Have you implemented a linked list before?
A. Yes
B. No

INTRO TO LINKED LISTS

Problem Solving with Computers-II

C++

```
#include <iostream>
using namespace std;

int main(){
    cout<<"Hola Facebook\n";
    return 0;
}
```

GitHub

Linked list vs Array

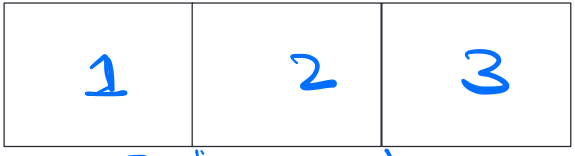
Vector & linked list

size is fixed

int arr[3] = {1, 2, 3};

Array

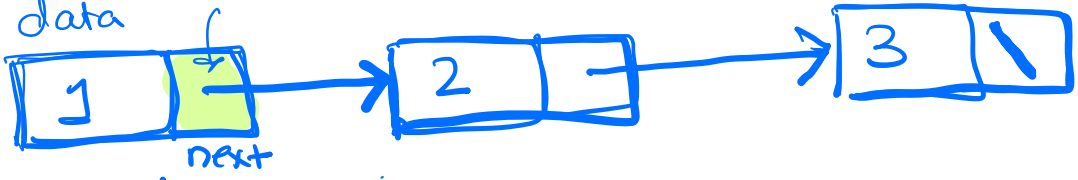
0x8000



arr[0] arr[1] 0x8004 0x8008

Linked list

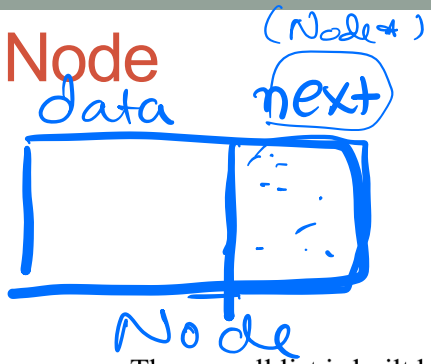
explicity store the address of the next node



node

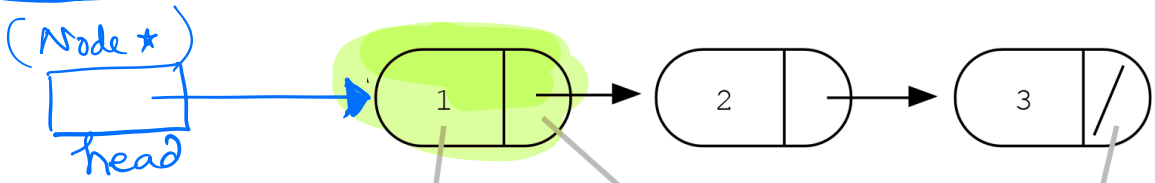
Linked chain of nodes

Defining the type Node



Address of the next Node

The overall list is built by connecting the nodes together by their next pointers. The nodes are all allocated in the heap.



Pointer to the first node in the list.

Each node stores one data element (int in this example).

Each node stores one next pointer.

The next field of the last node is NULL.

Which of the following are valid ways of representing a linked list

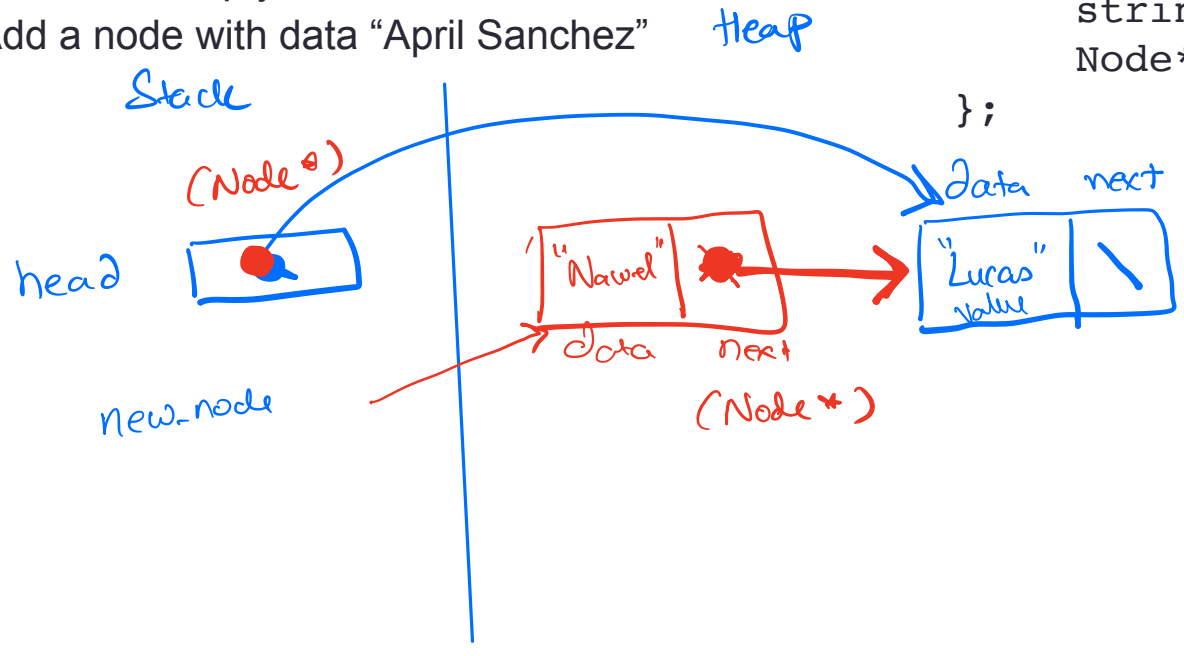
A. `Node* head;`
B. `int* head = nullptr;`
C. `Node* head; Node* tail;`
D. Need to define a new type called `LinkedList`

```
struct Node {
    int data;
    Node *next;
};
```

