Question: Implement own bind

```
Function.prototype.bind = function(context){

    const fn = this;
    const mainArguments = [].slice.call(arguments, 1);
    return function() {
        const currentArgs = [].slice.call(arguments);
        return fn.apply(context, [...mainArguments, ...currentArgs]);
    }
}
```

Question: Debounce

```
function debounce(func, interval, callfirst){

   let timeout;
   return function () {
      const context = this, args = arguments;

      let delay = function() {
         timeout = null;
         if(!callfirst){
         func.apply(context, args);
         }
      }

      const isCallFirst =  callfirst && !timeout;

      clearTimeout(timeout);

      timeout = setTimeout(delay, interval|| 500);
```

```
        if(isCallFirst) {

          func.apply(context, args);
        }
    }

}
```

Question : currying

```
function curry(func){

return  function (){
          const arguments1 = arguments;
        if(arguments1.length >= func.length){
            return func.apply(this, arguments1);
        }else{
        return function(){
             return curry.apply(this,
func.bind(argument1.concat(arguments)))
         }
        }
    }
}


curriedSum(10, 20, 30) => 60
curriedSum(10, 20)(30) => 60
curriedSum(10)(20)(30) => 60

let curriedSum = curry(sum);
```

Question: implement loadsh get

```
__get(object, keys, defaultVal = null): any {
    keys = Array.isArray(keys) ? keys :
keys.replace(/(\[(\d)\])/g, '.$2').split('.'); //
split by dot of array
    object = object[keys[0]];
    if (object && keys.length > 1) {
      return this.__get(object, keys.slice(1),
defaultVal);
    }
    return object === undefined ? defaultVal :
object;
  }
```

Question Link list

// adds an element at the end

// of list

add(element)

{

// creates a new node

var node = new Node(element);

```
        // to store current node
        var current;

        // if list is Empty add the
        // element and make it head
        if (this.head == null)
                this.head = node;
        else {
                current = this.head;

                // iterate to the end of the
                // list
                while (current.next) {
                        current = current.next;
                }

                // add node
                current.next = node;
        }
        this.size++;
}
```

```
// insert element at the position index
// of the list
insertAt(element, index)
{
        if (index > 0 && index > this.size)
                return false;
        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 = 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++;
        }
}

// removes an element from the
// specified location
removeFrom(index)
{
        if (index > 0 && index > this.size)
```

```
        return -1;
    else {
        var curr, prev, it = 0;
        curr = this.head;
        prev = curr;

        // deleting first element
        if (index == = 0) {
            this.head = curr.next;
        } else {
            // iterate over the list to the
            // position to removce 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;
            }
            prev = current;
            current = current.next;
        }
        return -1;
}

// finds the index of element
indexOf(element)
{
        var count = 0;
        var current = this.head;

        // iterae 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;
}

// gives the size of the list
size_of_list()
{
        console.log(this.size);
}

class Node{
    constructor(data, next = null){
        this.data = data,
        this.next = next
    }
}
```

Question : memorization

```
const memoize = (callback, threshold = 1000) => {

let memo = new LRU(threshold);

return(args) => {

if(memo.get(args) != undefined){
console.log("from cache");
console.log(memo.getSizeOfCache())
return memo.get(args);
}else{
memo.set(args, callback(args))
return  memo.get(args);
}

}

}
```

Question : LRU

```
class LRU{

constructor(threshold = 100){
    this.max = threshold;
    this.cache = new Map();
}

get(key){
```

```
    // console.log("iun get", key)
    let item = this.cache.get(key);
     console.log(key,item)
    if(item != undefined){
        this.cache.delete(key);
        this.cache.set(key, item);
    }
   return item;

}

set(key, val){
    if(this.cache.has(key)){
         this.cache.delete(key);
    }

    if(this.cache.size === this.max){
        this.cache.delete(this.getFirst())
    }
    this.cache.set(key, val);

}

getFirst(){
    return this.cache.keys().next().value;
}

getSizeOfCache(){
    return this.cache.keys()
}

}
```

Question : chocolate/wrapper

```
static int countMaxChoco(int money,
                         int price, int wrap)
    {

        // Corner case
        if (money < price)
            return 0;

        // First find number of chocolates
        // that can be purchased with the
        // given amount
        int choc = money / price;

        // Now just add number of chocolates
        // with the chocolates gained by
        // wrapprices
        choc = choc + (choc - 1) / (wrap - 1);
        return choc;
    }
```

// recursion

```
int countRec(int choc, int wrap)
{
    // If number of chocolates is less than
    // number of wrappers required.
    if (choc < wrap)
        return 0;

    // We can immediatly get newChoc using
```

```
    // wrappers of choc.
    int newChoc = choc/wrap;

    // Now we have "newChoc + choc%wrap"
wrappers.
    return newChoc + countRec(newChoc +
choc%wrap,
                              wrap);
}
```

Question : maxDiff from an array

```
function getMaxiff (arr){
  const length  = arr.length;
 let maxDiff = -100
 if(!length){
    return  maxDiff;
 }
 let maximumRightValue = arr[length-1];
 for(let i = length-2; i>=0 ; i--){
  if(arr[i] > maximumRightValue){
    maximumRightValue = arr[i];
  }else{
    const currentDiff = maximumRightValue - arr[i];
  //  console.log(currentDiff, arr[i])
    if(currentDiff > maxDiff){
```

```
      maxDiff = currentDiff;
    }
   }
 }
 return maxDiff;
}
console.log(getMaxiff([2, 3, 10, 6, 4, 8, 1]))
```

Question: Implement map function

```
const hoMyMap = function(callback, arr) {

    let resultArray = [];
    for(let i = 0; i<arr.length; i++){
        resultArray.push(callback(arr[i], i, this))
    }

    return resultArray;
}
```

Memorization for async

```
function memo(func, isAsync){
    let memo = {};

    const x = function(args){
        memo[args] = memo[args] || func.apply(this, args);
        return  memo[args];
    }
    x.store = memo;
```

```
    if(isAsync){
        return async function(){
            const args = JSON.stringify(arguments)
            x(arguments);
        }
    }else{
        return function(){
            const args =[].slice.call(arguments);
            x(args);
        }
    }

}
```

