



VEHICLES MOVING ALONG ROADS (LINKED LIST)

Data Structures and
Algorithms-I Credit Activity
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Name: Onkar B Satpute

INTRODUCTION

- Data structures are essential for organizing and managing data efficiently.
- Linked lists are a key dynamic data structure.
- This presentation explores how linked lists model the movement of vehicles along roads.

WHAT IS A LINKED LIST?

- A Linked List is a collection of nodes where each node contains data and a pointer to the next node.
- Types: Singly, Doubly, and Circular Linked Lists.
- It's used for dynamic memory allocation and efficient insertion/deletion operations.

APPLICATION OVERVIEW

- Vehicles moving along roads can be represented as nodes in a linked list.
- Each vehicle (node) is linked to another via a pointer, symbolizing the path (road).
- As vehicles move, pointers update, representing road transitions.

DATA FLOW AND REPRESENTATION

- Vehicles (nodes) are placed on roads (linked list).
- As a vehicle moves, the linked list updates pointers dynamically.
- Insertion and deletion operations represent adding or removing vehicles from the road.

LINKED LIST OPERATIONS IN VEHICLE MANAGEMENT

- Insertion (Add a vehicle):
 - Add a vehicle to the head, middle, or tail of the list (road).
- Deletion (Remove a vehicle):
 - Remove a vehicle from the list, and update the pointers accordingly.

ADVANTAGES OF LINKED LISTS IN VEHICLE SIMULATION

- Dynamic memory allocation helps handle varying traffic.
- Efficient insertion and deletion operations make real-time updates easy.
- Scales well with increasing number of vehicles.

LIVE CODING EXAMPLE

- Code Example (Insertion and Deletion):
 - Demonstrating how vehicles are inserted or removed in a linked list structure.
 - Simple code showing the dynamic behavior of the list.

GITHUB CLASSROOM SIMULATION

- GitHub Classroom is used to simulate vehicle movements in real time.
- Simulation displays real-time changes as vehicles move along roads (linked list).

CONCLUSION

- Linked lists are efficient for modeling real-time vehicle movement on roads.
- Their dynamic nature allows flexibility in handling traffic.
- This method provides efficient memory management and scaling.