

### Arrays Methods

#### concat (array0?, value1?, ... , valueN?)

The concat() method is used to merge two or more arrays. It does not change the existing arrays, but instead returns a new array.

```
const letters = ['a', 'b', 'c'];
const numbers = [1, 2, 3];
letters.concat(numbers);
// result in ['a', 'b', 'c', 1, 2, 3]
```

#### splice(start, deleteCount?, item1?, item2?, itemN?)

The splice() method changes the contents of an array by removing or replacing existing elements and/or adding new elements in place. To access part of an array without modifying it, see slice().

```
const months = ['Jan', 'March', 'April', 'June'];
months.splice(1, 0, 'Feb');
//output: ["Ja n", " Feb ", " Mar ch", " Apr il", " Jun e"]
```

#### slice (start?, end?)

The slice() method returns a shallow copy of a portion of an array into a new array object selected from start to end (end not included) where start and end represent the index of items in that array. The original array will not be modified.

```
const animals = ['ant', 'bison', 'camel', 'duck', 'elephant'];
animals.slice(2, 4)
// output: ["ca mel ", " duc k"]
```

#### shit ()

The shift() method removes the first element from an array and returns that removed element. This method changes the length of the array.

#### unshift (element0,element1)

The unshift() method adds one or more elements to the beginning of an array and returns the new length of the array.

### Arrays Methods (cont)

#### sort ((firstEl, secondEl) => { ... })

The sort() method sorts the elements of an array in place and returns the sorted array. The default sort order is ascending, built upon converting the elements into strings.

If compareFunction(a, b) returns a value > than 0, sort a before a.  
 If compareFunction(a, b) returns a value < than 0, sort a before b.  
 If compareFunction(a, b) returns 0, a and b are considered equal.

#### filter ((element, index, array) => { ... })

The filter() method creates a new array with all elements that pass the test implemented by the provided function.

```
let filtered = [12, 5, 8, 130, 44].filter((value) => value >= 10);
// filtered is [12, 130, 44]
```

#### find ((element, index, array) => { ... })

The find() method returns the value of the first element in the provided array that satisfies the provided testing function. If no values satisfy the testing function, undefined is returned.

```
const array1 = [5, 12, 8, 130, 44];
const found = array1.find( element => element > 10);
// expected output: 12
```

The join() method creates and returns a new string by concatenating all of the elements in an array (or an array-like object), separated by commas or a specified separator string. If the array has only one item, then that item will be returned without using the separator.

```
var a = ['Wind', 'Water', 'Fire'];
a.join();// 'Wind, Wat er, Fire'
a.join(''); // 'WindW ate rFire'
```

### Linked List

```
class Node {
  constructor(value) {
    this.s.e lement = value;
    this.s.next = null;
    this.s.p revious = null;
  }
}

class LinkedList {
  constructor() {
    this.s.head = null; //root Node
    this.s.tail = null; // last element of the list
    this.s.size = 0;
  }

  addHead(v alue) {
    const newNode = new Node(v alue);
    newNode.next = this.head;
    this.head = newNode;
    if (this.s.head) {
      this.s.head.p revious = newNode;
    } else {
      this.s.tail = newNode;
    }
    this.s.head = newNode; //
    update head
    this.s.size += 1;
    return newNode;
  }

  //Adds element to the end of the list (tail)
  //O(1)
  add Tail (v alue) {
    const newNode = new Node(v alue);
  }
}
```



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```
        if (this.head) {
            new Node.previous
= this.tail;
            this.tail.next =
newNode;
            this.tail =
newNode;
        } else {
```

### Linked List (cont)

```
> this.head = newNode;
  this.tail = newNode;
}
this.size += 1;
return newNode;
}

// insert element at the position index of
the list
insertAt(element, index)
{
if (index < 0 || index > this.size)
return console.log("Please enter a valid
index.");
else {
// creates a new node
var node = new Node(element);
var curr, prev;
curr = this.head;
// add the element to the
// first index
if (index == 0) {
node.next = this.head;
this.head = node;
} else {
curr = this.head;
var it = 0;
// iterate over the list to find
// the position to insert
while (it < index) {
it++;
prev = curr;
curr = curr.next;
}
// adding an element
node.next = curr;
prev.next = node;
}
this.size++;
}
}
```

### Linked List (cont)

```
> //Removes element from the start of the
list (head/root).
//Runtime O(1)
removeHead() {
const head = this.head;
if (head) {
this.head = head.next;
if (this.head) {
this.head.previous = null;
} else {
this.tail = null;
}
this.size -= 1;
}
return head && head.value;
}
//Removes element to the end of the list.
Similar to Array.pop
//Runtime: O(1)
removeTail() {
const tail = this.tail;
if (tail) {
this.tail = tail.previous;
if (this.tail) {
this.tail.next = null;
} else {
this.head = null;
}
this.size -= 1;
}
return tail && tail.value;
}
// removes an element from the specified
location
removeFrom(index)
{
if (index < 0 || index >= this.size)
return console.log("Please Enter a
valid index");
else {
var curr, prev, it = 0;
```

### Linked List (cont)

```
> curr = this.head;
  prev = curr;

// deleting first element
if (index === 0) {
  this.head = curr.next;
} else {
  // iterate over the list to the
  // position to remove an element
  while (it < index) {
    it++;
    prev = curr;
    curr = curr.next;
  }

  // remove the element
  prev.next = curr.next;
}
this.size--;

// return the remove element
return curr.element;
}
}
// removes a given element from the list
removeElement(element)
{
var current = this.head;
var prev = null;
// iterate over the list
while (current != null) {
// comparing element with current
// element if found then remove the
// and return true
if (current.element === element) {
if (prev == null) {
this.head = current.next;
} else {
prev.next = current.next;
}
this.size--;
return current.element;
```

### Linked List (cont)

```
> }
prev = current;
current = current.next;
}
return -1;
}
// finds the index of element
indexOf(element)
{
var count = 0;
var current = this.head;

// iterate over the list
while (current != null) {
// compare each element of the list
// with given element
if (current.element === element)
return count;
count++;
current = current.next;
}

// not found
return -1;
}

isEmpty()
{
return this.size == 0;
}
}
```

### Queue with Array

```
//FIFO(First in First Out)
class Queue {
// Array is used to
implement Queue
constructor() {
this.items =
[];
}
enqueue(element){
//O(1)
this.items.push(element);
}
```

### Queue with Array (cont)

```
> //Removes an element from the front of
a queue (items[0])
dequeue(){ // O(n)
return this.items.shift();
}
peek(){
// return the front element from the queue
return this.items[0];
}
isEmpty(){
// return true if queue is empty
return this.items.length == 0;
}
}
```

### Queue with Linked List

```
class Queue {
constructor() {
this.items = new
LinkedList();
}
//Add element to the queue
//Runtime: O(1)
enqueue(item) {
this.items.addTail(item);
return this;
}
//Remove element from the
queue
//Runtime: O(1)
dequeue() {
return this.removeHead();
}
getSize() {
return this.items.size;
}
isEmpty() {
return !this.items.size;
}
}
```

### Stack with Array

```
//LIFO(Last in First Out) AND
FILO(First in Last Out)
class Stack {
// Array is used to
implement stack
constructor() {
this.items =
[];
}
push(element){ //O(1)
this.items.push(element);
}
pop(){ // O(1)
return this.items.pop();
}
peek(){
// return the top most
element from the stack
return this.items[this.items.length - 1];
}
isEmpty(){
// return true if stack
is empty
return this.items.length == 0;
}
}
```