Memoization with cache return

```
function memo(func){
    let memo = {};
    let a = function(){
        const args = [].slice.call(arguments);
        if(memo[args]){
            return memo[args];
        }else{
            memo[args] = func.apply(this, args);
            return  memo[args];
        }
    };
    a.store = memo;
    return a;
}
```

Stock profit maximize (Single trans)

```
var maxProfit = function(prices) {
    let result = 0;
    let min = prices[0];
    for(let i = 1; i < prices.length; i++) {
        min = Math.min(prices[i], min);
        result = Math.max(result, prices[i] - min);
    }
    return result;
};
```

Stock profit maximize multiple transaction

```
var maxProfit = function(prices) {
    let profit = 0;
    for (let i = 0; i < prices.length - 1; i++) {
        const possibleProfit = prices[i + 1] - prices[i];
        profit = Math.max(profit + possibleProfit, profit);
    }
    return profit;
};
```

```
var maxProfit = function(prices) {
    if(prices.length < 2) return 0;
    let min = prices[0], sum = 0;
    for(let i = 1 ; i < prices.length ; i++){
        if(prices[i]  >= prices[i - 1]){
            sum += (prices[i] - prices[i-1]);
        }
    }

    return sum;
};
```

Stock profit(sell before buying)

```
var maxProfit = function(prices) {
    let haveOne = -prices[0]
    let haveTwo = -Infinity
    let notHaveOne = -Infinity
    let notHaveTwo = -Infinity
    for (let i = 1; i < prices.length; i++) {
        haveOne = Math.max(haveOne, -prices[i])
        haveTwo = Math.max(haveTwo, notHaveOne-prices[i])
        notHaveOne = Math.max(notHaveOne, haveOne+prices[i])
        notHaveTwo = Math.max(notHaveTwo, haveTwo+prices[i])
    }
    return Math.max(0, notHaveOne, notHaveTwo)
};
```

Longest Word in Dictionary

```
var longestWord = function(words) {
    let set = new Set(words);
    let res = "";
    words.forEach(a => {
        if(a.length < res.length) return;
        if(a.length == res.length && a > res) return;
        for(let i = a.length - 1; i> 0 ; i--) {
            if( !set.has( a.substring(0, i))) return

        }
        res = a;
    })
    return res;
};
```

Jump Game

```
var jump = function(nums) {
    let currFarest = 0
    let currEnd = 0
    let jump = 0
    for (let i = 0; i < nums.length - 1; i++) {
      currFarest = Math.max(currFarest, i + nums[i])
      // Improvement
      if (currFarest >= nums.length -1) return jump+1
      if (currEnd === i) {
        jump++
        currEnd = currFarest
      }
    }
    return jump
  };
```

```
function jump(nums) {
    var max = 0;
    var nextMax = 0;
    var jumps = 0;

    nums.some((v, i) => {
```

```
        if (max >= nums.length - 1) {
            return true;
        }

        nextMax = Math.max(i + v, nextMax);

        if (i === max) {
            max = nextMax;
            jumps++;
        }
    });

    return jumps;
}
```

Rotten eggs problem :

```
var orangesRotting = function(grid) {
    const height = grid.length;
    const width = grid[0].length;
    let fresh = 0;
    const queue = [];
    for (let i = 0; i < height; i++) {
      for (let j = 0; j < width; j++) {
        if (grid[i][j] === 2) queue.push([i, j]);
        if (grid[i][j] === 1) fresh++;
      }
    }
    let minute = 0;
    while (queue.length) {
      const size = queue.length;
      for (let i = 0; i < size; i++) {
        const [x, y] = queue.shift();
        if (x - 1 >= 0 && grid[x - 1][y] === 1) {
          grid[x - 1][y] = 2;
          fresh--;
          queue.push([x - 1, y]);
        }
        if (x + 1 < height && grid[x + 1][y] === 1) {
          grid[x + 1][y] = 2;
          fresh--;
          queue.push([x + 1, y]);
        }
```

```
        if (y - 1 >= 0 && grid[x][y - 1] === 1) {
          grid[x][y - 1] = 2;
          fresh--;
          queue.push([x, y - 1]);
        }
        if (y + 1 < width && grid[x][y + 1] === 1) {
          grid[x][y + 1] = 2;
          fresh--;
          queue.push([x, y + 1]);
        }
      }
      if (queue.length > 0) minute++;
    }
    return fresh === 0 ? minute : -1;
  };
```

BFS

```
var orangesRotting = function(grid) {
    const height = grid.length;
    const width = grid[0].length;
    let fresh = 0;
    const queue = [];
    for (let i = 0; i < height; i++) {
      for (let j = 0; j < width; j++) {
        if (grid[i][j] === 2) queue.push([i, j]);
        if (grid[i][j] === 1) fresh++;
      }
    }
    let minute = 0;
    while (queue.length) {
      const size = queue.length;
      for (let i = 0; i < size; i++) {
        const [x, y] = queue.shift();
        if (x - 1 >= 0 && grid[x - 1][y] === 1) {
          grid[x - 1][y] = 2;
          fresh--;
          queue.push([x - 1, y]);
        }
        if (x + 1 < height && grid[x + 1][y] === 1) {
          grid[x + 1][y] = 2;
          fresh--;
          queue.push([x + 1, y]);
        }
```

```
      if (y - 1 >= 0 && grid[x][y - 1] === 1) {
        grid[x][y - 1] = 2;
        fresh--;
        queue.push([x, y - 1]);
      }
      if (y + 1 < width && grid[x][y + 1] === 1) {
        grid[x][y + 1] = 2;
        fresh--;
        queue.push([x, y + 1]);
      }
    }
    if (queue.length > 0) minute++;
  }
  return fresh === 0 ? minute : -1;
};
```

