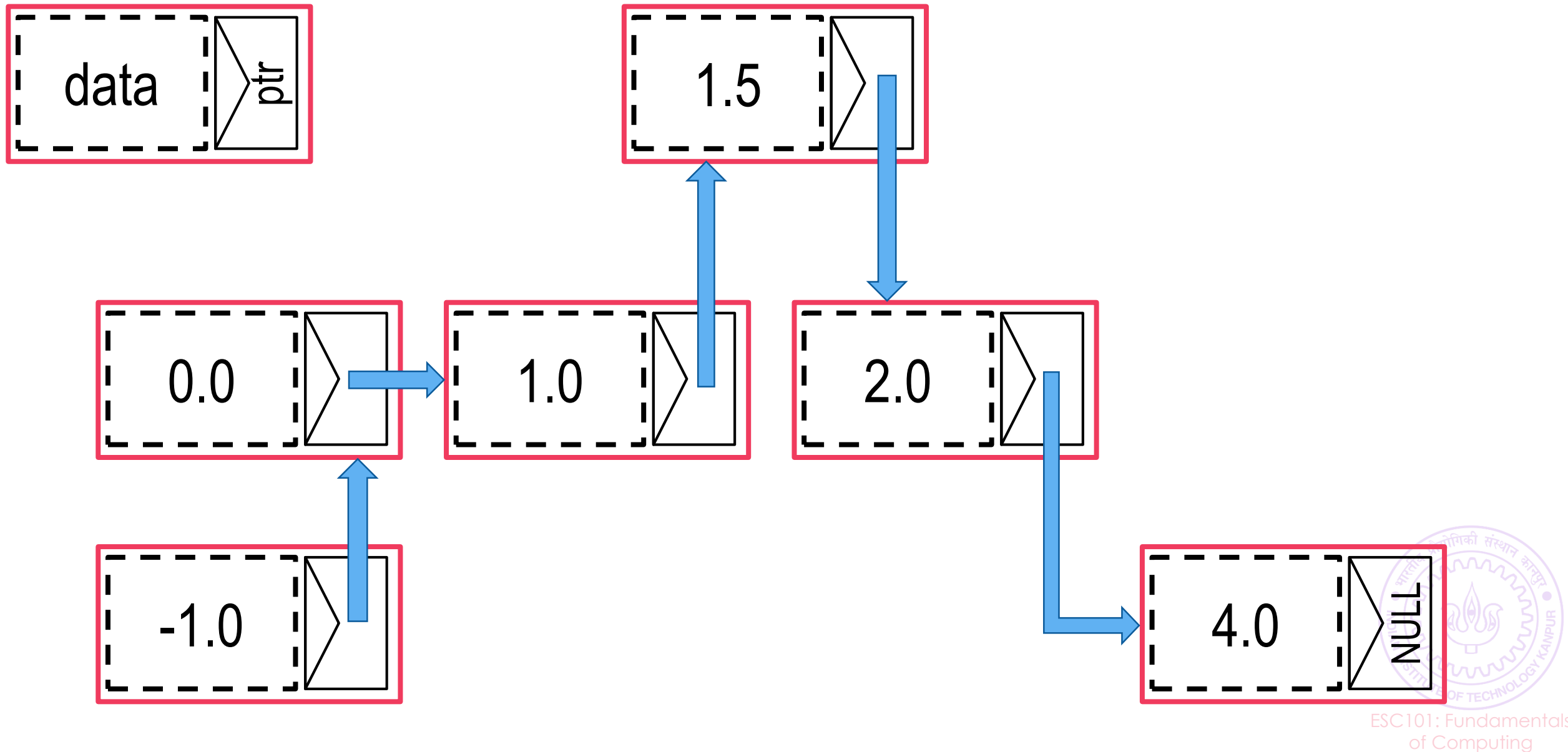
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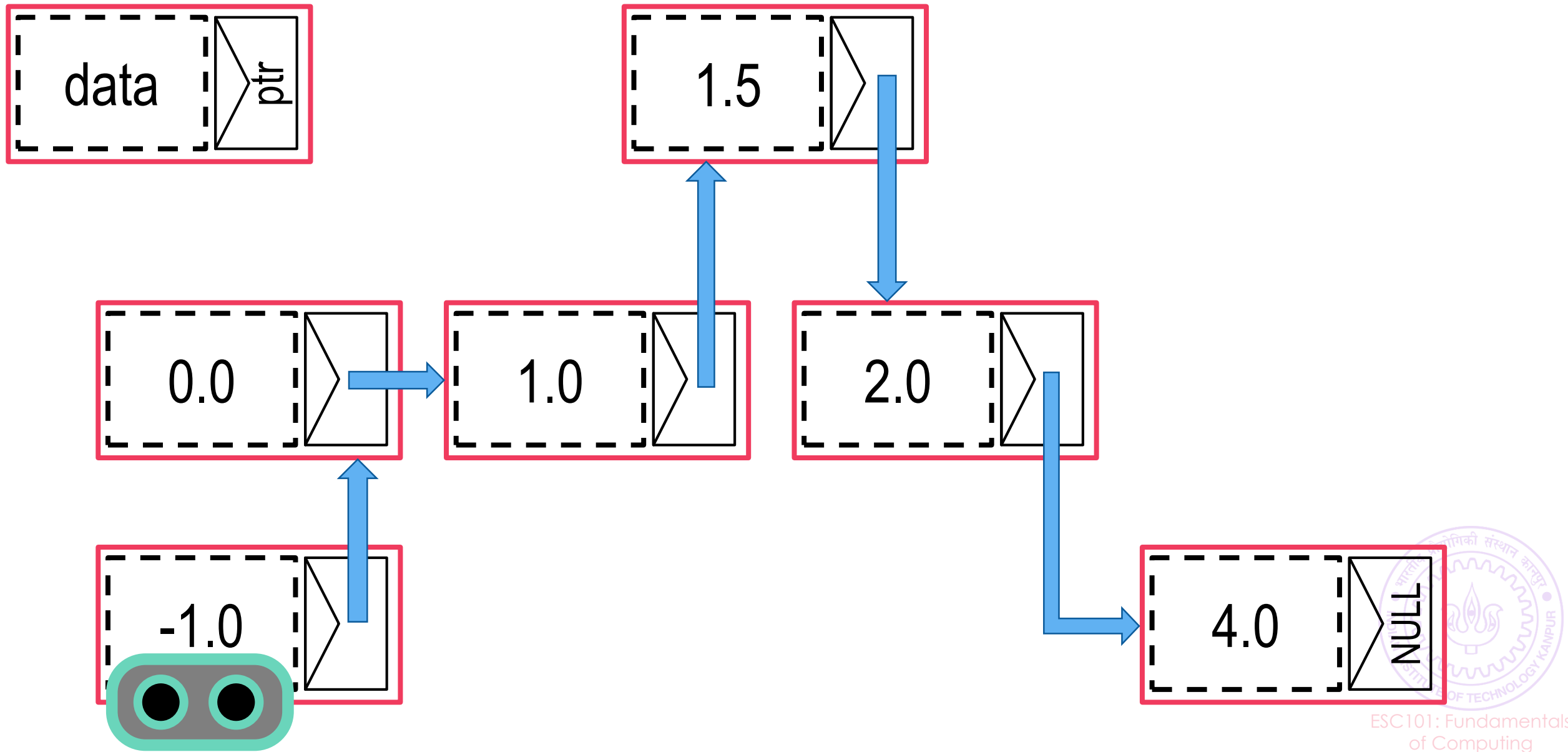
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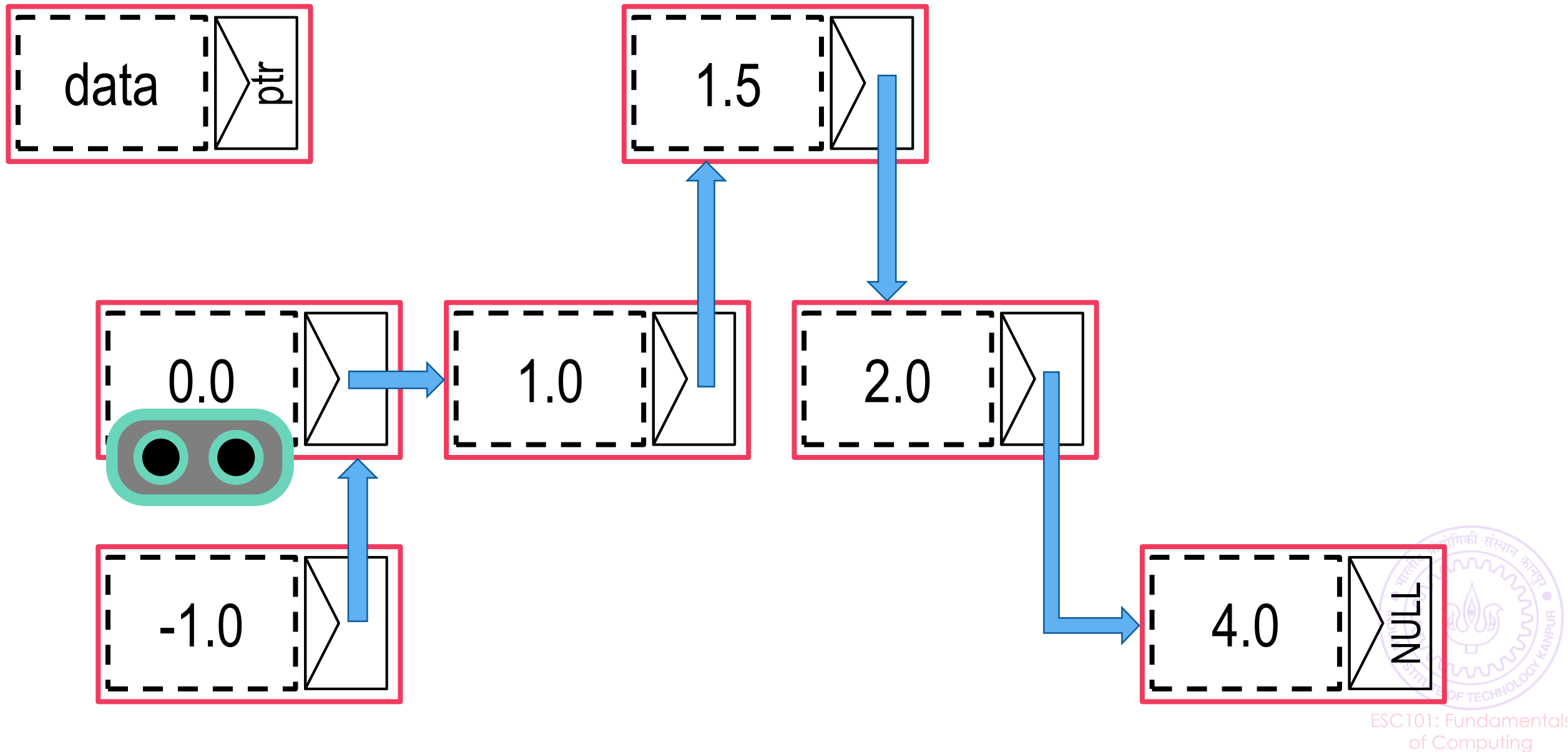
