Example scheme of linkedlist

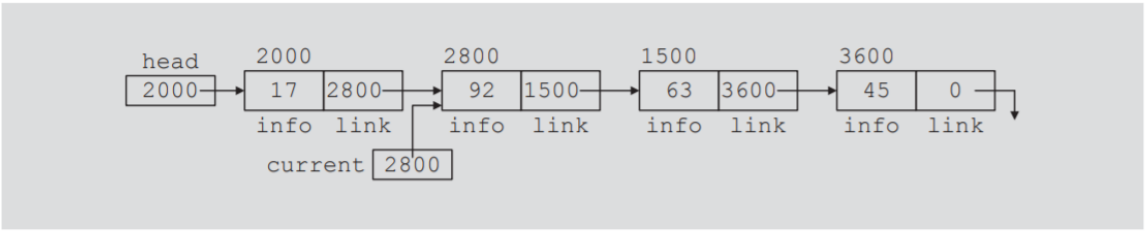
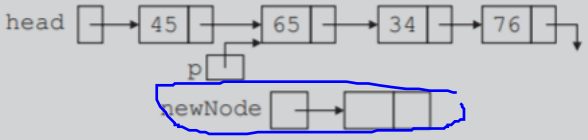
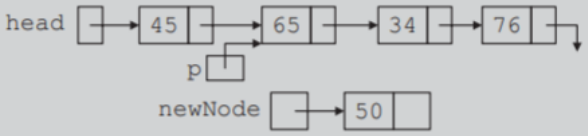
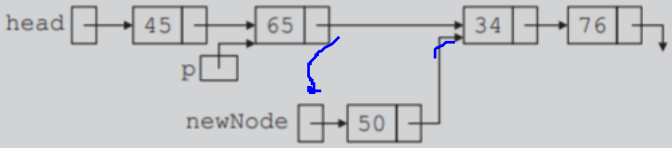
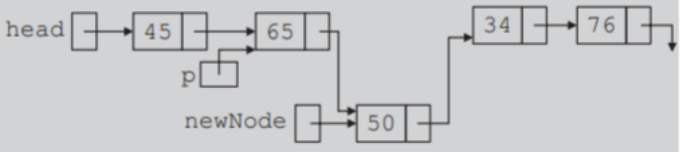


FIGURE 5-5 List after the statement `current = current->link;` executes

Insertion

TABLE 5-3 Inserting a node in a linked list

Statement	Effect
`newNode = new nodeType;`	
`newNode->info = 50;`	
`newNode->link = p->link;`	
`p->link = newNode;`	

Losing the linkedlist sequence

Figure 5-7 shows the resulting list after these statements execute.

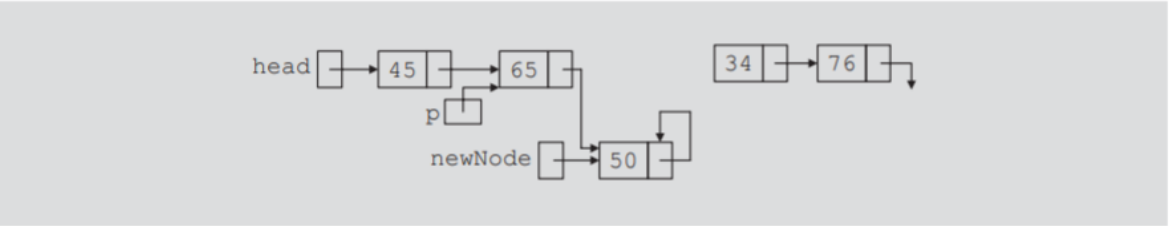
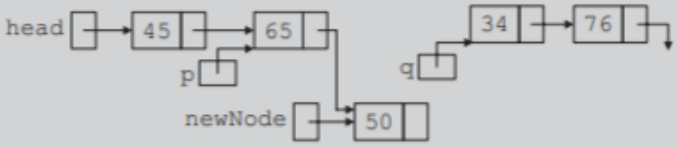
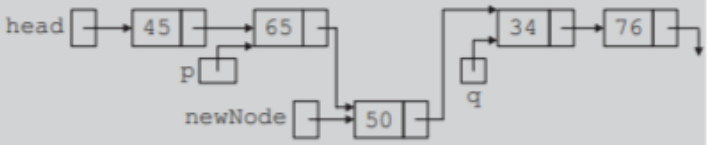


FIGURE 5-7 List after the execution of the statement `p->link = newNode;` followed by the execution of the statement `newNode->link = p->link;`

TABLE 5-4 Inserting a node in a linked list using two pointers

Statement	Effect
`p->link = newNode;`	
`newNode->link = q;`	

DELETION

DELETION

Consider the linked list shown in Figure 5-9.