Task runner

```
const exampleTaskA = (name) => new Promise(resolve => setTimeout(function() {
    console.log(`Task ${name} Done`);
    resolve()
  }, Math.floor(Math.random() * 2000)))

  function TaskRunner(concurrency) {
    this.limit = concurrency;
    this.store = [];
    this.active = 0;
  }

  TaskRunner.prototype.next = function() {
    if (this.store.length) this.runTask(...this.store.shift())
  }

  TaskRunner.prototype.runTask = function(task, name) {
    this.active++
    console.log(`Scheduling task ${name} current active: ${this.active}`)
    task(name).then(() => {
      this.active--
      console.log(`Task ${name} returned, current active: ${this.active}`)
      this.next()
    })
  }
  TaskRunner.prototype.push = function(task, name) {
    if (this.active < this.limit) this.runTask(task, name)
```

```
    else {
      console.log(`queuing task ${name}`)
      this.store.push([task, name])
    }
  }

  var task = new TaskRunner(2);
  task.push(exampleTaskA, 1)
  task.push(exampleTaskA, 2)
```

Sort character by frequency

```
var frequencySort = function(s) {
    var map = {};
    var result = '';
    var stringArray = s.split('');
    //put the character count into a map
    for(var i=0;i<stringArray.length;i++){
        map[stringArray[i]] = map[stringArray[i]] + 1 || 1;
    }
    //sort the map first, then push into the result
    Object.keys(map).sort((a,b)=>map[b]-map[a]).forEach(function(v){
        for(var j=0;j<map[v];j++){
            result += v;
        }
    });

    return result;

};
```

Two Sum

```
const twoSum = (nums, target) => {
    const map = {};
    for (let i = 0; i < nums.length; i++) {
      const another = target - nums[i];
      if (another in map) {
        return [map[another], i];
      }
      map[nums[i]] = i;
    }
```

```
    return null;
  };
```

Median of two sorted array

```
var findMedianSortedArrays = function(nums1, nums2) {
    //ES6 syntax to break down the 2 arrays
       let num = [...nums1, ...nums2];
    //Sort in numerical order
     num.sort((a,b) => a-b);

     if(num.length % 2 != 0){
         //Return the middle value if number of total elements is odd
          return (num[Math.floor(num.length/2)]);
     }else{
         //Return the average of the middle values if number of total elements is
 even
          return (num[Math.floor(num.length/2)-
1] + num[Math.floor(num.length/2)])/2;
     }
 };
```

Container With Most Water

```
var maxArea = function(height) {
    let max = 0;
    let i = 0;
    let j = height.length - 1;

    while(i < j){
        let cur = (j - i) * Math.min(height[i], height[j]);
        max = Math.max(cur, max);
        height[i] <= height[j] ? i ++ : j --;
    }

    return max;
};
```

Triplet sum

```
var threeSum = function(nums) {
    var rtn = [];
    if (nums.length < 3) {
        return rtn;
    }
    nums = nums.sort(function(a, b) {
        return a - b;
    });
    for (var i = 0; i < nums.length - 2; i++) {
        if (nums[i] > 0) {
            return rtn;
        }
        if (i > 0 && nums[i] == nums[i - 1]) {
            continue;
        }
        for (var j = i + 1, k = nums.length - 1; j < k;) {
            if (nums[i] + nums[j] + nums[k] === 0) {
                rtn.push([nums[i], nums[j], nums[k]]);
                j++;
                k--;
                while (j < k && nums[j] == nums[j - 1]) {
                    j++;
                }
                while (j < k && nums[k] == nums[k + 1]) {
                    k--;
                }
            } else if (nums[i] + nums[j] + nums[k] > 0) {
                k--;
            } else {
                j++;
            }
        }
    }
    return rtn;
};
```

Remove Duplicates from Sorted Array

```
var removeDuplicates = function(nums) {
    let lastIndex = 0;
```

```
    nums.forEach(n => {
        if(nums[lastIndex] != n){
            lastIndex++;
            nums[lastIndex] = n;
        }
     });
    return lastIndex +1;
};
```

Next Permutation

```
var nextPermutation = function(nums) {
    // find the first descending element, nums[i-1] that satisfies nums[i-
1] < nums[i] in the array from the right
    let i = nums.length - 1;
    while (i > 0) {
        if (nums[i-1] >= nums[i]) {
            i--;
        } else {
            break;
        }
    }
    // swap nums[i-1] with the smallest element between nums[i] and nums[length-
1] that is larger than nums[i-
1] (only do this step if the current array is not entirely descending like [4, 3,
 2, 1])
    let j = nums.length - 1;
    while (j > i) {
        if (nums[j] <= nums[i-1]) {
            j--;
        } else {
            break;
        }
    }
    if (i !== 0) {
        swap(nums, i-1, j);
    }
    // reverse the part between nums[i] and nums[length-1] by using swap
    let mid = Math.floor((i+nums.length)/2);
    for (let k = i; k < mid; k++) {
        swap(nums, k, nums.length - k + i - 1);
    }
};
```

```
function swap(arr, i, j) {
    let temp = arr[i];
    arr[i] = arr[j];
    arr[j] = temp;
}
```

Find index in rotated sorted array

```
ar search = function(nums, target) {
    let start = 0,
      end = nums.length - 1;

    while (start < end) {
      let mid = Math.floor((start + end) / 2);

      // fast path, early returns...
      if (nums[mid] === target) return mid;
      if (nums[start] === target) return start;
      if (nums[end] === target) return end;

      // left part is sorted...
      if (nums[mid] > nums[start]) {
        if (target > nums[start] && target < nums[mid]) {
          end = mid - 1;
        } else {
          start = mid + 1;
        }
      }
      // right part is sorted...
      else if (nums[mid] < nums[end]) {
        if (target > nums[mid] && target < nums[end]) {
          start = mid + 1;
        } else {
          end = mid - 1;
        }
      } else {
        return -1;
      }
    }
    return nums[start] === target ? start : -1;
  };
```

Find the set of combination of sum

```
var combinationSum = function(candidates, target) {
    if (!candidates || !candidates.length) { return []; }
    candidates.sort((a,b) => a - b);
    const solutions = [];
    const findCombos = function(candIdx, subtotal, solution) {
        for (let i = candIdx; i < candidates.length; i++) {
            if (subtotal + candidates[i] === target) {
                solutions.push(solution.concat(candidates[i]));
            } else if (subtotal + candidates[i] < target) {
                findCombos(i, subtotal + candidates[i], solution.concat(candidate
s[i]));
            }
        };
    };
    findCombos(0, 0, []);
    return solutions;

};
```

