# Searching Algorithm

◆ Linear Search …. In Array

- Simple
- Go through the Array till you find the item
- If end of the Array then item does not exist

Linked Lists

- Binsearch( A, n ,v) {
- int l, int h, mid;
- while ( l <= h ) {
- mid = ( l + h ) / 2;
- if ( A[mid] == v ) { return mid; }
- else if ( A[mid] > v ) { h = mid − 1; }
- else { l = mid + 1; }
- }
- return -1;
- }

```
Int rBinsearch( A, l, h ,v) {
    int mid;
    mid = ( l + h ) / 2;
    if ( A[mid] == v ) { return mid; }
    if ( l > h ) { return -1; }
    else if ( A[mid] > v ) { h = mid − 1; }
     else { l = mid + 1; }
     return ( rBinsearch( A , l ,h, v ) );

}
```

# Searching Algorithm

◆ Linear Search …. In List
- Simple
- Go through the Array till you find the key (item)
- If end of the Array then key does not exist

# Searching Algorithm

◆ Binary search... in Array

- Look for the key in the middle of the array
- If found, return
- Else if key is < (or >) the item in middle

  Then look for the item in lower half of the array
- Else look for item in upper half of the array

Do this in non-recursive way

# Searching Algorithm

◆ Binary search... in Array

- Look for the key in the middle of the array
- If found, return
- Else if key is < (or >) the item in middle
  Then look for the item in lower half of the array
- Else look for item in upper half of the array

Do this in recursive way

# Searching Algorithm

- Inserting an item in Sorted Array ..
  - Make sure Array is not full
  - Find the position where to insert
  - Move all other items to make space for insertion.
- What is the Big O, if search is linear (first search and then insert)
  - O(n) for search and insert ?
- What was the big O for insertion in array, but unsorted ?

- Insert an item in sorted array, search is done using bin-search
  - What is big O for inserting an item (first search and then insert)

# Searching Algorithm

- Inserting an item in Sorted linked list
    - Find position in linked list
    - Insert item (make links)
- What is the Big O  (first search and then insert)

    O(logn) for search and insert ?

- What was the big O for insertion in linked list, but unsorted ?

# Searching Algorithm

◆ Binary search… in linked list ??? How ??