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SUB- DATA STRUCTURE LAB	

Question 1.
Write the routine for insertion operation of a singly linked list?

What is Single Linked List?

Simply a list is a sequence of data, and the linked list is a sequence of data linked with each other.

Before we implement actual operations, first we need to set up an empty list. First, perform the following steps before implementing actual operations.

- Step 1 - Include all the header files which are used in the program.
- Step 2 - Declare all the user defined functions.
- Step 3 - Define a Node structure with two members data and next
- Step 4 - Define a Node pointer 'head' and set it to NULL.
- Step 5 - Implement the main method by displaying operations menu and make suitable function calls in the main method to perform user selected operation.

Insertion

In a single linked list, the insertion operation can be performed in three ways. They are as follows...

1. Inserting At Beginning of the list

2. Inserting At End of the list
3. Inserting At Specific location in the list

Inserting At Beginning of the list

We can use the following steps to insert a new node at beginning of the single linked list...

- Step 1 - Create a newNode with given value.
- Step 2 - Check whether list is Empty (head == NULL)
- Step 3 - If it is Empty then, set newNode→next = NULL and head = newNode.
- Step 4 - If it is Not Empty then, set newNode→next = head and head = newNode.

Inserting At End of the list

We can use the following steps to insert a new node at end of the single linked list...

- Step 1 - Create a newNode with given value and newNode → next as NULL.
- Step 2 - Check whether list is Empty (head == NULL).
- Step 3 - If it is Empty then, set head = newNode.
- Step 4 - If it is Not Empty then, define a node pointer temp and initialize with head.
- Step 5 - Keep moving the temp to its next node until it reaches to the last node in the list (until temp → next is equal to NULL).
- Step 6 - Set temp → next = newNode.

Inserting At Specific location in the list (After a Node)

We can use the following steps to insert a new node after a node in the single linked list...

- Step 1 - Create a newNode with given value.
- Step 2 - Check whether list is Empty (head == NULL)
- Step 3 - If it is Empty then, set newNode → next = NULL and head = newNode.
- Step 4 - If it is Not Empty then, define a node pointer temp and initialize with head.
- Step 5 - Keep moving the temp to its next node until it reaches to the node after which we want to insert the newNode (until temp1 → data is equal

to location, here location is the node value after which we want to insert the newNode).

- Step 6 - Every time check whether temp is reached to last node or not. If it is reached to last node then display 'Given node is not found in the list!!! Insertion not possible!!!' and terminate the function. Otherwise move the temp to next node.
- Step 7 - Finally, Set 'newNode → next = temp → next' and 'temp → next = newNode'