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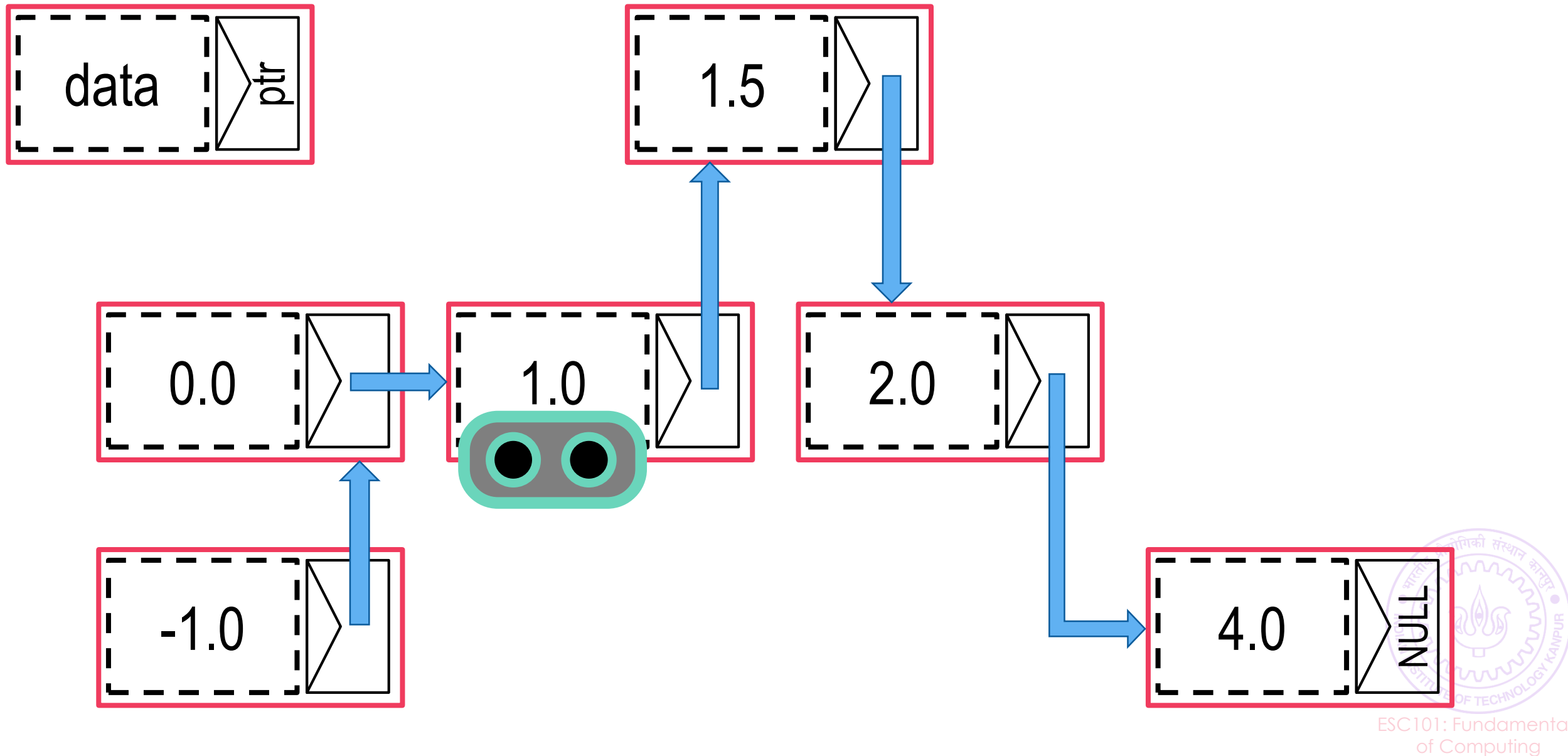
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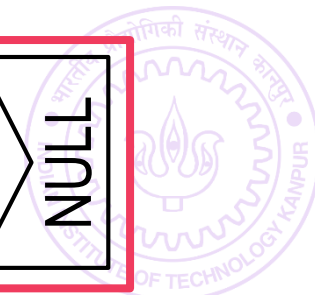
