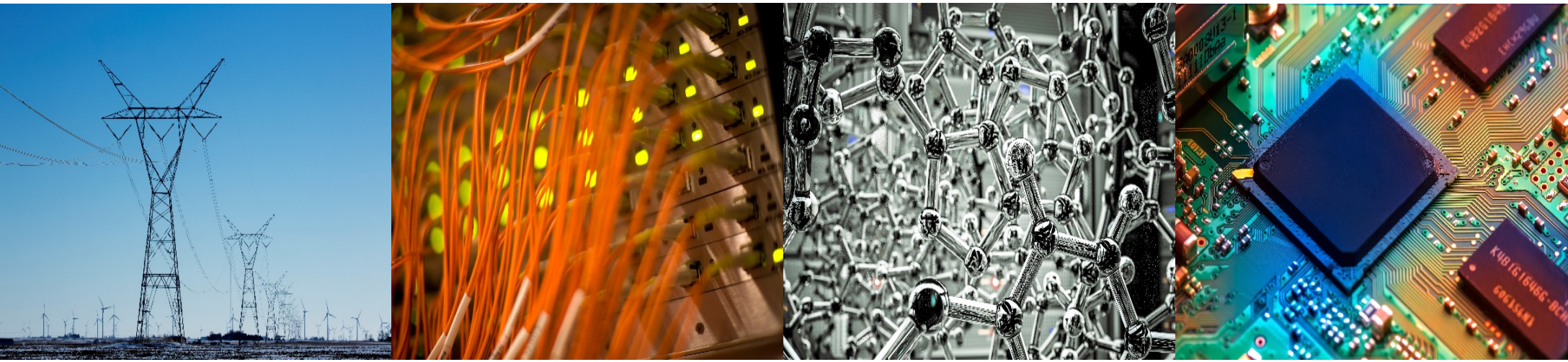
ECE 220 Computer Systems & Programming

Lecture 26 – Linked List

July 22, 2020



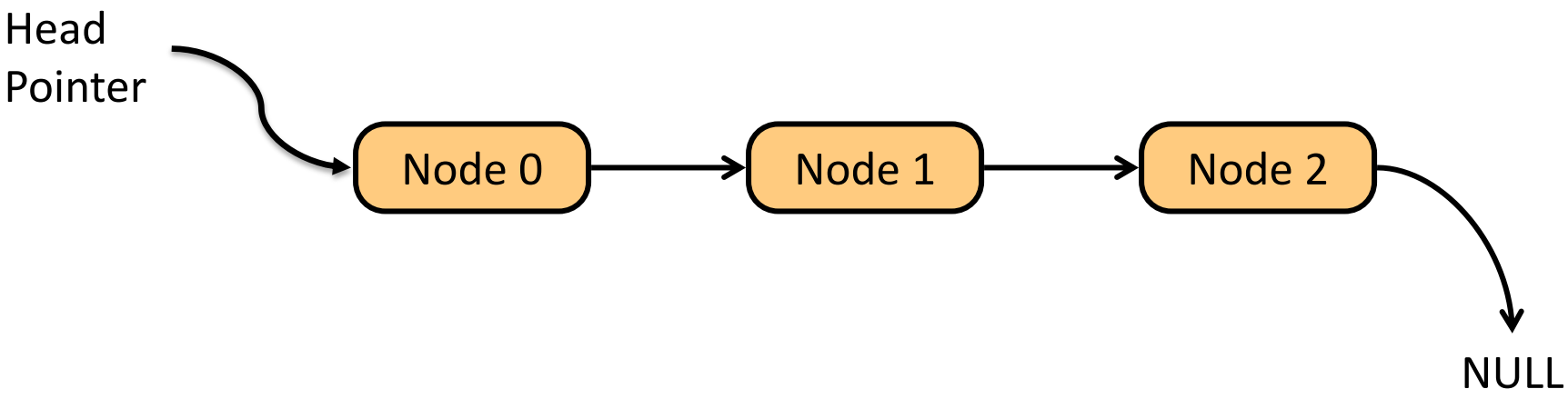
ILLINOIS
Electrical & Computer Engineering
GRAINGER COLLEGE OF ENGINEERING

