

EXERCISES

Review Questions

1. Make a comparison between a linked list and a linear array. Which one will you prefer to use and when?
2. Why is a doubly linked list more useful than a singly linked list?
3. Give the advantages and uses of a circular linked list.
4. Specify the use of a header node in a header linked list.
5. Give the linked representation of the following polynomial:
$$7x^3y^2 - 8x^2y + 3xy + 11x - 4$$
6. Explain the difference between a circular linked list and a singly linked list.
7. Form a linked list to store students' details.
8. Use the linked list of the above question to insert the record of a new student in the list.
9. Delete the record of a student with a specified roll number from the list maintained in Question 7.
10. Given a linked list that contains English alphabet. The characters may be in upper case or in lower case. Create two linked lists—one which stores upper case characters and the other that stores lower case characters.

11. Create a linked list which stores names of the employees. Then sort these names and re-display the contents of the linked list.

Programming Exercises

1. Write a program that removes all nodes that have duplicate information.
2. Write a program to print the total number of occurrences of a given item in the linked list.
3. Write a program to multiply every element of the linked list with 10.
4. Write a program to print the number of non-zero elements in the list.
5. Write a program that prints whether the given linked list is sorted (in ascending order) or not.
6. Write a program that copies a circular linked list.
7. Write a program to merge two linked lists.
8. Write a program to sort the values stored in a doubly circular linked list.
9. Write a program to merge two sorted linked lists. The resultant list must also be sorted.
10. Write a program to delete the first, last, and middle node of a header linked list.
11. Write a program to create a linked list from an already given list. The new linked list must contain every alternate element of the existing linked list.
12. Write a program to concatenate two doubly linked lists.
13. Write a program to delete the first element of a doubly linked list. Add this node as the last node of the list.
14. Write a program to
 - (a) Delete the first occurrence of a given character in a linked list
 - (b) Delete the last occurrence of a given character
 - (c) Delete all the occurrences of a given character
15. Write a program to reverse a linked list using recursion.
16. Write a program to input an n digit number. Now, break this number into its individual digits and then store every single digit in a separate node thereby forming a linked list. For example, if you enter 12345, then there will 5 nodes in the list containing nodes with values 1, 2, 3, 4, 5.
17. Write a program to add the values of the nodes of a linked list and then calculate the mean.
18. Write a program that prints minimum and maximum values in a linked list that stores integer values.
19. Write a program to interchange the value of the first element with the last element, second element with second last element, so on and so forth of a doubly linked list.
20. Write a program to make the first element of singly linked list as the last element of the list.
21. Write a program to count the number of occurrences of a given value in a linked list.
22. Write a program that adds 10 to the values stored in the nodes of a doubly linked list.
23. Write a program to form a linked list of floating point numbers. Display the sum and mean of these numbers.
24. Write a program to delete the k^{th} node from a linked list.
25. Write a program to perform deletions in all the cases of a circular header linked list.
26. Write a program to multiply a polynomial with a given number.
27. Write a program to count the number of non-zero values in a circular linked list.
28. Write a program to create a linked list which stores the details of employees in a department. Read and print the information stored in the list.
29. Use the linked list of Question 28 so that it displays the record of a given employee only.
30. Use the linked list of Question 28 and insert information about a new employee.
31. Use the linked list of Question 28 and delete information about an existing employee.
32. Write a program to move a middle node of a doubly link list to the top of the list.
33. Write a program to create a singly linked list and reverse the list by interchanging the links and not the data.
34. Write a program that prints the n th element from the end of a linked list in a single pass.
35. Write a program that creates a singly linked list. Use a function `isSorted` that returns 1 if the list is sorted and 0 otherwise.
36. Write a program to interchange the k th and the $(k+1)$ th node of a circular doubly linked list.
37. Write a program to create a header linked list.

Single Linked List: Assignments

1. Write a program to create a single linked list.
2. Write a program to display a single linked list.
3. Write a program to insert a node at the beginning of a single linked list.
4. Write a program to insert a node at the end of a single linked list.
5. Write a program to insert a node before a given node of a single linked list.
6. Write a program to insert a node after a given node of a single linked list.
7. Write a program to delete a node from the beginning of a single linked list.
8. Write a program to delete a node from the end of a single linked list.
9. Write a program to delete a node after a given node of a single linked list.
10. Write a program to delete a node of a single linked list.
11. Write a program to delete the entire single linked list.

Circular Linked List: Assignments

1. Write a program to create a circular linked list.
2. Write a program to display a circular linked list.
3. Write a program to insert a node at the beginning of a circular linked list.
4. Write a program to insert a node at the end of a circular linked list.
5. Write a program to delete a node from the beginning of a circular linked list.
6. Write a program to delete a node from the end of a circular linked list.
7. Write a program to delete a node after a given node of a circular linked list.
8. Write a program to delete the entire circular linked list.

Doubly Linked List: Assignments

1. Write a program to create a doubly linked list.
2. Write a program to display a doubly linked list.
3. Write a program to insert a node at the beginning of a doubly linked list.
4. Write a program to insert a node at the end of a doubly linked list.
5. Write a program to insert a node before a node of a doubly linked list.
6. Write a program to insert a node after a node of a doubly linked list.
7. Write a program to delete a node from the beginning of a doubly linked list.
8. Write a program to delete a node from the end of a doubly linked list.
9. Write a program to delete a node after a given node of a doubly linked list.
10. Write a program to delete a node before a given node of a doubly linked list.
11. Write a program to delete the entire doubly linked list.

Circular Doubly Linked List: Assignments

1. Write a program to create a circular doubly linked list.
2. Write a program to display a circular doubly linked list.
3. Write a program to insert a node at the beginning of a circular doubly linked list.
4. Write a program to insert a node at the end of a circular doubly linked list.
5. Write a program to delete a node from the beginning of a circular linked list.
6. Write a program to delete a node from the end of a circular linked list.
7. Write a program to delete a given node of a circular doubly linked list.
8. Write a program to delete the entire circular doubly linked list.