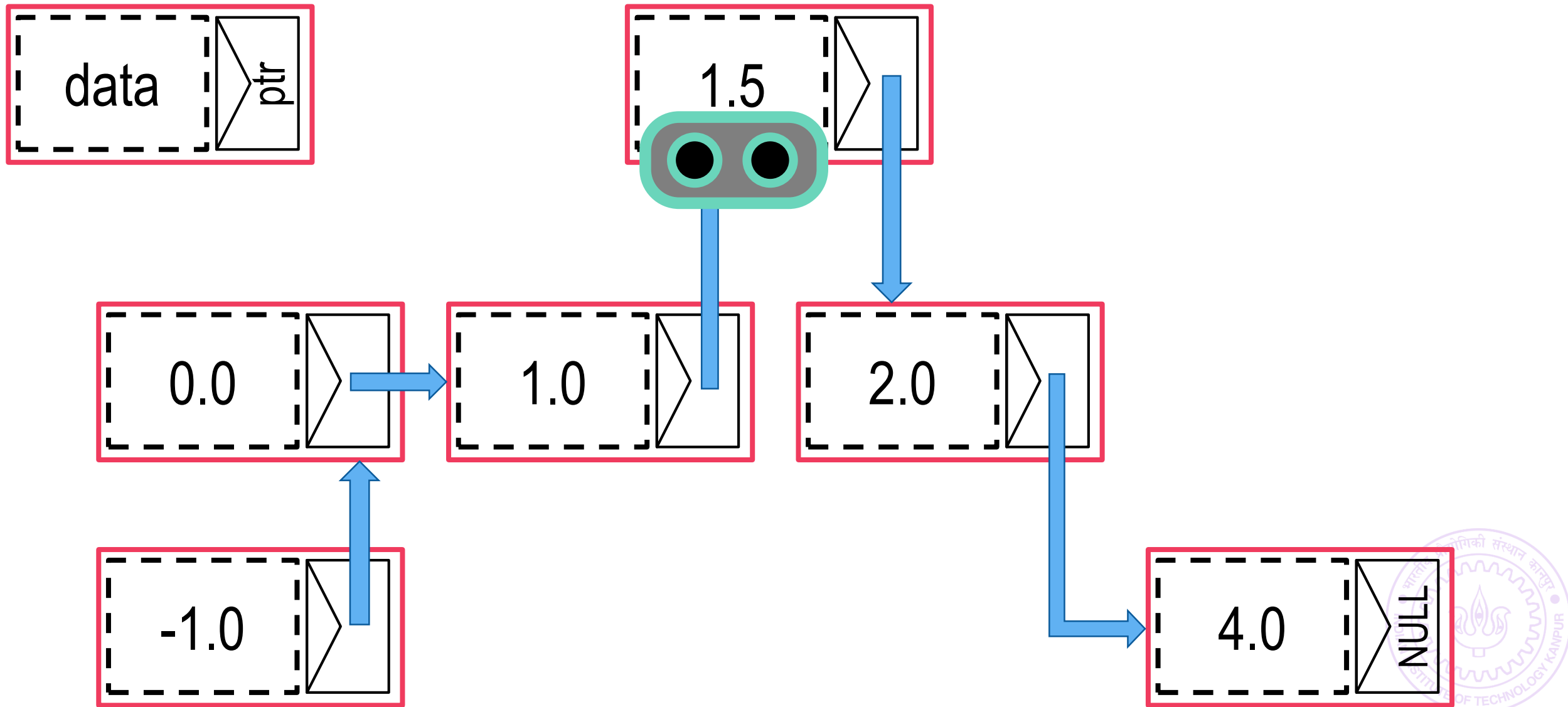
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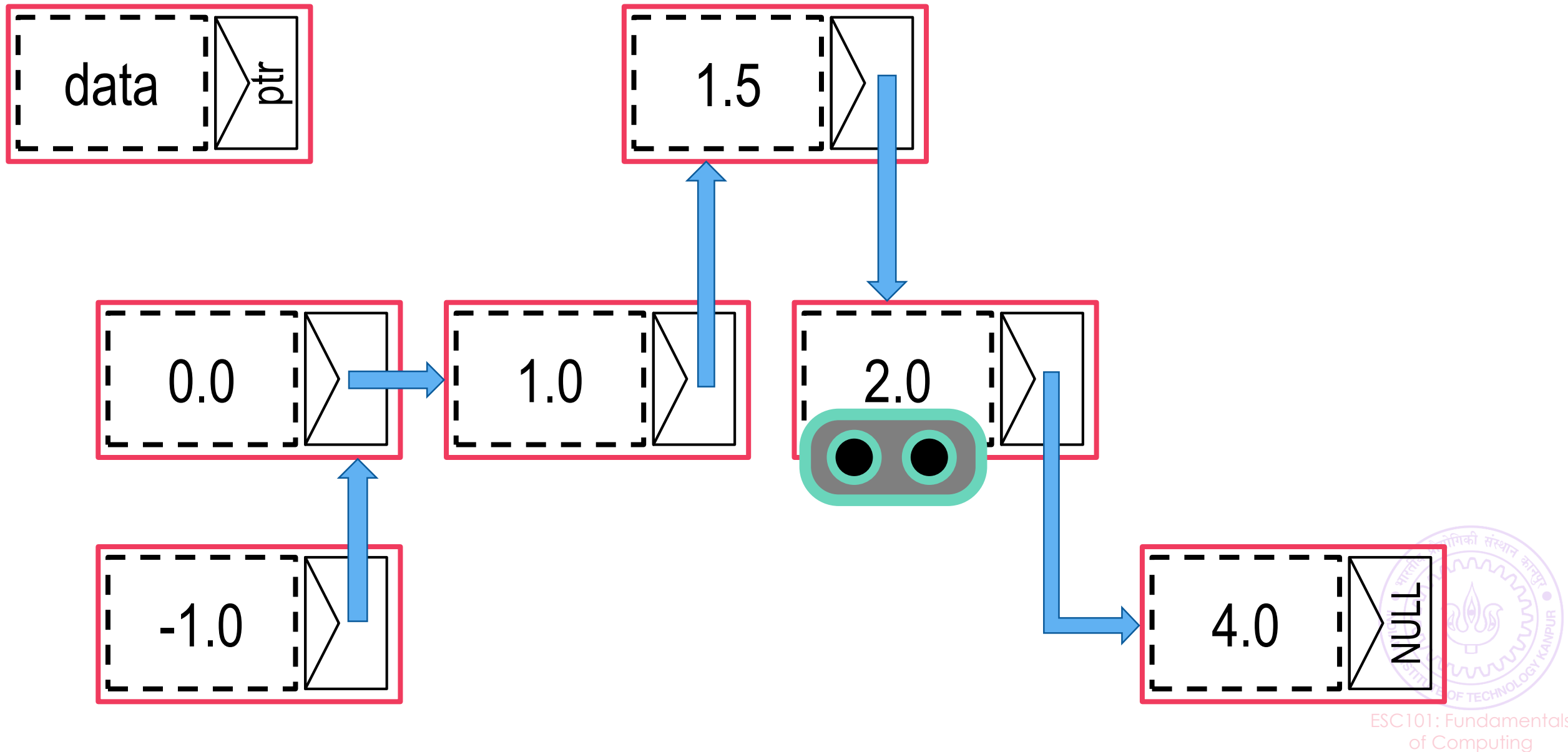
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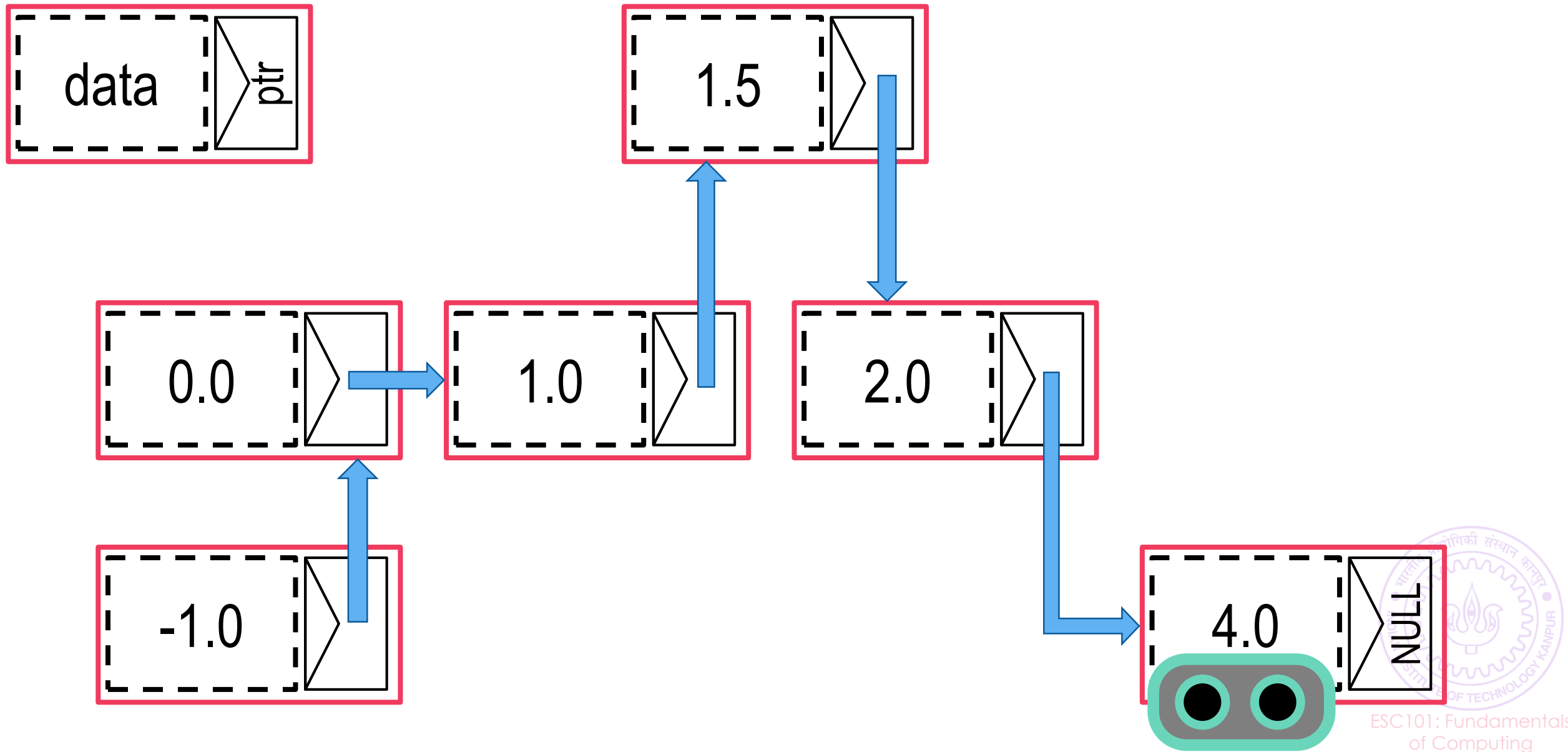