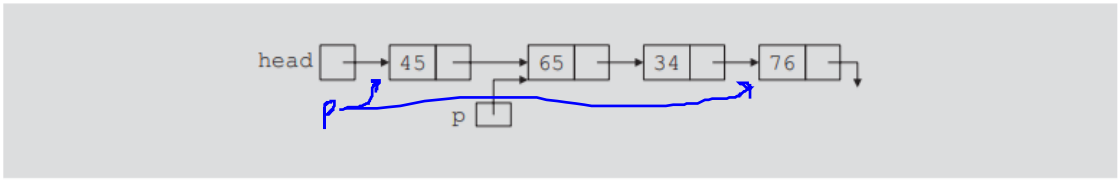


FIGURE 5-9 Node to be deleted is with `info 34`

Suppose that the node with **`info 34`** is to be deleted from the list. The following statement removes the node from the list:

```
p->link = p->link->link;
```

Figure 5-10 shows the resulting list after the preceding statement executes.

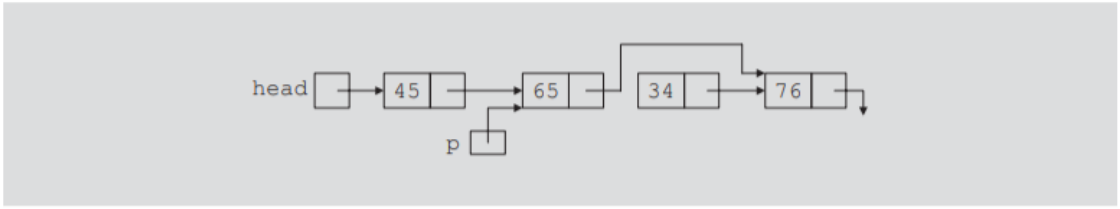
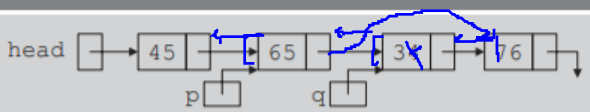
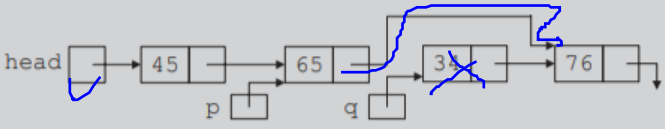
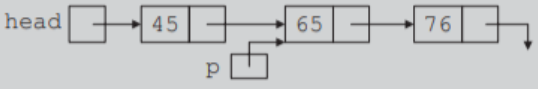


FIGURE 5-10 List after the statement `p->link = p->link->link;` executes

TABLE 5-5 Deleting a node from a linked list

Statement	Effect
`q = p->link;`	
`p->link = q->link;`	
`delete q;`	

[5]

1. Mark the following statements as true or false.

F a. In a linked list, the order of the elements is determined by the order in which the nodes were created to store the elements.

F b. In a linked list, memory allocated for the nodes is sequential.

F c. A single linked list can be traversed in either direction.

F d. In a linked list, nodes are always inserted either at the beginning or the end because a linked link is not a random access data structure.

T e. The head pointer of a linked list cannot be used to traverse the list.

Consider the linked list shown in Figure 5-35. Assume that the nodes are in the usual **info-link** form. Use this list to answer Exercises 2 through 7. If necessary, declare additional variables. (Assume that **list**, **p**, **s**, **A**, and **B** are pointers of type **nodeType**.)

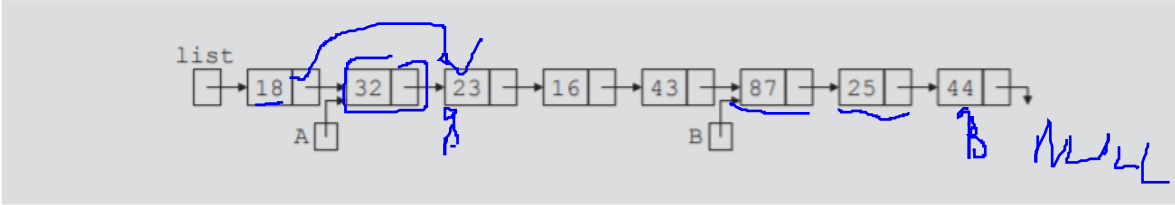


FIGURE 5-35 Linked list for Exercises 2–7

2. What is the output of each of the following C++ statements?

   a. `cout << list->info;` 18

   b. `cout << A->info;` 32

   c. `cout << B->link->info;` 25

   d. `cout << list->link->link->info` 23

3. What is the value of each of the following relational expressions?

   a. `list->info >= 18` ✓

   b. `list->link == A` ✓

   c. `A->link->info == 16` ✗

   d. `B->link == NULL` ✗

   e. `list->info == 18` ✓

4. Mark each of the following statements as valid or invalid. If a statement is invalid, explain why.

a. `A = B;`

b. `list->link = A->link;`

c. `list->link->info = 45;`

d. `*list = B;`

e. `*A = *B;`

f. `B = A->link->info;`

g. `A->info = B->info;`

h. `list = B->link->link;`

i. `B = B->link->link->link;`

5. Write C++ statements to do the following:

a. Make `A` point to the node containing `info` `23`.

b. Make `list` point to the node containing `16`.

c. Make `B` point to the last node in the list.

d. Make `list` point to an empty list.

e. Set the value of the node containing `25` to `35`.

f. Create and insert the node with `info` `10` after the node pointed to by `A`.

g. Delete the node with `info` `23`. Also, deallocate the memory occupied by this node.