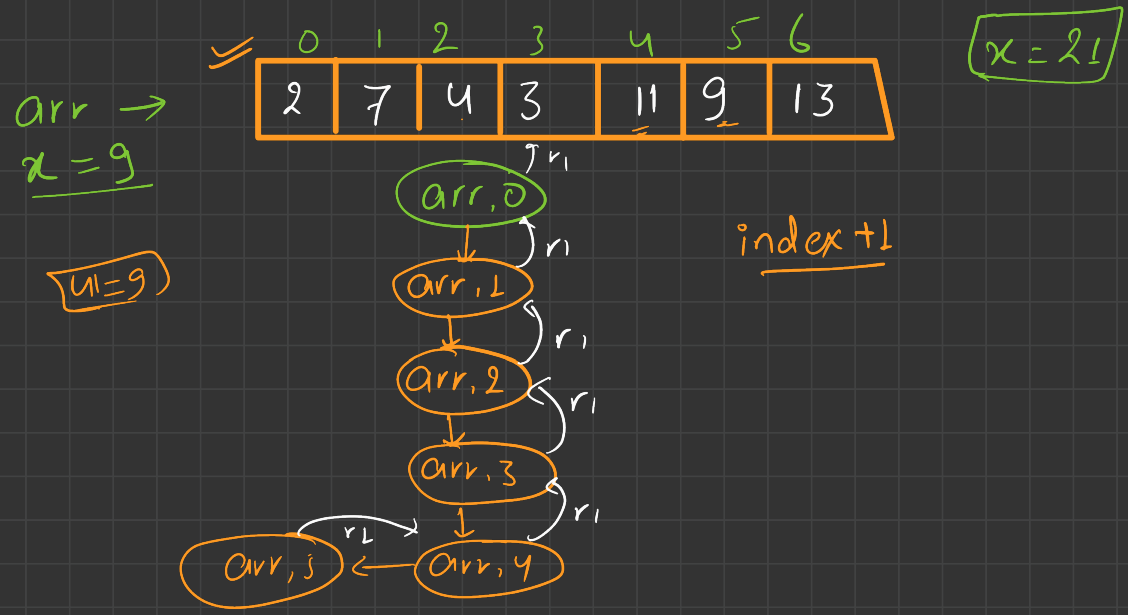
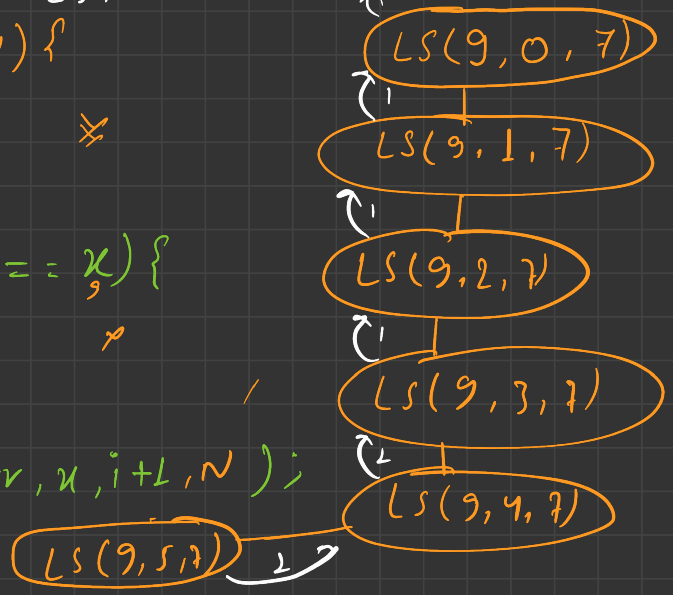
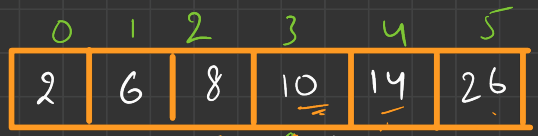
Linear Search



```
bool LinearSearch (int arr[], int x, int index, int N ){
    if (index == N){
        return 0
    }
    if (arr[index] == x){
        return 1
    }
    return LinearSearch(arr, x, i+1, N );
```



Binary Search



$x = 10$

$= 0$ $= 3$ $= 5$

Start = mid + 1

end = mid - 1

$\frac{start + end}{2}$ $= \frac{0+5}{2}$

$mid = \frac{3+5}{2} = 4$

$\frac{3+3}{2} = 3$

```
BinarySearch (int arr, int start, int end, int x) {
    if (start > end) {
        return 0;
    }
    int mid = start + (end - start) / 2
    if (arr[mid] == x) {
        return 1;
    else if (arr[mid] < x)
return BinarySearch (arr, mid+1, end, x);
    else {
return BinarySearch (arr, start, mid -1, x);
return
}
```

```
BinarySearch (int arr, int start, int end, int x) {
    if (start > end) {
        return 0;
    }
    int mid = start + (end - start) / 2
    if (arr[mid] == x) {
        return 1;
    else if (arr[mid] < x)
return BinarySearch (arr, mid+1, end, x);
    else {
return BinarySearch (arr, start, mid -1, x);
}
```

BS (0, 5, 10)

BS (3, 5, 10)

BS (3, 3, 10)

start = 0
end = 5
x = 10
mid = 2 4
=

$$\left[mid = start + \frac{(end - start)}{2} \right]$$

[20 10 10 7 6 4 2 1]

4 byte