First missing positive

```
var firstMissingPositive = function(nums) {
    let next = 1;
    let index = 0;
    while(index < nums.length) {
        if(nums[index] == next) {
            next += 1;
            index = 0;
        } else {
            index += 1;
        }
    }
    return next;
};
```

Rotate image by 90 degree

```

Transpose the matrix
Reverse each row
var rotate = function(matrix) {
```

```
    for (let i=0;i<matrix.length;i++) {
        for (let j=i;j<matrix[0].length;j++) {
            let temp = matrix[i][j];
            matrix[i][j] = matrix[j][i];
            matrix[j][i] = temp;
        }
    }

    for (let i=0;i<matrix.length;i++) {
        for (let j=0;j<matrix[0].length/2;j++) {
            let temp = matrix[i][j];
            matrix[i][j] = matrix[i][matrix[0].length-j-1];
            matrix[i][matrix[0].length-j-1] = temp;
        }
    }
};
```

Maximum sum subarray

```
var maxSubArray = function(nums) {
    if(nums.length == 0) return 0;
    let result = Number.MIN_SAFE_INTEGER;
    let sum = 0;
    for(let i = 0; i < nums.length; i++) {
        sum += nums[i];
        result = Math.max(sum, result);
        sum = sum < 0 ? 0 : sum;
    }
    return result;
};
```

Spiral matrix

```
var spiralOrder = function(matrix) {
    let res=[];
    if(matrix.length==0) return [];
    res.push(...matrix.shift());
    while(matrix.length>0){
        //rotate left
        matrix=matrix[0].map((item,index,arr)=>{return matrix.map(x=> x[arr.lengt
h-1-index])});
        //shift
        res.push(...matrix.shift());
```

```
    }

    return res
};
```

Merge intervals

```
function merge(intervals) {
    if (!intervals.length) return intervals
    intervals.sort((a, b) => a.start !== b.start ? a.start - b.start : a.end - b.
end)
    var prev = intervals[0]
    var res = [prev]
    for (var curr of intervals) {
      if (curr.start <= prev.end) {
        prev.end = Math.max(prev.end, curr.end)
      } else {
        res.push(curr)
        prev = curr
      }
    }
    return res
  }
```

Unique path in matrix

```
var uniquePaths = function(m, n) {
    var arr = new Array(m);
      for (var i = 0; i < arr.length; ++i) {
        arr[i] = new Array(n);
      }
      let res = numberOfPathsRecDP(arr,m-1,n-1);
      //console.log(arr2D)
      return res
    };

    function numberOfPathsRecDP(memo,m,n){
      //console.log('index',m,n)
      if(m === 0|| n === 0) {
        memo[m][n] = 1
        return 1;
      }
```

```
      if(memo[m][n] === undefined){
        //console.log(n)
        memo[m][n] = numberOfPathsRecDP(memo,m-
1,n) + numberOfPathsRecDP(memo,m,n-1)
      }
      return memo[m][n];
    }
```

Plus one to the array

```
var plusOne = function(digits) {
    for(let i = digits.length - 1; i >= 0; i --){
      if(digits[i] === 9){
        digits[i] = 0;
      }
      else {
        digits[i] ++;
        return digits;
      }
    }
    return [1, ...digits];
  };
```

Sort colors inplace

```
function sortColors (nums) {
    let low = 0, high = nums.length - 1

    for (let i = 0; i <= high;i++) {
        if (nums[i] === 0) {
            [nums[i], nums[low]] = [nums[low], nums[i]]
            low++;
        } else if (nums[i] == 2) {
            [nums[i], nums[high]] = [nums[high], nums[i]]
            high--;i--
        }
    }
};
```

Number of subset

```
var subsets = function(nums) {
    let result = [];
    dfs([], 0);

    function dfs(current, index){
        result.push(current);
        for(let i = index; i < nums.length; i++) {
            dfs(current.concat(nums[i]), i + 1);
        }
    }

    return result;
};
```

```
const subsets = nums => {
    let res = [[]],
        curr;
    for(let num of nums) {
        curr = res.map(x => [...x, num]);
        res = [...res, ...curr];
    }
    return res;
};
```

Maximum rectangle

```
var maximalRectangle = function(matrix) {
    if (matrix.length === 0) {
        return 0
    }
    const heights = new Array(matrix[0].length + 1).fill(0)
    let ret = 0
    matrix.forEach(line => {
        line.forEach((flag, i) => {
            heights[i] = flag === '1' ? heights[i] + 1 : 0
        })
        const stack = [[0, -1]]
```

```
        let top = 0
        heights.forEach((height, index) => {
            let memoIndex = index
            while (stack[top][0] > height) {
                const [h, i] = stack.pop()
                ret = Math.max(ret, (index - i) * h)
                memoIndex = i
                top--
            }
            if (stack[top][0] < height) {
                stack.push([height, memoIndex])
                top++
            }
        })
    })
    return ret
};
```

Parenthesis check

```
var isValid = function(s) {
    let map = {
        ")": "(",
        "]": "[",
        "}": "{"
    }
    let arr = [];
    for(let i = 0; i < s.length; i ++){
        if(s[i] === "(" || s[i] === "[" || s[i] === "{"){
            arr.push(s[i]);
        }
        else{
            if(arr[arr.length - 1] === map[s[i]]){
                arr.pop();
            }
            else return false;
        }
    }
    return arr.length === 0 ? true : false;
};
```

Reverse Link list

```
var reverseList = function(head) {
    let pre = null
    while(head){
        const next = head.next
        head.next = pre
        pre = head
        head = next
    }
    return pre
};
```

Group Anagram

```
const groupAnagrams = strs => {
    const map = {};

    for (let str of strs) {
        const key = [...str].sort().join('');

        if (!map[key]) {
            map[key] = [];
        }

        map[key].push(str);
    }

    return Object.values(map);
};
```

Intersection of two array

```
function intersection(nums1, nums2) {
    const set = new Set(nums1);
    return [...new Set(nums2.filter(n => set.has(n)))];
}
```

```
const intersection = (nums1, nums2) => {
    return [...new Set(nums1.filter(num => nums2.includes(num)))]
```

```
};
```

