

Linked List

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(One-way Linked List-Insertion and Deletion)

Insertion into a Linked List

1. Insertion at the beginning of the list
2. Insertion before a given node
3. Insertion of a node with a given location
4. Insertion into a sorted list.

Insertion at the beginning of the list

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1. Set Info[New] := Item
2. Set Link[New] := Start
3. Set Start := New.
4. Return

Insertion before a given node

Insert_Before_Node(Info, Link, Start, Item, Given_Item)

1. Set Info[New] := Item
2. If Info[Start] = Given_Item then
3. Link[New] := Start and Start := New and Return.
4. Set Save := Start and PTR := Link[Start]
5. While PTR ≠ NULL and Info[PTR] ≠ Given_Item do step 6
6. Save := PTR and PTR := Link[PTR]
7. If PTR = NULL then Write: “Given Item is not in the List ” and Return.
8. Link[New] := PTR or Link[Save] := New.
9. Return

Insertion with a given location

Insert_In_LOC(Info, Link, Start, Item, LOC)

1. Set Info[New] := Item
2. If LOC=1 then Link[New] := Start and Start := New and Return.
3. Set Save := Start and PTR := Link[Start] and Count := 1.
4. While PTR \neq NULL and Count+1 \neq LOC do step 5
5. Save := PTR and PTR := Link[PTR] and Count := Count+1.
6. Link[New] := PTR and Link[Save] := New.
7. Return

Insertion into a Sorted List

Insert_Sorted_List_(Info, Link, Start, Item, LOC)

1. Set Info[New] := Item
2. If Item < Info[Start] then Link[New] := Start and Start := New and Return.
3. Set Save := Start and PTR := Link[Start].
4. While PTR ≠ NULL do steps 5 and 6.
5. If Item > Info[PTR] then Save := PTR and PTR := Link[PTR].
6. If Item ≤ Info[PTR] then Link[New] := PTR and Link[Save] := New and Return
7. If PTR = NULL then Link[New] := PTR and Link[Save] := New.
8. Return

Deletion From a One-Way Linked List

1. Deletion of the first node
1. Deletion of a node with a given location
2. Deletion of a node with given value

Deletion of First Node

Suppose we want to delete the first node N from the one way list.

Delete_First(Info, Link, Start)

1. If $Start = NULL$ then Return
2. Set $Start := Link[Start]$
3. Return

Deletion of a Node with Given Location

Suppose we want to delete a node N with location N from the list.

Delete_Node_LOC(Info, Link, Start, LOC)

1. If $LOC = 1$ then $Start := Link[Start]$ and Return.
2. Set $Save := Start$ and $PTR := Link[Start]$ and $Count := 1$
3. While $PTR \neq NULL$ and $Count + 1 \neq LOC$ do step 4
4. $Save := PTR$ and $PTR := Link[PTR]$ and $Count := Count + 1$.
5. If $PTR = NULL$ then Write: "Location not found" and Return.
6. Set $Save := Link[PTR]$
7. Return.

Deletion of a Node with Given Value

Suppose we want to delete a node N with a given value from the list.

Delete_Node_Value(Info, Link, Start, Item)

1. If $\text{Item} = \text{Info}[\text{Start}]$ then $\text{Start} := \text{Link}[\text{Start}]$ and Return.
2. Set $\text{Save} := \text{Start}$ and $\text{PTR} := \text{Link}[\text{Start}]$.
3. While $\text{PTR} \neq \text{NULL}$ and $\text{Info}[\text{PTR}] \neq \text{Item}$ do step 4
4. $\text{Save} := \text{PTR}$ and $\text{PTR} := \text{Link}[\text{PTR}]$.
5. If $\text{PTR} = \text{NULL}$ then Write: "Item not in the List" and Return.
6. Set $\text{Link}[\text{Save}] := \text{Link}[\text{PTR}]$
7. Return.

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