Linked Lists

A linked list in a sequence of data stoructures, which age connected together via links. Linked list is the second most-wed data structure after array.

Important terms in Linked List:

19nk: Each link of a linked list can store a data called an element.

Next: Each link of a linked list contains a link to the next link called Next.

Linked List Reportsentation:

Linked list can be visualized as a chash of noden.

A linked list is represented by a pointer to the linked list. The first node of the linked list. The first node is called the head. If the linked list is empty, then the value of the head is NULL.

Each node consist at least two pasts.

(9) data (8) Pointea.

We can reporteent a node using storucturen.

ens stauct node

A ne B ne C ne D ne >NU

Int data; struct node* next;

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Typer of Linked List:The various types of denked list are

(1) Single Linked list - Item navigation is forward only.
(3) Doubly Linked list - Items can be navigated forward and backward.

(900) Cincular Linked list - Last item contains link to the first element has a link to the last element.

Baic Obstations:

Insertion : Adds an element at the beginning of the list Deletion: Deleter an element at the beginning of the list

Display: Displays the complete list.

Search: Searcher an element uping the given key.

Delete: Deleter an element using the given key.

Why Linked List:

Asprays can be used to store linear data of similary types. But aways have the following limitations,

(8) The size of the away is fixed.

(Inserting a new element on an away of elemento 95 expensive.

Drawbacks of single Linked List:

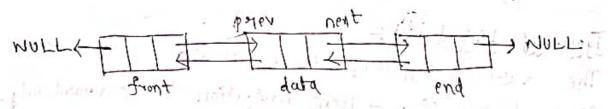
(4) Random access in not allowed. We have to access elements sequentially.

(ii) We can not do binary search with linked lists effectiontly.

memory P rtx → (979) space of restring problem.

Doubly Linked List:

In doubly Linked list each node hop two links, The first points to the previous node and second link points to the next hode. The first node of the list hay 9ths previous link putting to NULL. The last node of the list has its nent link putting to NULL.



The two lanks helps up to to to the list in both backward and forward disjection.

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Basic Openations:

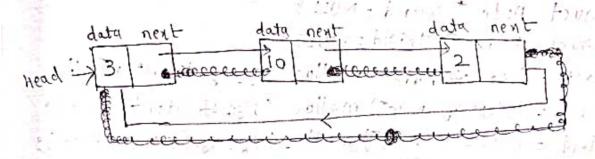
add-front: Ardds a new node in the beginning of the list.

add-95tery: Addr a new node after another node add-before: Adds a new node before another node. add-end: Adds new node in the end of the list. delete: Remover the node.

forward-torqueouse: Torqueouse the list in forward direction backward-traverse: Torqueouse the list in backward direction

Cioncular Linked Lists

Circular linked list is a little more complicated linked data structure. In the circular linked list we can insert elements any where in the list. In the circular linked list the previous element stores the address of the next element and the last element stores the address of the starting element.



Applications:-

() It is used in own personal computers, where multiple applications running.

(8) Multiplayed Games Plke Ludo.

Implement affin:

In circular linked list the last node will have it's next point to the Head of the list.

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whi Dozaw backs of Single Linked List: (9) We can navigate only in forward direction. & Searching it very difficult. (Ph) We require extra memory for pointer. prints you Random access is very difficult Single Linked List Longrame: Doubly or # include x stdio. h> #findude ~ #include , #Include < stalib.h> stauct no struct node Int data: 1 ont dat struct node neut? stauct storuct void main() 3% void me stayet node + first = NULL; 1 struct node * second = NULL > stauct Stayed node " Third = NULLs stauct first = (stauct node*) malloc (size of (stauct node))= stauct second = (staruet node*) malloc (size of (staruet node)): of (short truct) to size) sollow (short truct node) = breakt tirit second first >data=10; thing Eponose + trest 72825 second - data = 200 fiss+ second - next = thrade first third -> data =30% 10192 thraid - next = NULL stault node + temps temp = first ; prints (" flements of Linked List are In'); exeluited) be respet dut of The boston winer Alter onlyit

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  prints (" No elements to be displayed in Linked Listing)
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Doubly Linked List Lyogrames.
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Hindlyde Lstdliboh>
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Int datas
  storget node + parevo
 storuct node next?
  3%
 void main ()
 2.
 stauct node + first = NULLS
  stauct node * second = NULLS
  stauct node - third = NULL;
   figst = (stauct node") malloc (sizeof (stauct node))=
   second = (staruct node") malloc (starut node)) y
   thind = (struct node) malloc (struct node));
   EPAST - PARU = NULLS
   first -) dat a =100
   CVard & PuoDes = Tran + Fresh
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    second - data = 20;
    second - nent = thing d- parv=
    thend -> prev = recond > nent;
    thord of data=30%
    thind - next = NULL;
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