Set properties

```
function isSuperset(set, subset) {
    for (let elem of subset) {
        if (!set.has(elem)) {
            return false
        }
    }
    return true
}

function union(setA, setB) {
    let _union = new Set(setA)
    for (let elem of setB) {
        _union.add(elem)
    }
    return _union
}

function intersection(setA, setB) {
    let _intersection = new Set()
    for (let elem of setB) {
        if (setA.has(elem)) {
            _intersection.add(elem)
        }
    }
    return _intersection
}

function symmetricDifference(setA, setB) {
    let _difference = new Set(setA)
    for (let elem of setB) {
        if (_difference.has(elem)) {
            _difference.delete(elem)
        } else {
            _difference.add(elem)
        }
    }
    return _difference
}

function difference(setA, setB) {
```

```
    let _difference = new Set(setA)
    for (let elem of setB) {
        _difference.delete(elem)
    }
    return _difference
}

// Examples
let setA = new Set([1, 2, 3, 4])
let setB = new Set([2, 3])
let setC = new Set([3, 4, 5, 6])

isSuperset(setA, setB)          // => true
union(setA, setC)               // => Set [1, 2, 3, 4, 5, 6]
intersection(setA, setC)        // => Set [3, 4]
symmetricDifference(setA, setC) // => Set [1, 2, 5, 6]
difference(setA, setC)          // => Set [1, 2]
```

Unique email address

```
var numUniqueEmails = function(emails) {
    return new Set(emails.map(function(item, index) {
        var [name, domain] = item.split("@")
        var [nameNoPlus, namePlus] = name.split("+");
        var nameSimplified = nameNoPlus.split(".").join("")
        var emailSimplified = nameSimplified + "@" + domain;
        return emailSimplified;
    })).size;

};
```

First unique character index

```

var firstUniqChar = function(s) {

    var map=new Map();
    let deletehash = {};
    for(i=0;i<s.length;i++){
         if(map.has(s[i])){
             map.delete(s[i]);
             deletehash[s[i]] = i;
         }
```

```
         else{
             if(!deletehash[s[i]]){
                 map.set(s[i],i);
             }

         }
     }

    if( map.values().next().value ||  map.values().next().value === 0){
        return  map.values().next().value;
    }
    return -1;
};
```

Subarray Sum Equals K

```
var subarraySum = function(nums, k) {
    let map = {0: 1};
    let sum = 0;
    let count = 0;

    for (let i = 0; i < nums.length; i++) {
         console.log(sum)
        console.log(map)
        sum += nums[i];

        if (map[sum - k]) {
            count += map[sum - k];
            console.log("in", sum-k)
        }
        map[sum] = map[sum] ? map[sum] + 1 : 1;

    }

    return count;
};
```

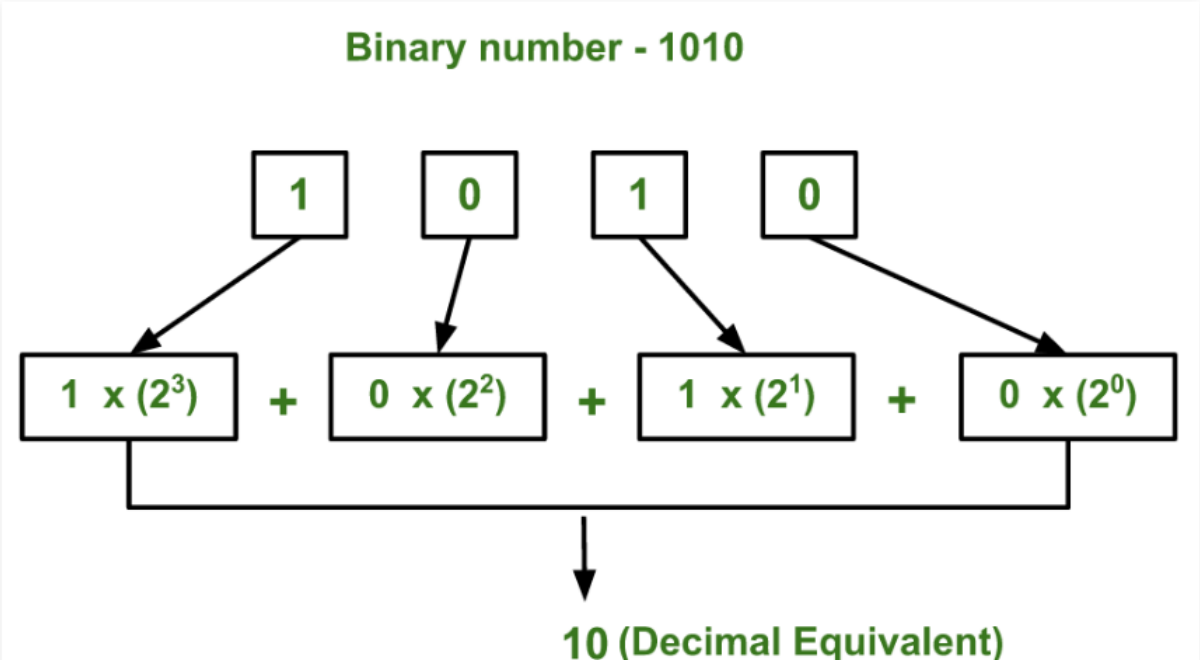
Convert dec to binary

```
function binary(n){
let s = "";
```

```
while(n > 0){
    s = n % 2 + s
    n = parseInt(n / 2);
}
return s;
}
```

parseInt(num, radix);

Convert binary to dec



Pow(x, n)

```
var myPow = function(x, n) {
    if (n === 0) return 1
    else if (n === 1) return x;
    else if (n === -1) return 1 / x;
    else if (n % 2 === 0) {
        const m = myPow(x, n/2);
        return m * m
    }
    else return x * myPow(x, n - 1);
};
```

