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A

- I. RECURSION: Recursion is a process a procedure goes through when one of the step in the procedure involves invoking the function itself.

II. **Algorithm.**

Consider the following:

n is number of disk, A, B, and C which are initial, auxiliary and destination pegs respectively

Procedure tower(n, A, B, C)

if n == 1

print move disk to destination

else

tower(n-1, A, B, C)

tower(n-1, C, A, B)

Working of algorithm

Given n = 4

1.Initial state:

A (D4 D3 D2 D1) B () C ()

2.Recursive call 1 (n = 3):

- Move D1, D2, and D3 from A to B using C as the temporary peg (recursive call 1).

A (D4) B (D3 D2 D1) C ()

3.Recursive call 2 (n = 3):

- Move D4 from A to C using B as the temporary peg (recursive call 2).

A () B (D3 D2 D1) C (D4)

4. Recursive call 1 (n = 2):

- Move D1 and D2 from B to C using A as the temporary peg (recursive call 1).

A () B (D3) C (D4 D2 D1)

5. Recursive call 2 (n = 2):

- Move D3 from B to A using C as the temporary peg (recursive call 2).

A (D3) B () C (D4 D2 D1)

6. Recursive call 1 (n = 1):

- Move D1 from C to B.

A (D3) B (D1) C (D4 D2)

7. Recursive call 2 (n = 1):

- Move D2 from C to A.

A (D3 D2) B (D1) C (D4)

8. Move D1 from B to C.

A (D3 D2) B () C (D4 D1)

9. Recursive call 1 (n = 1):

- Move D2 from A to B.

A (D3) B (D2) C (D4 D1)

10. Move D3 from A to C.

A () B (D2) C (D4 D1 D3)

11. Recursive call 1 (n = 2):

- Move D1 and D2 from B to C using A as the temporary peg (recursive call 1).

A () B () C (D4 D1 D3 D2)

12. Recursive call 2 (n = 2):

- Move D4 from A to C using B as the temporary peg (recursive call 2).

A () B () C (D4 D1 D3 D2)

13. Final state:

A () B () C (D4 D1 D3 D2)

B

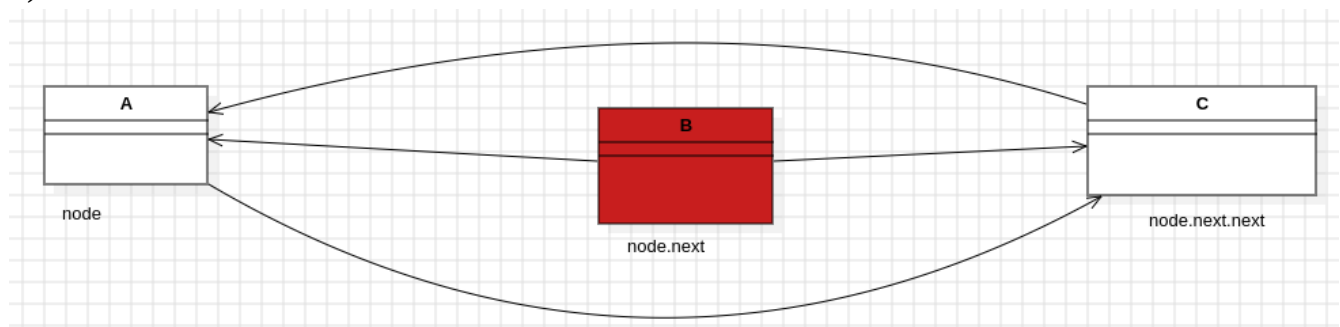
- I. Level of a node: The level of a node in a tree refers to the distance between the root node and the node in question. The root node is considered to be at level 0, its children are at level 1, their children are at level 2, and so on.
- II. Height of a tree: The height of a tree is the maximum level among all the nodes in the tree. It represents the length of the longest path from the root node to any leaf node.
- III. Path length of a tree: The path length of a tree is the sum of the levels of all the nodes in the tree. It represents the total number of edges traversed when moving from the root node to all the other nodes in the tree.

C)

a)

- Linked lists are dynamic data structures, meaning they can grow or shrink in size during runtime, while arrays have a fixed size determined during their creation.
- Insertion and deletion operations are more efficient in linked lists while arrays may require shifting.
- Linked lists consume more memory compared to arrays due to the additional memory required for storing pointers/references.
- Arrays permit random access and are generally faster while linked lists allow for sequential access and dynamic changes.

b)



Let B be the node to be deleted.

- Set t to the node.next i.e B.
- set node.next (A) to t.next (C).
- set t.next.previous to t.previous .
- Free the space occupied by t .