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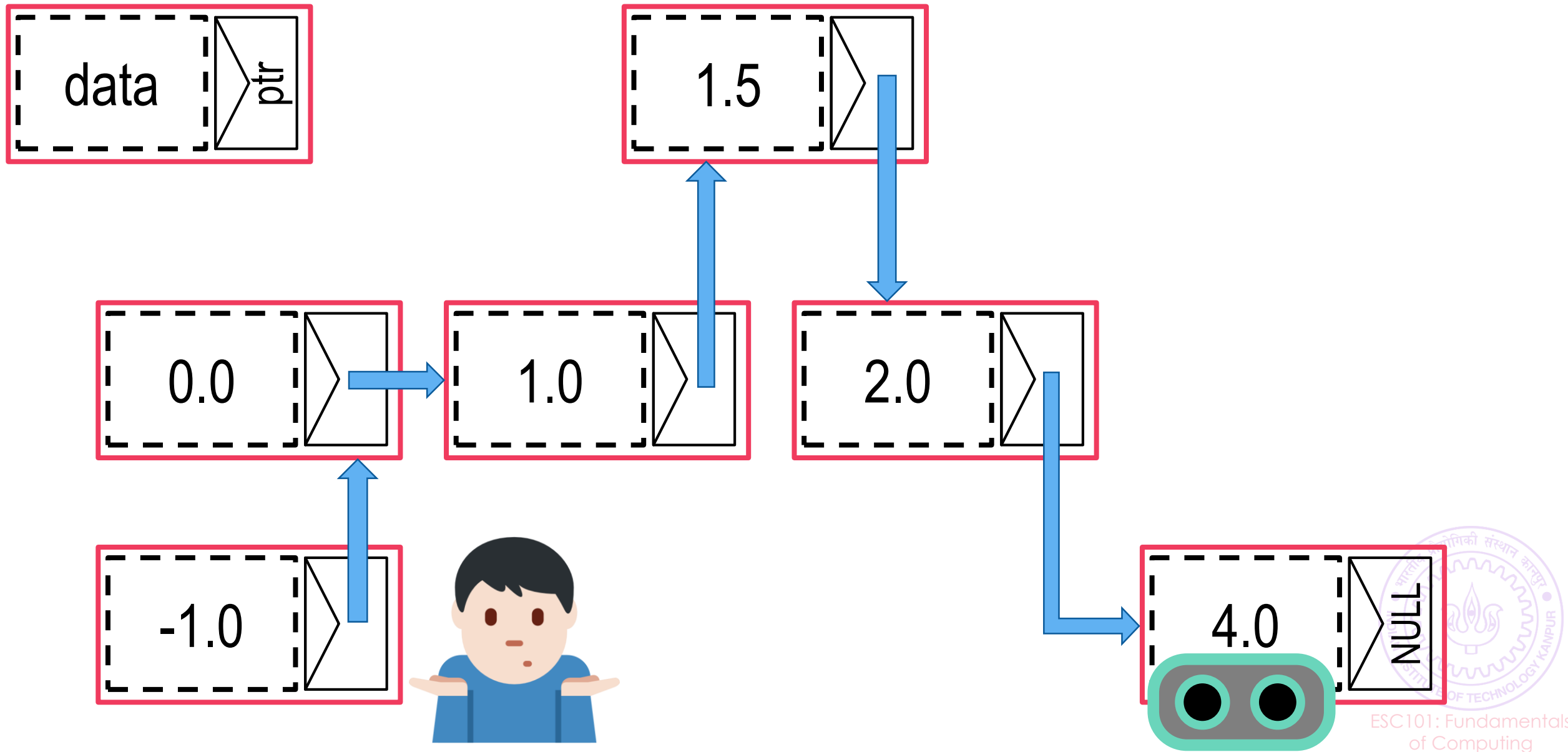
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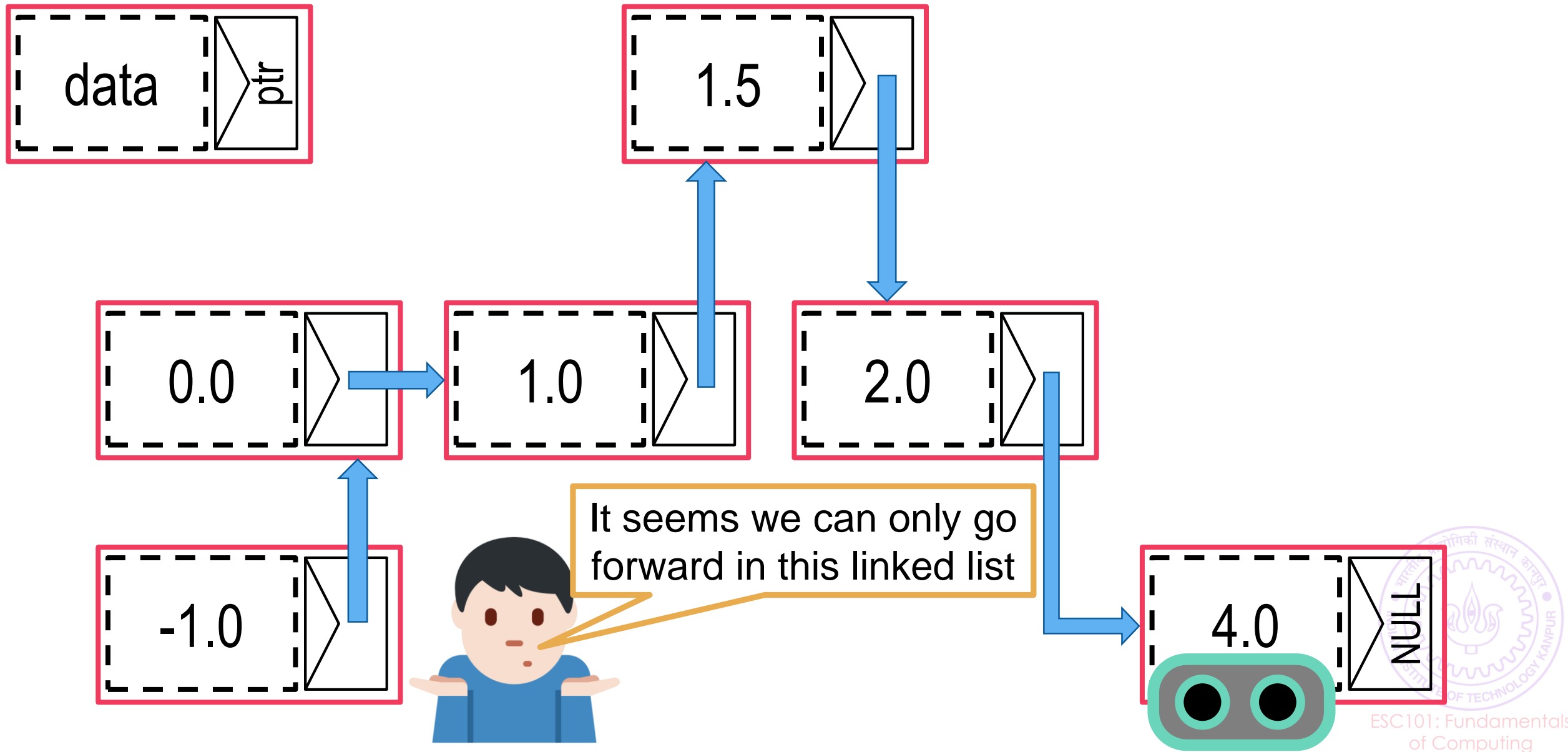