K-th Symbol in Grammar

```
var kthGrammar = function(N, K) {
    if (N === 1) return 0;
    const mother = kthGrammar(N-1, parseInt((K+1)/2));
    return K % 2 === 0 ? !mother : mother;
};
```

```

// This function returns the complementary value
var cpl = function(n){
    if(n==0){
        return 1
    }
    if(n==1){
        return 0
    }
}

var kthGrammar = function(N, K) {

// If N is 1 or K is 1 the first value has to be 0 so we check that
   if(N==1 || K==1){
       return 0
   }

// If N is 2 and K is 2 is the simplest occurrence of 1

   if(N==2 && K==2){
       return 1
   }

// When K is smaller or equal than 2^N-
1 the solution is the same as the kthGrammar(N-1, K) problem
   if(K<=Math.pow(2, N-1)){
       return kthGrammar(N-1, K)
   }
// When K is larger than 2^N-
1 the solution is the complementary value (opposite) of the kthGrammar(N, K-
Math.pow(2, N-1))

   return cpl(kthGrammar(N, K-Math.pow(2, N-1)))
}
```

Permutation of array

```
var permute = function(nums, n = 0) {
    if (n >= nums.length) return [[]];
    const res = [];
    const prevs = permute(nums, n + 1);  // permutations of elements after n
    for (let prev of prevs) {
        for (let i = 0; i <= prev.length; i++) {
            let p = prev.slice(0);
            p.splice(i, 0, nums[n]);  // successively insert element n
            res.push(p);
        }
    }
    return res;
};
```

Generate Parentheses

```
var generateParenthesis = function(n) {
    var arr = [];
    compose(n, n, '');
    return arr;

    function compose(left, right, str) {
      if (!left && !right && str.length) return arr.push(str);
      if (left) compose(left - 1, right, str + '(');
      if (right > left) compose(left, right - 1, str + ')');
    }
  };
```

Longest Substring Without Repeating Characters

```
var lengthOfLongestSubstring = function(s) {
    if (!s) return 0;

    const positions = {};
    let startIndex = 0;
    let maxLength = 0;

    for (let i = 0; i < s.length; i++) {
        const char = s.charAt(i);

        if (positions[char] !== undefined && positions[char] >= startIndex) {
```

```
            maxLength = Math.max(maxLength, i - startIndex);
            startIndex = positions[char] + 1;
        }

        positions[char] = i;
    }

    maxLength = Math.max(maxLength, s.length - startIndex);

    return maxLength;
};
```

Add to list in reverse

```
var addTwoNumbers = function(l1, l2) {
    var List = new ListNode(0);
    var head = List;
    var sum = 0;
    var carry = 0;

    while(l1!==null||l2!==null||sum>0){

        if(l1!==null){
            sum = sum + l1.val;
            l1 = l1.next;
        }
        if(l2!==null){
            sum = sum + l2.val;
            l2 = l2.next;
        }
        if(sum>=10){
            carry = 1;
            sum = sum - 10;
        }

        head.next = new ListNode(sum);
        head = head.next;

        sum = carry;
        carry = 0;

    }

    return List.next;
```

```
};
```

ZigZag Conversion

```
function convert(s, numRows) {

    if (numRows === 1) {
      return s;
    }

    const N = s.length;
    const arr = [...Array(numRows)].map(r => []);

    for (let i = 0; i < N; i++) {
      const pos = i % (2*numRows-2);
      const ii = pos < numRows ? pos : 2*numRows-2-pos;
      arr[ii].push(s[i]);
    }

    return arr.map(r => r.join('')).join('');
  }
```

String to Integer (atoi)

```
The Idea

Trim
Get the sign
Get the digit
var myAtoi = function(str) {
    let i=0, sign = 1, num = 0, MIN = -2147483648, MAX = 2147483647;
    str = str.trim();
    if (str[i]=='-' || str[i]=='+') sign = str[i++]=='-'?-1:1;
    while (str[i] && str[i].charCodeAt(0)-48 <= 9 && str[i].charCodeAt(0)-
48 >= 0) {
        num = num*10 + (str[i++].charCodeAt(0)-48);
    }
    num = sign*num;
    return num<=MIN?MIN:num>=MAX?MAX:num;
};
```

Search Insert Position

```
var searchInsert = function(nums, target) {
    let index = -1;
    for(let i=0; i< nums.length; i++){
        if(nums[i] === target || nums[i] > target){
            index = i;
            break;
        }
    }
    return index === -1 ? nums.length : index;
};
```

Unique Paths in grid

```
const uniquePaths = (m, n) => {
    const makeMatrix = (m, n) => Array(m).fill(Array(n).fill(1));
    let matrix = makeMatrix(m, n);
    for(let i = 1; i < m; i++) {
        for(let j = 1; j < n; j++) {
            matrix[i][j] = matrix[i-1][j]+matrix[i][j-1];
        }
    }
    return matrix[m-1][n-1];
};
```

Unique Paths in grid with obstacle

```
var uniquePathsWithObstacles = function(obstacleGrid) {
    let mtrx = obstacleGrid;

    for (let i = 0; i < mtrx.length; i++) {
        for (let j = 0; j < mtrx[0].length; j++) {
            if (!i && !j) mtrx[i][j] !== 1 ? mtrx[i][j] = 1 : mtrx[i][j] = 0;
            else if (!j) mtrx[i][j] !== 1 ? mtrx[i][j] = mtrx[i - 1][j] : mtrx[i]
[j] = 0;
            else if (!i) mtrx[i][j] !== 1 ? mtrx[i][j] = mtrx[i][j - 1] : mtrx[i]
[j] = 0;
```

```
            else mtrx[i][j] !== 1 ? mtrx[i][j] = mtrx[i - 1][j] + mtrx[i][j - 1]
: mtrx[i][j] = 0;
        }
    }

    return mtrx[mtrx.length - 1][mtrx[0].length - 1];
};
```

Remove Duplicates from Sorted List

```
/**
 * Definition for singly-linked list.
 * function ListNode(val) {
 *     this.val = val;
 *     this.next = null;
 * }
 */
/**
 * @param {ListNode} head
 * @return {ListNode}
 */
var deleteDuplicates = function(head) {
    const dummy = new ListNode();
    dummy.next = head;
    let node = dummy;                                          // the las
t known distinct node
    while (node.next) {
        if (node.next.next && node.next.val === node.next.next.val) {  // if the
next two nodes are equal...
            let nonValNode = node.next.next.next;
            while (nonValNode && nonValNode.val === node.next.val) {   // ...find
 the first one that isn't...
                nonValNode = nonValNode.next;
            }
            node.next = nonValNode;                            // ...and
glue it to the last known distinct node;...
        } else {
            node = node.next;                                  // ...othe
rwise the next node is distinct
        }
    }
    return dummy.next;
};
```

