

# Detect Loop in A Linked List [LeetCode](#)

Write a program to identify loop in a linked list

## Approach 1: Hash Set (unordered\_map) for Cycle Detection

- Traverse the linked list, marking each visited node within an unordered\_map.
- If a node that has already been visited is encountered, a cycle is detected.
- This approach requires additional memory to store visited nodes.

**Time Complexity:**  $O(n)$ , where  $n$  is the number of nodes in the linked list.

**Space Complexity:**  $O(n)$ , attributed to the space consumed by the hash map to store visited nodes.

## Approach 2: Floyd's Cycle Detection Algorithm (Tortoise and Hare)

- Use two pointers, slow and fast, to navigate the linked list.
- The slow pointer advances one node at a time, while the fast pointer progresses by two nodes at a time.
- If a cycle exists, the two pointers will eventually meet within the cycle.

**Time Complexity:**  $O(n)$ , where  $n$  represents the number of nodes in the linked list.

**Space Complexity:**  $O(1)$ , as only a fixed amount of additional space is used.