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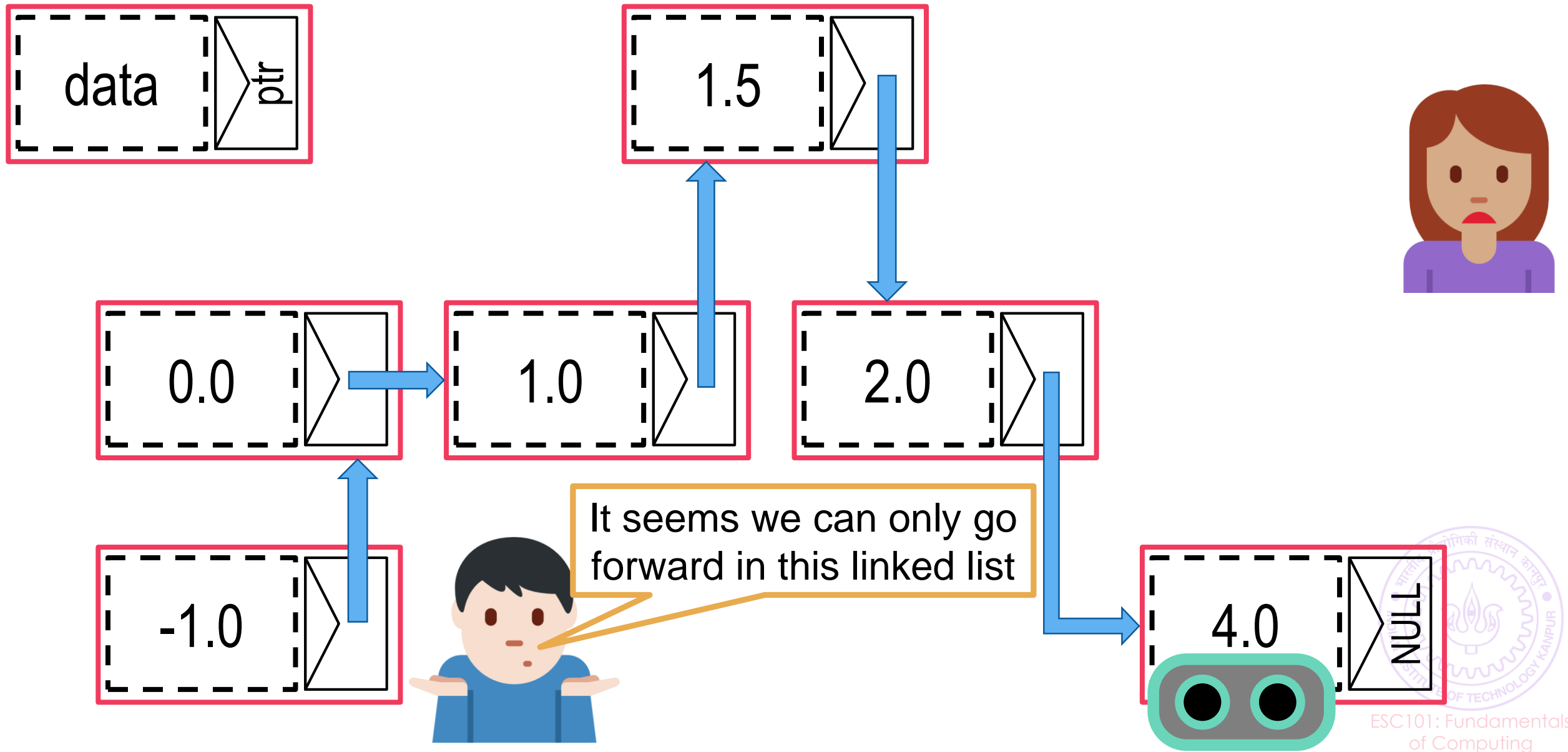
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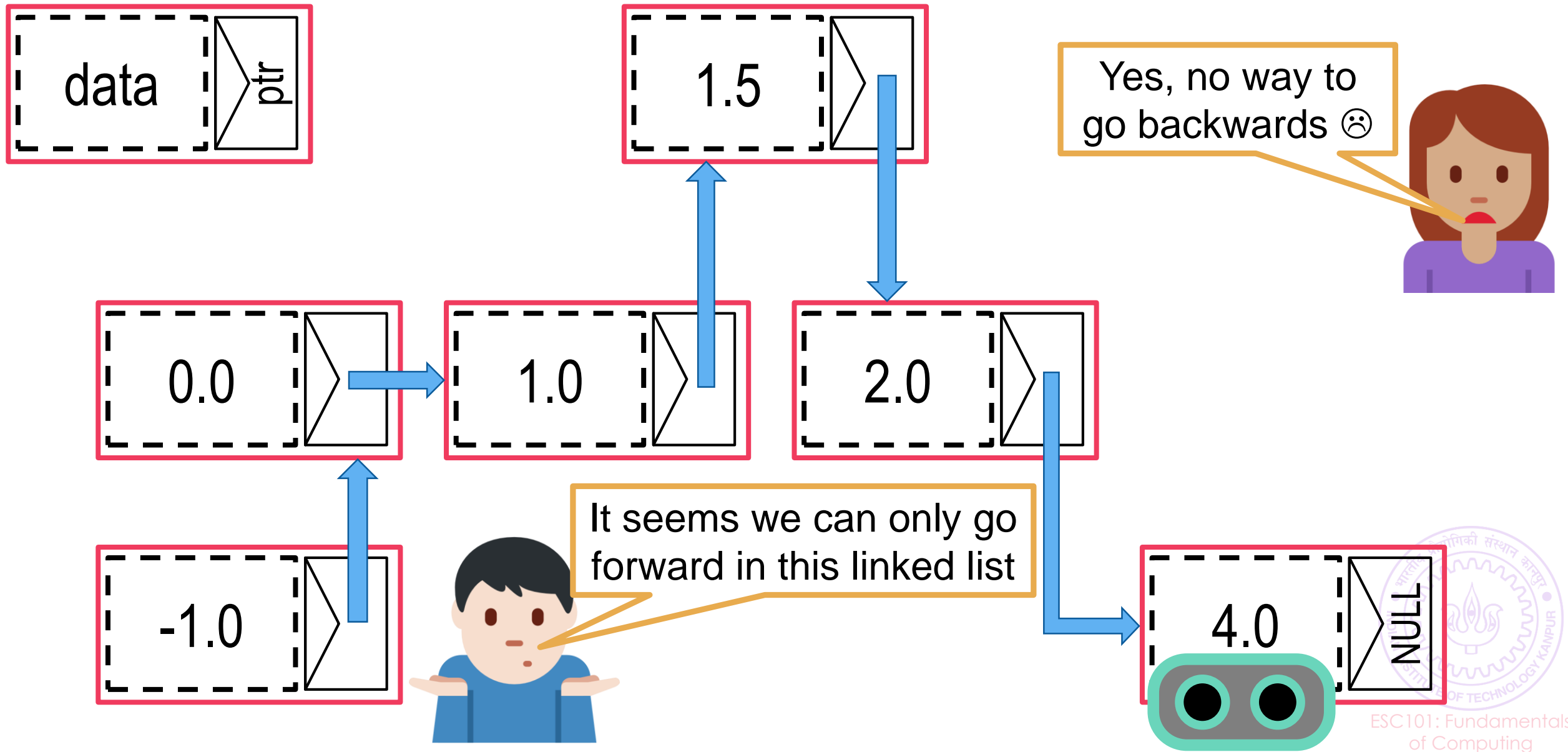
A Cartoon of Linked Lists