Validate Binary Search Tree

```
var isValidBST = function(root, min, max){
    return isValidBSTHelper(root, -Infinity, Infinity);
};

let isValidBSTHelper = function(root, min, max){
    if(root === null) return true;
    if(root.val <= min || root.val >= max) return false;
    return isValidBSTHelper(root.left, min, root.val) && isValidBSTHelper(root.ri
ght, root.val, max);
}
```

Binary Tree Level Order Traversal

```
var levelOrder = function(root) {
    let result = [];
    currentLevelNodes = [];
    if(root)
        currentLevelNodes.push(root);
    while(currentLevelNodes.length > 0) {
        current = [];
        let len = currentLevelNodes.length;
        for (let i = 0; i< len; i++) {
            let node = currentLevelNodes.shift();
            current.push(node.val);
            if(node.left) {
                currentLevelNodes.push(node.left);
            }
            if(node.right) {
                currentLevelNodes.push(node.right);
            }
        }
        result.push(current);
    }
    return result;
};
```

Binary Tree Zigzag Level Order Traversal

```
var zigzagLevelOrder = function(root) {
    let res = [];
    helper(root, 0, res);
    return res;
};

var helper = function(node, level, res){
    if(!node) return;
    if(!res[level]) res[level] = [];
    level % 2 ? res[level].unshift(node.val) : res[level].push(node.val);
    helper(node.left, level + 1, res);
    helper(node.right, level + 1, res);
}
```

Maximum Depth of Binary Tree

```
var maxDepth = function(root) {
    if(root === undefined || root===null){
        return 0;
    }
    return Math.max(maxDepth(root.left),maxDepth(root.right)) + 1;
};
```

Construct Binary Tree from Preorder and Inorder Traversal

```
var buildTree = function(preorder, inorder) {
    function helper(p1, p2, i1, i2) {
        if (p1 > p2 || i1 > i2) return null; // sanity check

        var value = preorder[p1],           // get the root value
            index = inorder.indexOf(value), // get inorder position
            nLeft = index - i1,             // count nodes in left subtree
            root  = new TreeNode(value);    // build the root node

        // build the left and right subtrees recursively
        root.left  = helper(p1 + 1, p1 + nLeft, i1, index - 1);
        root.right = helper(p1 + nLeft + 1, p2, index + 1, i2);
```

```
        return root;
    }

    return helper(0, preorder.length - 1, 0, inorder.length - 1);
};
```

Convert Sorted Array to Binary Search Tree

```
/**
 * Definition for a binary tree node.
 * function TreeNode(val) {
 *     this.val = val;
 *     this.left = this.right = null;
 * }
 */
/**
 * @param {number[]} nums
 * @return {TreeNode}
 */
var sortedArrayToBST = function(nums) {
    if (!nums.length) return null;

    const mid = Math.floor(nums.length / 2);
    const root = new TreeNode(nums[mid]);

    // subtrees are BSTs as well
    root.left = sortedArrayToBST(nums.slice(0, mid));
    root.right = sortedArrayToBST(nums.slice(mid + 1));

    return root;
};
```

Minimum Depth of Binary Tree

```
/**
 * Definition for a binary tree node.
 * function TreeNode(val) {
 *     this.val = val;
 *     this.left = this.right = null;
 * }
 */
```

```
/**
 * @param {TreeNode} root
 * @return {number}
 */
var minDepth = function(root) {
    if(!root) return 0;
    var result;
    function minHeight(root, depth){
        if(!root.left && !root.right){
            result = Math.min(result || depth, depth)
        }
        if(root.left) minHeight(root.left, depth + 1);
        if(root.right) minHeight(root.right, depth + 1);
    }
    minHeight(root, 1);
    return result;
};
```

Path Sum for binary tree

```
var hasPathSum = function(root, sum) {
    var a = false,
        b = false;

    if(root === null)
        return false;

    sum -= root.val;

    if(sum === 0 && root.left === null && root.right === null)
        return true;

    if(root.left !== null)
        a = hasPathSum(root.left, sum);
    if(root.right !== null)
        b = hasPathSum(root.right, sum);

    return a || b;

};
```

House Robber

```
var rob = function(nums) {

    solution = {};

    solution[nums.length] = 0;
    solution[nums.length-1] = nums[nums.length-1];

    for (let i=nums.length-2; i>=0; i--) {
        solution[i] = Math.max(nums[i] + solution[i + 2], solution[i+1]);
    }

    return solution[0];
};
```

Word Break

```
const wordBreak = (s, wordDict) => {
    return verify(s, wordDict, 0, [])
};

const verify = (word, dict, start, memo) => {
    if(start === word.length) return true
    if(memo[start] !== undefined ) return memo[start]
    for (let end = start +1; end <= word.length; end++) {

        let subStr= word.substring(start, end)

        if(dict.includes(subStr) && verify(word, dict, end, memo)) {
            return memo[start] = true
        }
    }
    return memo[start] = false
}
```

```
// new - The bug fixed.

var wordBreak = function(s, wordDict) {

        for (let i = 0; i < wordDict.length; i++) {

                s = s.split(wordDict[i]).join('.');
```

```
    }

    return s.split('.').join('').length === 0;

};
```

Minimum Size Subarray Sum

```
function minSubArrayLen(s, nums) {
    var min = Number.MAX_VALUE;
    // boundaries
    var l = 0;
    var r = -1;
    // current sum
    var sum = 0;
    while (r < nums.length) {
        if (sum >= s) {
            min = Math.min(min, r - l + 1);
            sum -= nums[l];
            l++;
        } else {
            r++;
            sum += nums[r];
        }
    }

    return min === Number.MAX_VALUE ? 0 : min;
}
```

Number of Islands

```
var numIslands = function(grid) {
    let count = 0;
    let h = grid.length;
    let w = h && grid[0].length;
    for(let i = 0; i < h; i ++){
        for(let j = 0; j < w; j ++){
            if(grid[i][j] === '0') continue;
            count ++;
            dfs(i, j);
        }
    }

    return count;

    function dfs(n, m){
```

```
        if(n < 0 || m < 0 || n >= h || m >= w) return;
        if(grid[n][m] === '1'){
            grid[n][m] = '0';
            dfs(n + 1, m);
            dfs(n - 1, m);
            dfs(n, m + 1);
            dfs(n, m - 1);
        }
    }

};
```