- **MT2 this Friday**

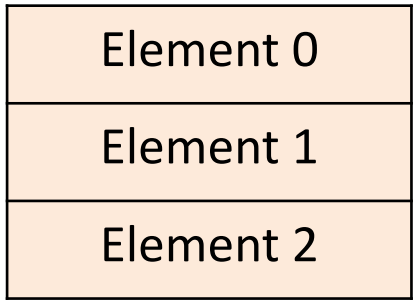
The Linked List Data Structure

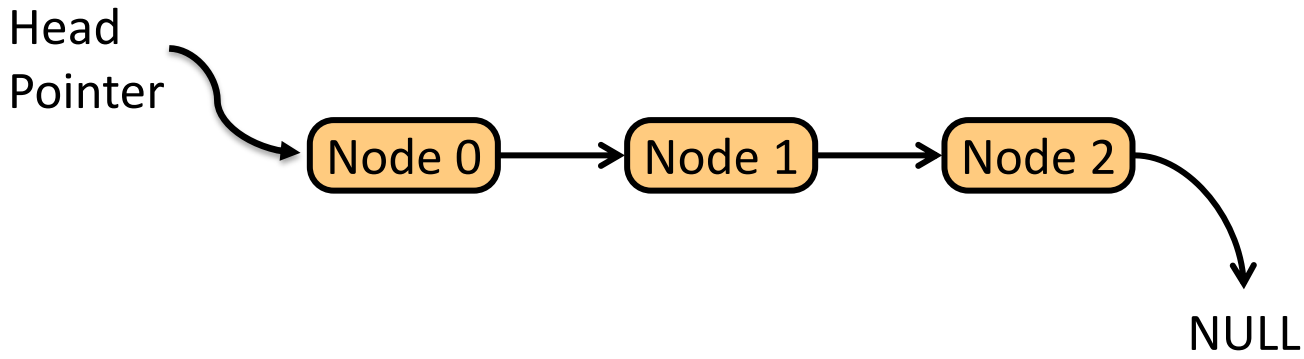
A linked list is an ordered collection of nodes, each of which contains some data, connected using pointers.

- Each node points to the next node in the list.
- The first node in the list is called the _____
- The last node in the list is called the _____



Array vs. Linked List

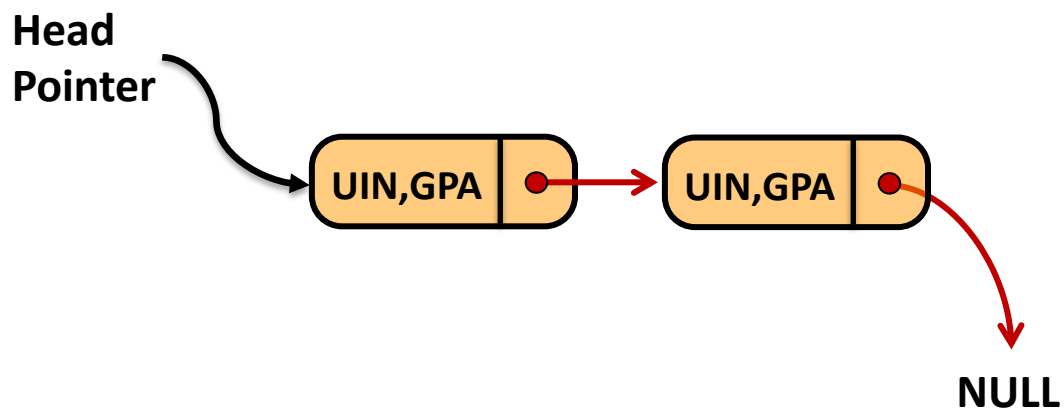




	Array	Linked List
Memory Allocation		
Memory Structure		
Memory Overhead		
Order of Access		
Insertion/Deletion		

Example: A List of Student Record

```
typedef struct studentStruct Node;
struct studentStruct{
   int UIN;
   float GPA;
   Node *next;
};
```