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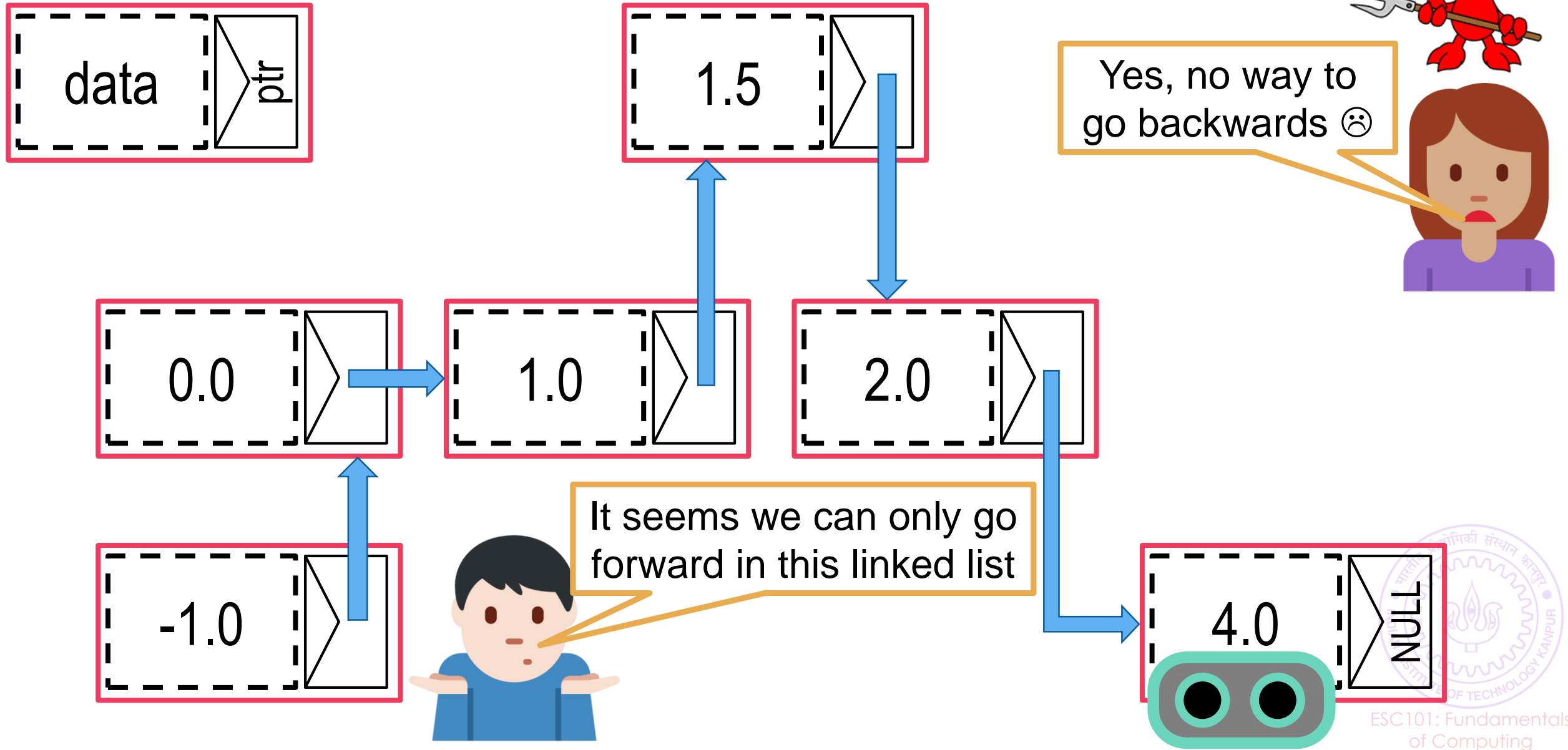