Move Zeroes inplace

```
function moveZeroes(nums) {
    var idx = 0;
    for (var i = 0; i < nums.length; i++) {
      if (nums[i] !== 0) {
        nums[idx] = nums[i];
        nums[i] = idx === i ? nums[i] : 0;
        idx++;
      }
    }
  }
```

Longest Increasing Subsequence

```
function lengthOfLIS(nums) {
    var lis = [];
    for (var i = 0; i < nums.length; i++) {
        lis.push(1);
        for (var j = 0; j < i; j++) {
            if (nums[j] < nums[i]) lis[i] = Math.max(lis[i], lis[j] + 1);
        }
    }
    return nums.length ? Math.max.apply(null, lis) : 0;
}
```

Coin Change

```
var coinChange = function(coins, amount) {
    var dp=new Array(amount+1);
    dp.fill(Number.MAX_VALUE-1);
    dp[0]=0;
    for(var i=1;i<=amount;i++)
    {
        for(var j=0;j<coins.length;j++)if(coins[j]<=i){
            dp[i]=Math.min(dp[i-coins[j]]+1, dp[i]);
        }

    }
       return dp[amount]==Number.MAX_VALUE-1 ? -1:dp[amount];
};
```

Top K Frequent Elements

```
const topKFrequent = (nums, k) => {
    const map = {};
    for (const n of nums) {
      if (map[n] == null) map[n] = 0;
      map[n]++;
    }

    const arr = [];
    for (const n in map) {
      arr.push({ n, count: map[n] });
    }

    return arr
      .sort((a, b) => b.count - a.count)
      .slice(0, k)
      .map(a => Number(a.n));
  };
```

Is Subsequence

```
var isSubsequence = function(s, t) {
    let newS = s;
    for (let char of t) {
        if (newS[0] === char) {
            newS = newS.slice(1);
```

```
        }
    }
    return !newS.length;
};
```

Merge Two Binary Trees

```
var mergeTrees = function(t1, t2) {
    if (!t1 && !t2) {
        return null;
    }

    if (!t1 || !t2) {
        return t1 || t2;
    }

    var root = new TreeNode(t1.val + t2.val);

    root.left = mergeTrees(t1.left, t2.left);
    root.right = mergeTrees(t1.right, t2.right);

    return root;
};
```

Max Area of Island

```
const maxAreaOfIsland = (grid) => {
    const res = { count: 0 }
    for (let r = 0; r < grid.length; r++) {
        for (let c = 0; c < grid[0].length; c++) {
            dfs(grid, r, c, res)
        }
    }
    return res.count
};

const dfs = (grid, r, c, res, area = { count: 0 }) => {
    if (!grid[r] || !grid[r][c]) return
    res.count = Math.max(res.count, area.count += grid[r][c])
    grid[r][c] = 0
    dfs(grid, r, c - 1, res, area)
    dfs(grid, r, c + 1, res, area)
    dfs(grid, r - 1, c, res, area)
```

```
    dfs(grid, r + 1, c, res, area)
};
```

Kth Largest Element in a Stream

```
class KthLargest {
    /**
     * @param {number} k
     * @param {number[]} nums
     */
    constructor(k, nums) {
        this.pq = new PriorityQueue({ initialValues: nums });
        this.k = k;

        while (this.pq.size() > this.k) {
            this.pq.poll();
        }
    }

    /**
     * @param {number} val
     * @return {number}
     */
    add(val) {
        if (this.pq.size() < this.k) {
            this.pq.offer(val);
        } else if (val > this.pq.peek()) {
            this.pq.poll();
            this.pq.offer(val);
        }

        return this.pq.peek();
    }
}
```

Capacity To Ship Packages Within D Days

```
var shipWithinDays = function(weights, D) {
    if (!weights || weights.length === 0 || D === 0) {
        return 0;
    }
    // The weights is actually sorted sequence.
    // The minimum capacity would be the minimum weight
    // we can start with that.
```

```
    // In naive approach, start with minium weight as your capacity
    // go through the weights, when you exceed capacity, increment the days since
 you can only
    // deliver max weight = capacity.
    // If at the end of weights, your total days exceeded D, that means your capa
city was less, and hence increase capacity.
    // Pick first item from left and add to capacity
    // Then repeat the previous process.
    // When you meet the days === D criteria, your capacity is the answer


    // What you did earlier was a linear search, since this is a sorted sequence
(not literally but sequence needs to be processed in the same order)
    // We can do the same thing with binary search. Keep dividing the weights by
2 to get the capacity value instead of increasing it one element at a time.


    let totalWeight = 0;
    let maxWeight = weights[0];
    for (let i = 0;i < weights.length;i++) {
        if (weights[i] > maxWeight) {
            maxWeight = weights[i];
        }
        totalWeight += weights[i];
    }

    let start = maxWeight;
    let end = totalWeight;

    while (start < end) {
        const mid = start + Math.floor((end - start) / 2);
        // this is capacity we are trying for.
        let numberOfDaysNeeded = 1;
        let currentDayWeightTotal = 0;

        // Now go through all the weights
        for (let i = 0;i < weights.length;i++) {
            const weight = weights[i];
            if (weight + currentDayWeightTotal > mid) {
                // current day weight becomes more than our capacity, so incremen
t the days,
                // reset current day sum
                numberOfDaysNeeded++;
                currentDayWeightTotal = 0;
            }
```

```
            currentDayWeightTotal += weight;
        }

        if (numberOfDaysNeeded > D) {
            // lets move right
            start = mid + 1;
        } else {
            // lets move left
            end = mid;
        }
    }
    return start;
};
```

Merge sorted array (m+n,n)

```
var merge = function (nums1, m, nums2, n) {
    var len = m + n;
    m--;
    n--;

    while (len--) {
        if (n < 0 || nums1[m] > nums2[n]) {
            nums1[len] = nums1[m--];
        } else {
            nums1[len] = nums2[n--];
        }
    }
};
```