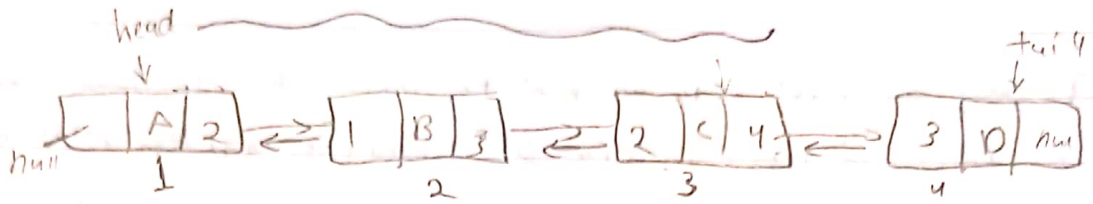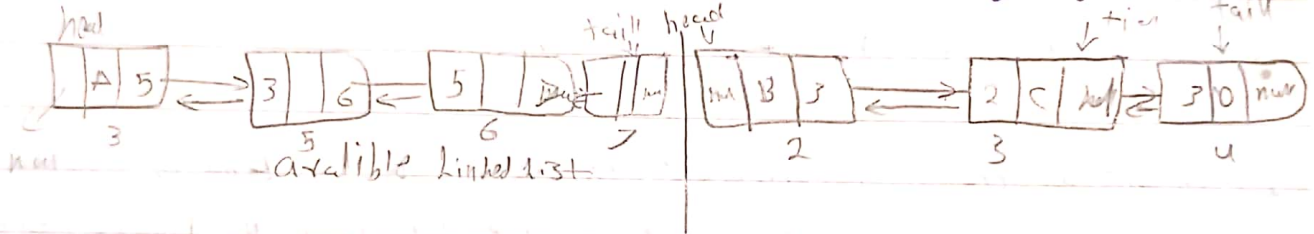## deletion in double linked list
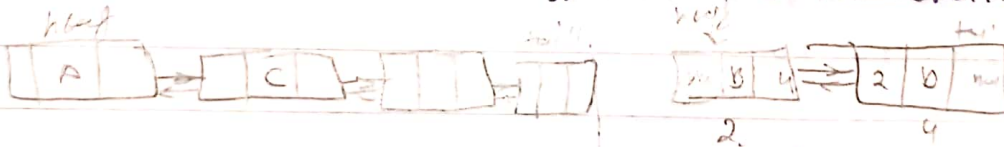

① at first :

we want to delet (A) from the linked list , firstly we make head pointing to the next node (2) and then we make previos of 2 = null and then we insert node L in a ralible linked list

② delete at middle :. we want to delet node 3 from the linked so we meho the previos of node 4 point to node 2 and next of node 2 point to node 4 and then insort 3 to aralible linked list

double linked list

③

delete node at end! we want to delete node 4 from double linked list we use acitily we make Next of 2 point to null and then insert node 4 to aralible linked list .
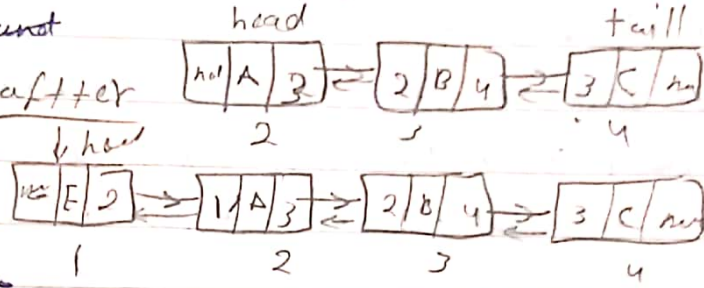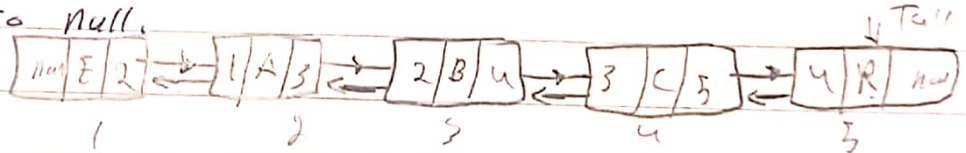
② Insert node to double linked list :

① insert at first : if we want to insert E to double linked List we put it in a node in availble linked List and then delet this node from availble linked list and make prevous of head point to it ~~and make head point to it~~ and and make prevos of node point to affter null and next to node point to head then make head point to it.

head   taill
$$\boxed{null | A | 3} \rightleftarrows \boxed{2 | B | 4} \rightleftarrows \boxed{3 | C | null}$$
        2   5   4

↓head
$$\boxed{null | E | 2} \rightleftarrows \boxed{1 | A | 3} \rightleftarrows \boxed{2 | b | 4} \rightleftarrows \boxed{3 | C | null}$$
                2   3   4

② insert at end : if we want to insert R to ~~of~~ end of double linked list ~~we use auxili pointer to po~~ we put value R in the node of availble linked list and then delet node from availble. then we make next of tail point to it and prevous of node point to head and we make head point to node finally we make next of node point to null.

                                                                    ↓Tail
$$\boxed{null | E | 2} \rightleftarrows \boxed{1 | A | 3} \rightleftarrows \boxed{2 | B | 4} \rightleftarrows \boxed{3 | C | 5} \rightleftarrows \boxed{4 | R | null}$$
        1   2   3   4   5

③ insert at midle : ~~we po~~ we want to insert Z , so we put value Z in ~~ati~~ node in availble linked list , then we delet node from availble linked list , we use auxiltry pointer to reach to midle. then we make next of node Z to point to auxilory pointer and prevous of node Z point to prevous of auxilevy pointer and make prevous of of auxil pointer to point to node Z and next of node of auxill pointer To point to node Z.

                                                    ↓auxill
after
$$\boxed{E | 2} \rightleftarrows \boxed{1 | A | 3} \rightleftarrows \boxed{2 | B | 4} \rightleftarrows \boxed{3 | C | 5} \rightleftarrows \boxed{4 | R | null}$$
        1   2   3   4   5

$$\boxed{null | 2 | 2} \rightleftarrows \boxed{1 | A | 5} \rightleftarrows \boxed{2 | B | 4} \rightleftarrows \boxed{3 | C | 3} \rightleftarrows \boxed{4 | R | null}$$
        1   2   5   3   4   5