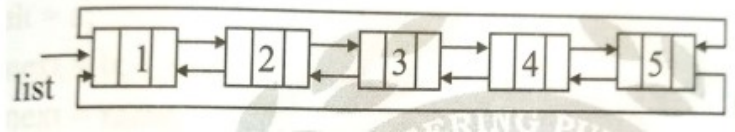


1. A stack is a LIFO (Last-In First-Out) data structure. Would it be correct to call it a (a) LILO structure? (b) FILO structure? Give reasons for your answers. (2 marks)
2. The following figure depicts the initial configuration of a doubly circular linked list. What is the output after executing the following code snippet? (2 marks)



```
list->next->next->next=list->prev;
list->prev->prev->prev=list->next->next->next->prev;
list->next->next->next->prev=list->prev->prev->prev;
printf("%d", list->prev->prev->prev->data);
```

3. Convert the given infix expression to postfix using a stack and evaluate it (using a stack):  
 $(1 + 2) * 3 - (4 - 5) * (6 + 7)$  (2 marks)
4. Define stable sorting. Which of the common sorting algorithms (like Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort) are stable? (2 marks)
5. Write an algorithm Stack\_Size() that returns the number of elements in a stack implemented using linked list. (2 marks)
6. Convert the given infix expression to postfix using a stack and evaluate it (using a stack):  
 $A + B * C - D \wedge E \wedge F$  (2 marks) Use  $A = 2, B = 3, C = 4, D = 5, E = 2, F = 2$
7. The pre-order traversal of a binary search tree is given by:  
12, 8, 6, 2, 7, 9, 10, 16, 15, 19, 17, 20. What is its post-order traversal? (2 marks)
8. As usual, Popeye the sailor man and Bluto enter a fight. This time the fight is so tight that Popeye is not able to win the challenge given by Bluto. Bluto gives Popeye two linked lists and wants him to get the first intersecting node (common data item) of the two lists. Write a pseudocode to help Popeye to win the challenge. (2 marks)
9. Convert the given infix expression to postfix using a stack and evaluate it (using a stack):  
 $((A - 2 * (B + C) - D * E) * F)$  Use  $A = 2, B = 3, C = 4, D = 5, E = 2, F = 1$  (2 marks)
10. Define in-place sorting. Which of the common sorting algorithms (like Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort) are in-place? (2 marks)
11. Convert the given sparse matrix into 3-tuple form. (2 marks)

$$\begin{pmatrix} 10 & 20 & 0 & 0 & 0 & 0 \\ 0 & 30 & 0 & 40 & 0 & 0 \\ 0 & 0 & 50 & 60 & 70 & 0 \\ 0 & 0 & 0 & 0 & 0 & 80 \end{pmatrix}$$

12. Write a pseudocode Check\_Palindrome(str) that checks whether an input string str is a palindrome or not using stack.
13. You are stuck in a mysterious world because of which you have lost your ability to count things! The exit door of the world is guarded by a ferocious lion. To let you get out of the world, the lion wants you to win a game in which you will be given a binary string and you need to tell whether the string consists of equal number of 0's and 1's. Use your data structure knowledge to win the game and rescue yourself. (2 marks)
14. Trace the BFS and DFS traversals for the given graph. (2 marks)