Simplest Linked List (just a head pointer)

- Create an empty list
- Add a node with data “April Sanchez”

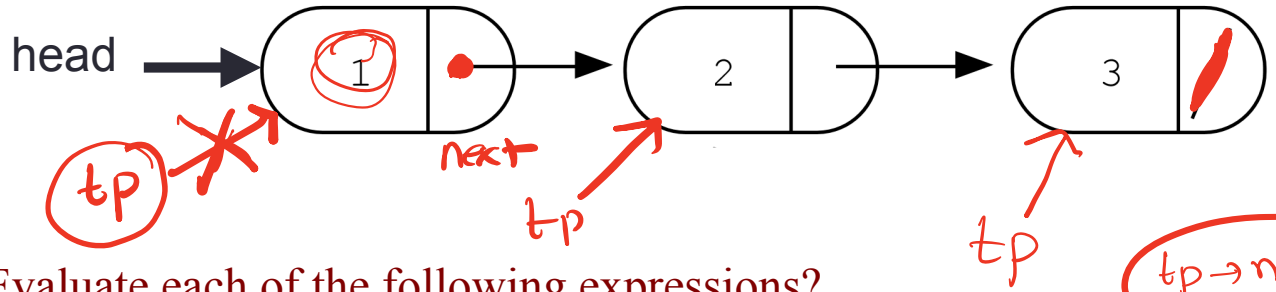
```
struct Node {
      string data;
      Node* next;
};
```



Assume the following linked list exists

```
struct Node {
    int data;
    Node *next;
};
```

In lecture, we practiced iterating over the nodes in the linked list using a while loop.



Evaluate each of the following expressions?

1. `head->data` 1
2. `head->next->data` 2
3. `head->next->next->data` 3
4. `head->next->next->next->data`

null

Run time error (Dereferencing a null pointer)

tp→next

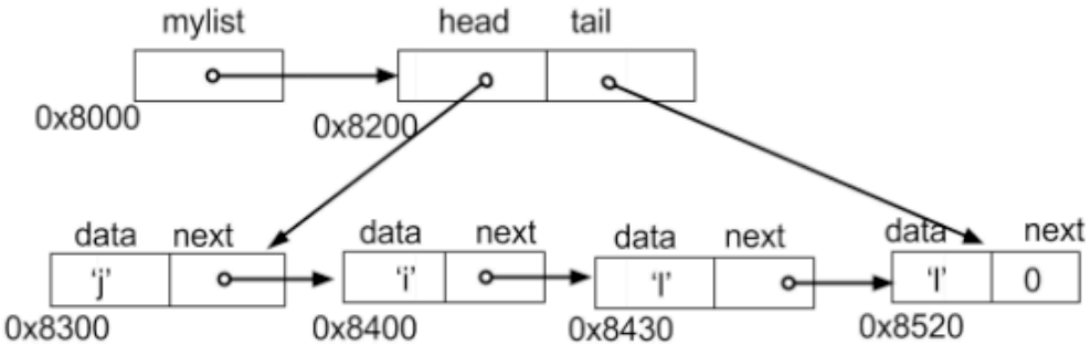
A. 1
B. 2
C. 3
D. nullptr
E. Run time error

LinkedList datatype

- Define the type LinkedList
- Create an empty list
- Add a node to the list with data “April Sanchez”

```
struct Node {
      string data;
      Node* next;
};
```

Accessing nodes in a linked list



a. cout<<mylist;
b. cout<<mylist->tail;
c. cout<<mylist->tail->data;
d. cout<<mylist->head->next;
e. cout<<mylist->head->next->

Next time

- OOP style Linked List