A Cartoon of Linked Lists

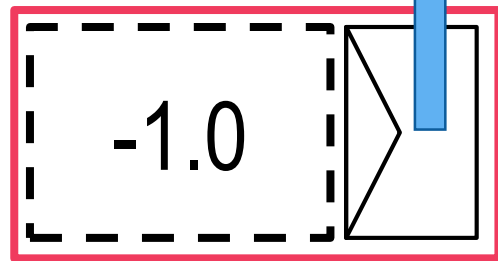
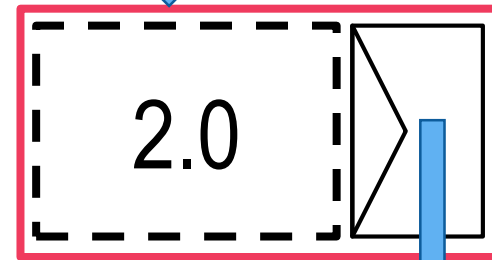
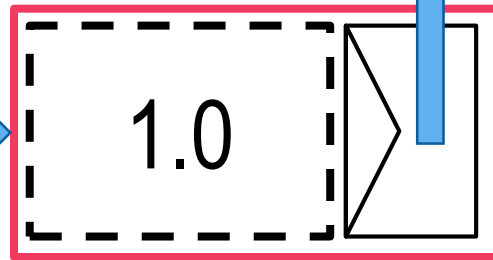
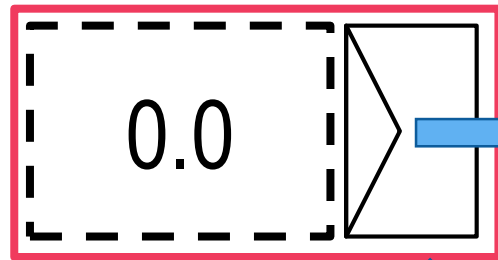
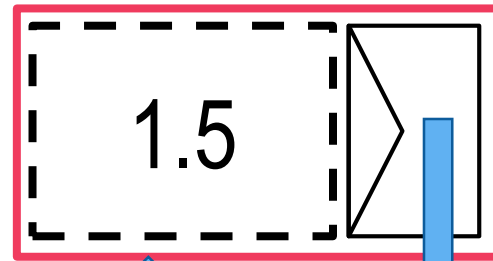
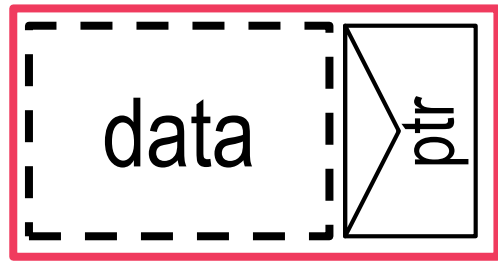
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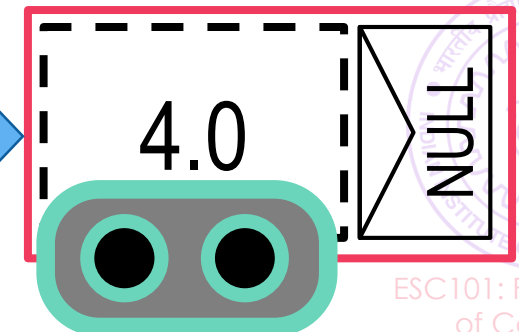
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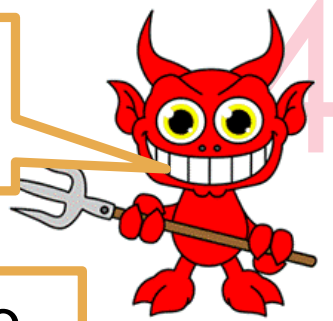
A Cartoon of Linked Lists



