Introduction To Data Structures

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Data

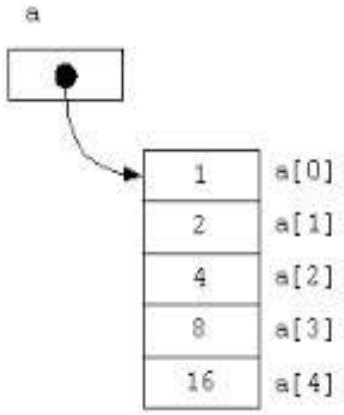
- Atomic Data
  - Single piece of information
  - For example salary : 2,00,000.
- Composite Data
  - Can be divided meaningfully
  - For example telephone no : 1-022-2887612
  - country code, area code, exchange no

Data Structure

- Logical way of Organizing Data which considers data as well as their relationship
- Two basic data structures are
  - Array
  - Link List

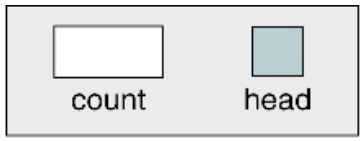
Array

- Properties
  - Homogeneous Data
  - Fixed Size
  - No Deletion
  - Sequential storage
  - Indexed Access
  - Single or multi-dimensional
  - Static memory allocation

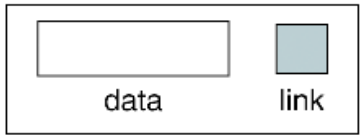


Link List

- Properties
  - No Fixed Size
  - Locations allocated dynamically
  - Shrinks or expands
- Basic Operations
  - Insertion
  - Searching
  - Retrieval
  - Deletion
  - Traversal



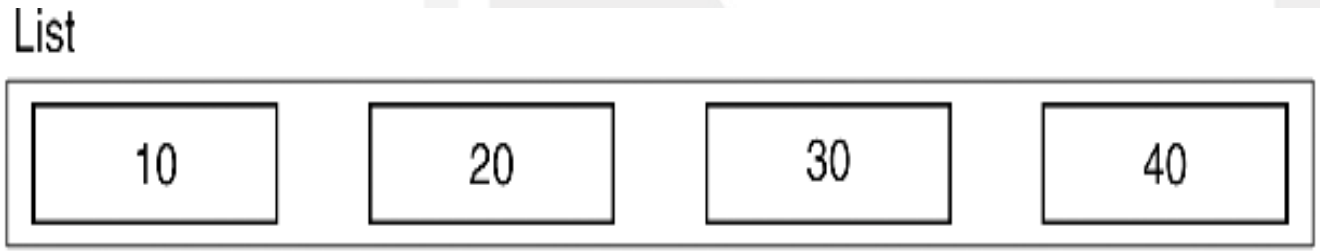
(a) Head structure



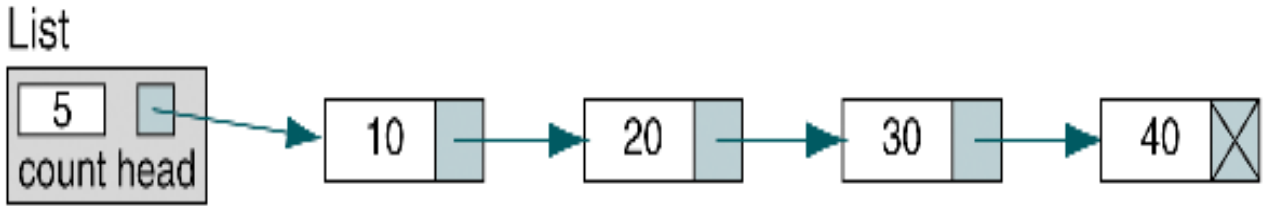
(b) Data node structure

```
list
  count
  head
end list

node
  data
  link
end node
```



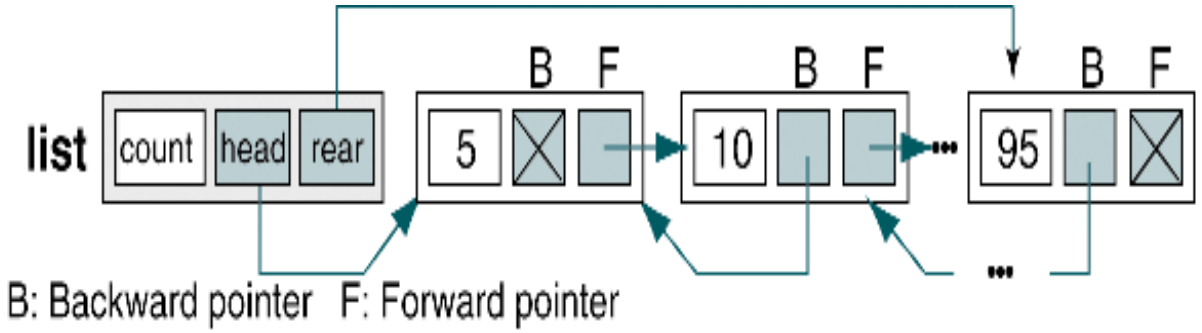
(a) Conceptual view of a list



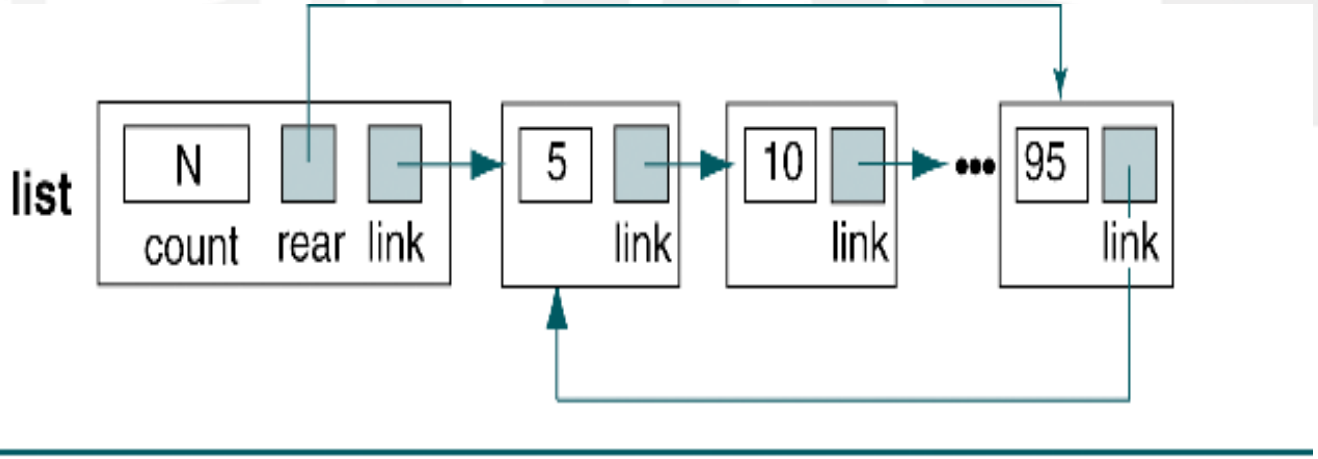
(b) Linked list implementation

Types

- Doubly Link List
  - Pointer to successor and predecessor



- Circular Link List
  - Last Node points to first node



Data Structures

- Stack
- Queue
- Tree
- Graph

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