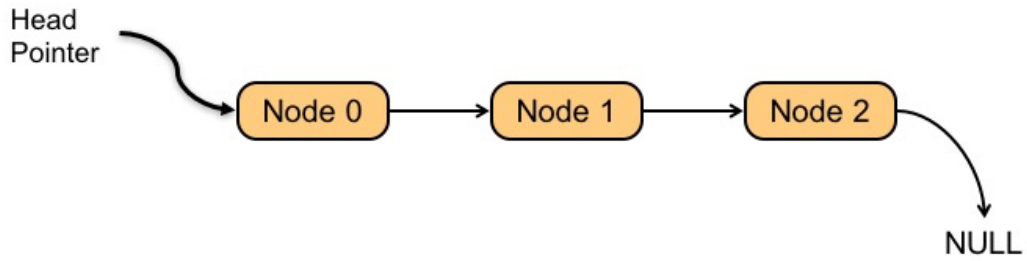


We have a list of 200 student records (nodes) sorted by UIN

1. Find a particular student record by UIN
2. Add a new student record to the sorted list at the correct location
3. Delete a student record from the list

Find a student record by UIN in a sorted list

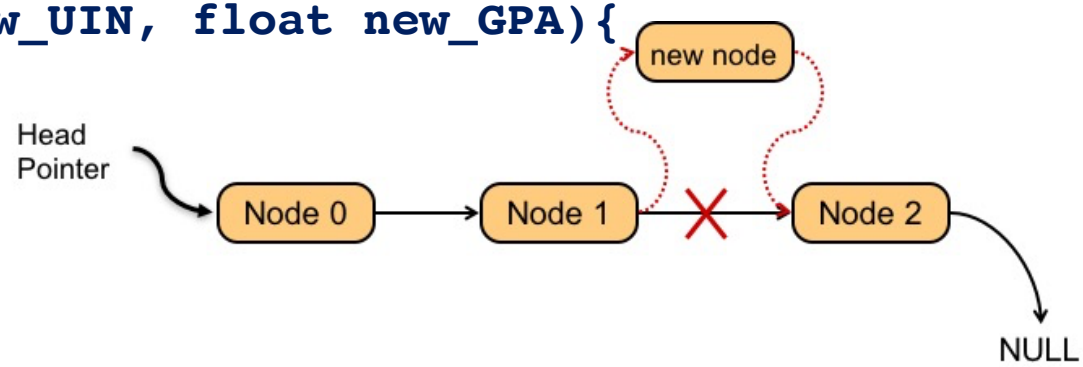
```
/* If matching UIN is found, print "record found" and return a pointer
to this node, otherwise print "record not found" and return NULL */
Node *find_node(Node *head, int find_UIN){
```




```
}
```

Add a new student record to a sorted list

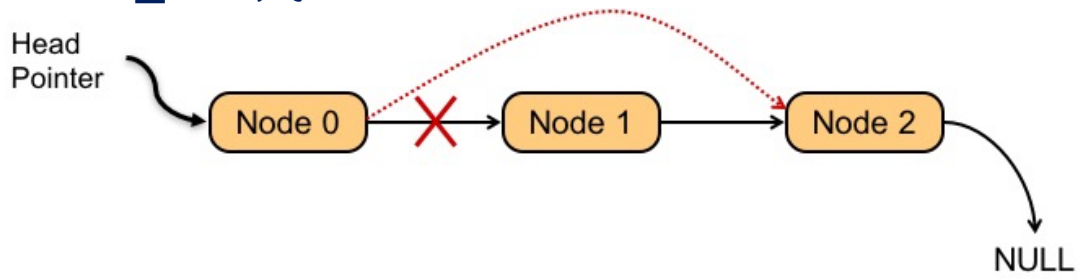
```
/* add a new node to a sorted list at the correct location */
void add_node(Node **list, int new_UIN, float new_GPA){
```




```
}
```

Delete an existing student record from a sorted list

```
/* remove a node from a sorted list */
void remove_node(Node **list, int old_UIN){
```




```
}
```