It seems we can only go forward in this linked list



Fear not – a simple solution



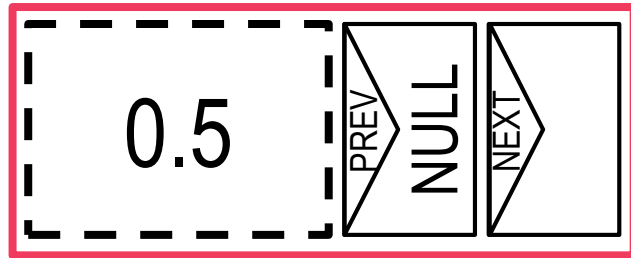
Yes, no way to go backwards ☹️



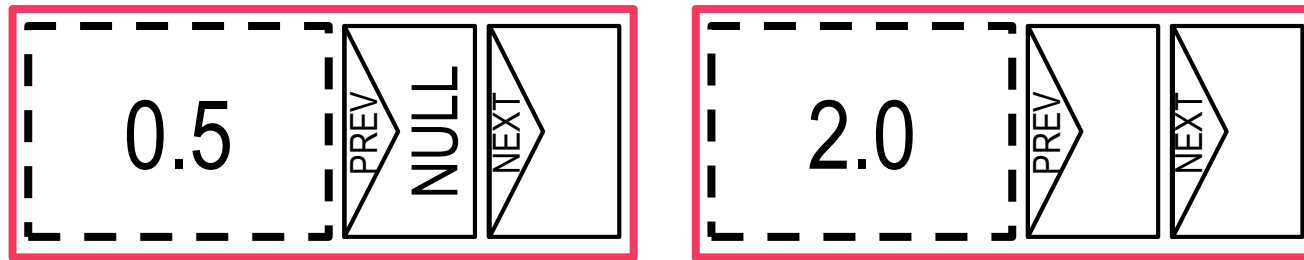
Doubly Linked Lists



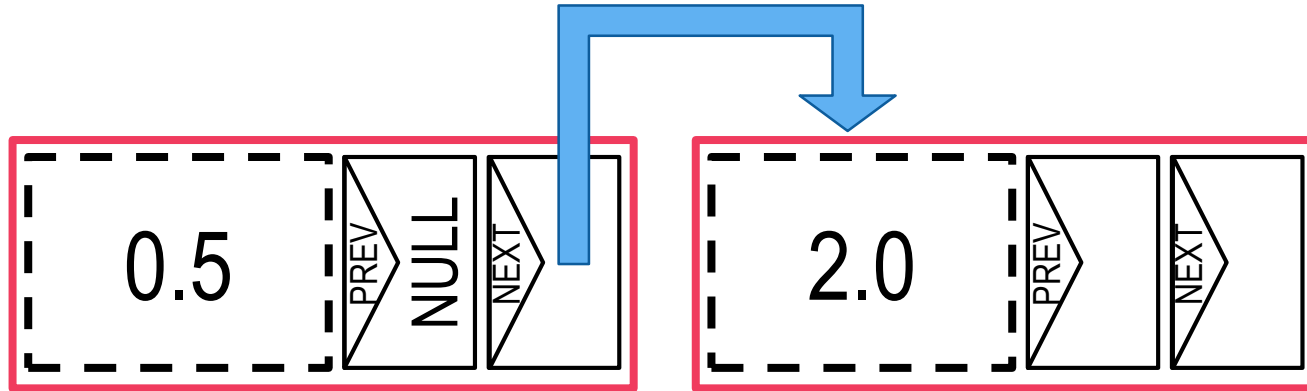
Doubly Linked Lists



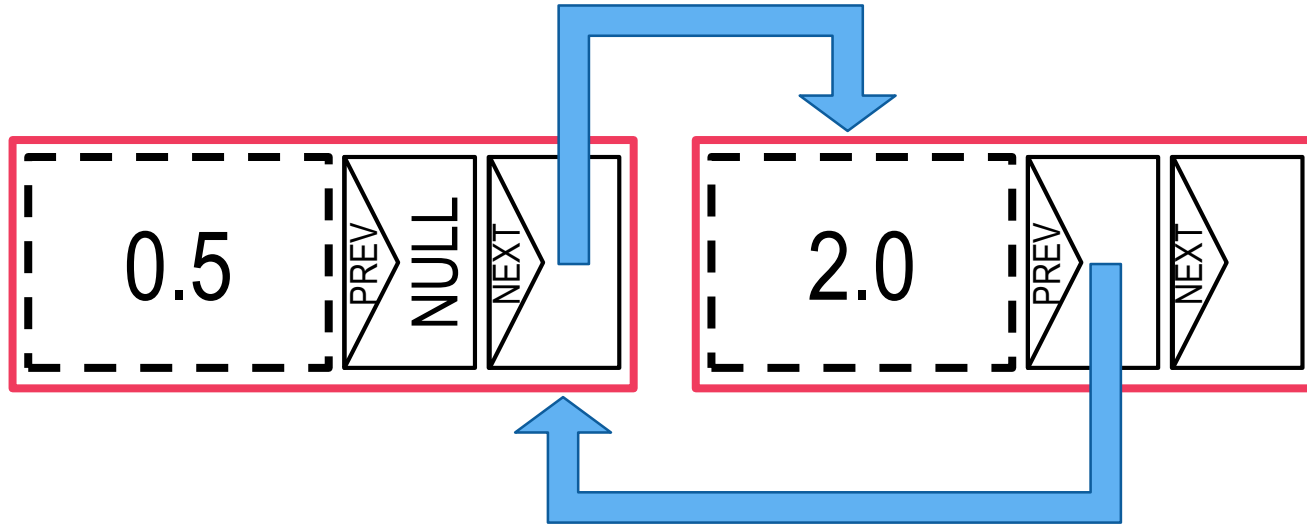
Doubly Linked Lists



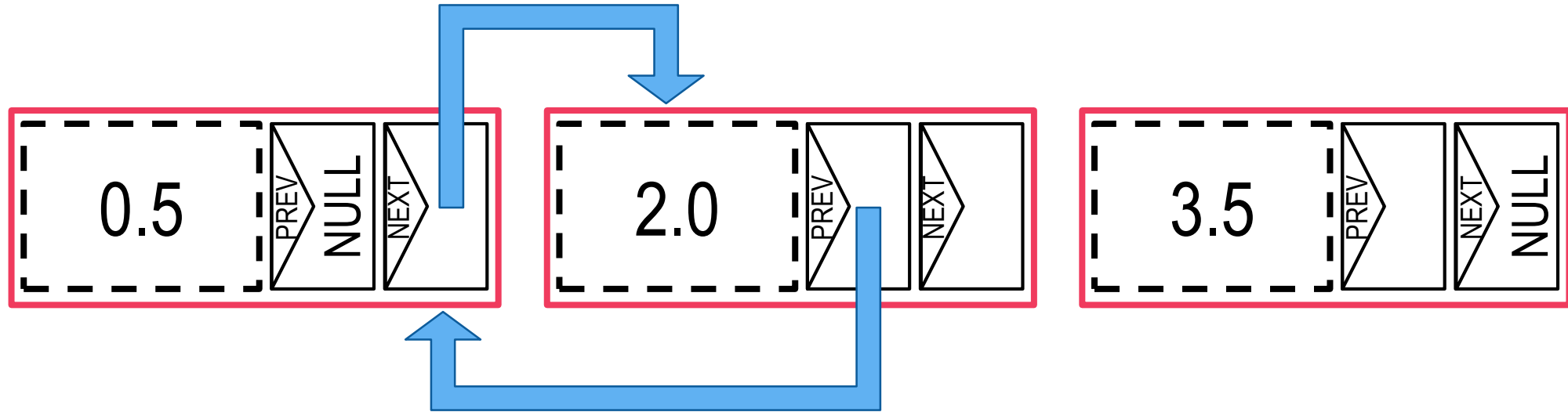
Doubly Linked Lists



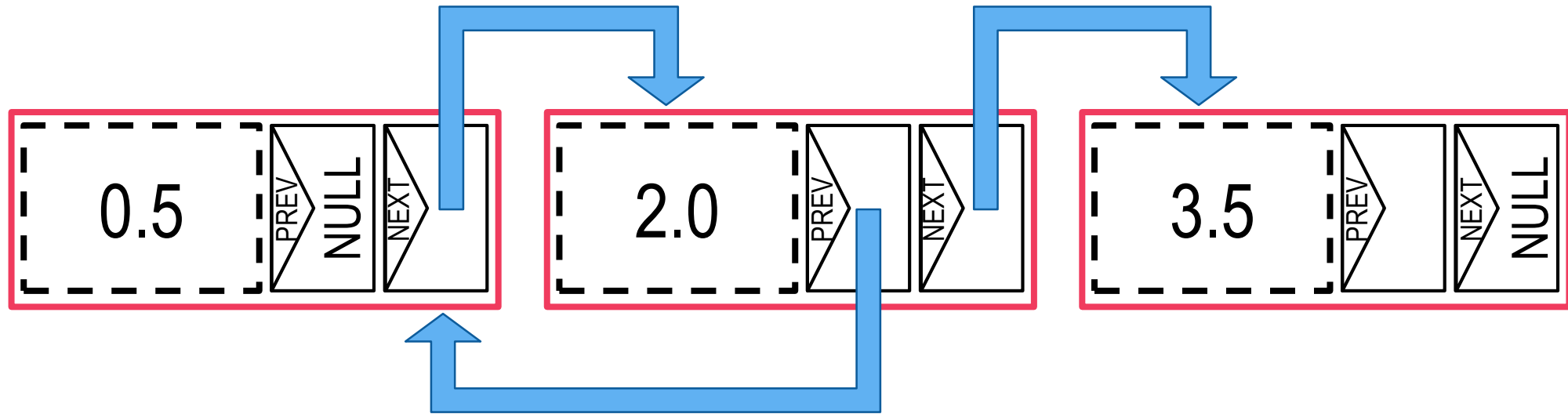
Doubly Linked Lists



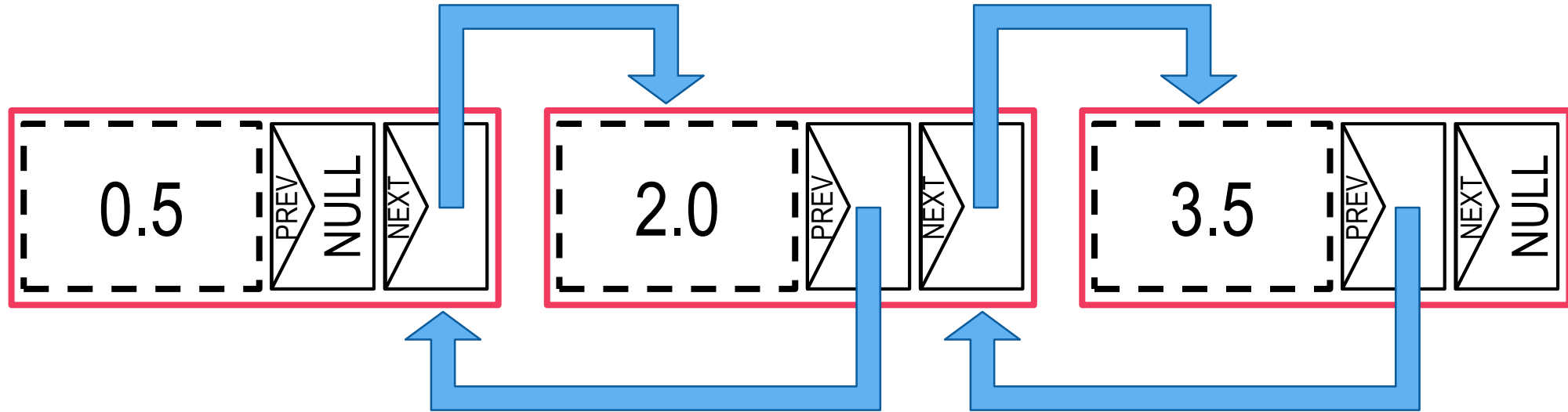
Doubly Linked Lists



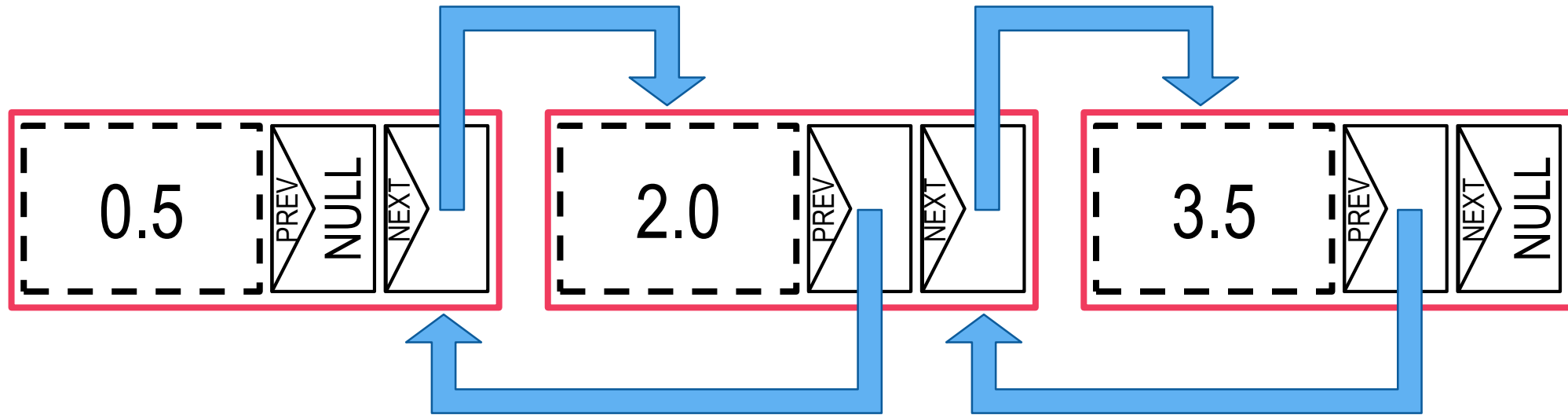
Doubly Linked Lists



Doubly Linked Lists



Doubly Linked Lists



Doubly Linked Lists

Allows traversal both ways.
However more code needed

