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Assignments on JavaScript

1) Write a program that asks the user for a number n and prints the sum of the numbers 1 to n.

JavaScript Code:

index.html | index.js

Q1 > index.js > ...

```
let number = Number(prompt("Enter the value of n: "));

const answer = document.createElement("h3");

let sum = 0;
for (let i = 1; i <= number; i++) {
  sum += i;
}

answer.innerHTML = "Sum of numbers from 1 to " + number + " = " + sum;
document.body.appendChild(answer);
console.log(sum);
```

Output:

127.0.0.1:5500/Q1/index.html

Q1. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n

Sum of numbers from 1 to 100 = 5050

---

2) Modify the previous program such that only multiples of three or five are considered in the sum, e.g. 3, 5, 6, 9, 10, 12, 15 for n=17.

JavaScript Program:

index.html | index.js

Q2 > index.js > ...

```
13      } else if (i % 5 == 0) {
14        arr.push(i);
15        sum += i;
16      }
17    }
18
19    const element1 = document.createElement("h3");
20    const element2 = document.createElement("h3");
21
22    element1.innerHTML =
23      "Sum of multiples of three or five upto " + number + " is: " + sum;
24
25    document.body.appendChild(element1);
26
27    element2.innerHTML = "Multples of 3 or 5 upto " + number + " is: " + arr;
28
29    document.body.appendChild(element2);
30
```

Output:

127.0.0.1:5500/Q2/index.html

2) Modify the previous program such that only multiples of three or five are considered in the sum,

e.g. 3, 5, 6, 9, 10, 12, 15 for n=17

Sum of multiples of three or five upto 100 is: 2418

Multples of 3 or 5 upto 100 is:
3,5,6,9,10,12,15,18,20,21,24,25,27,30,33,35,36,39,40,42,45,48,50,51,54,55,57,60,63,65,66,69,70,72,75,78,80,81,84,85,87,90,93,95,96,99,100

3) Make a function that returns “even” or “odd” depending on the number passed to it.

parity(1); --> "odd"

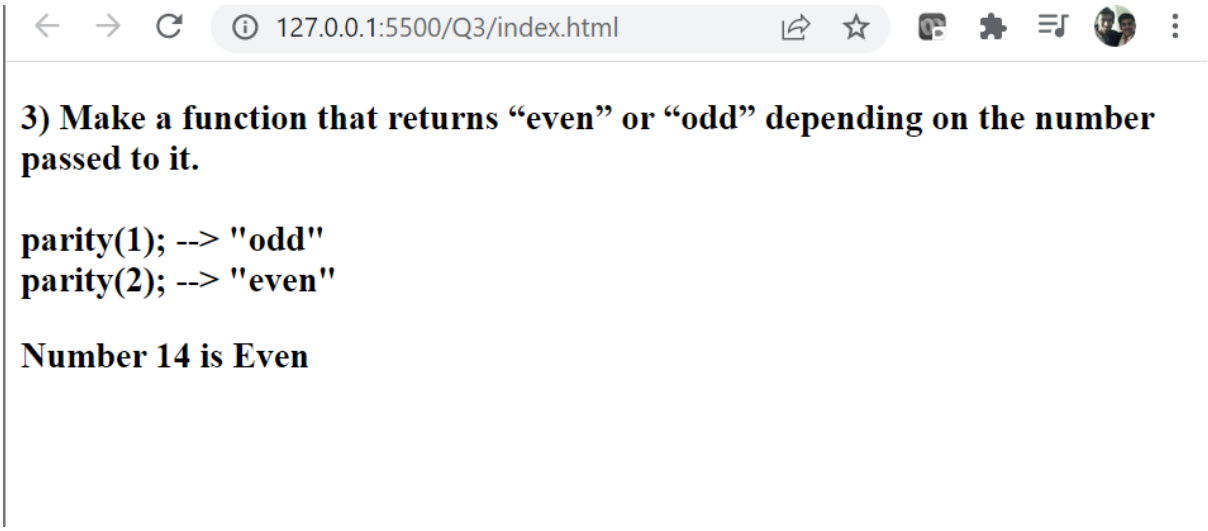
parity(2); --> "even"

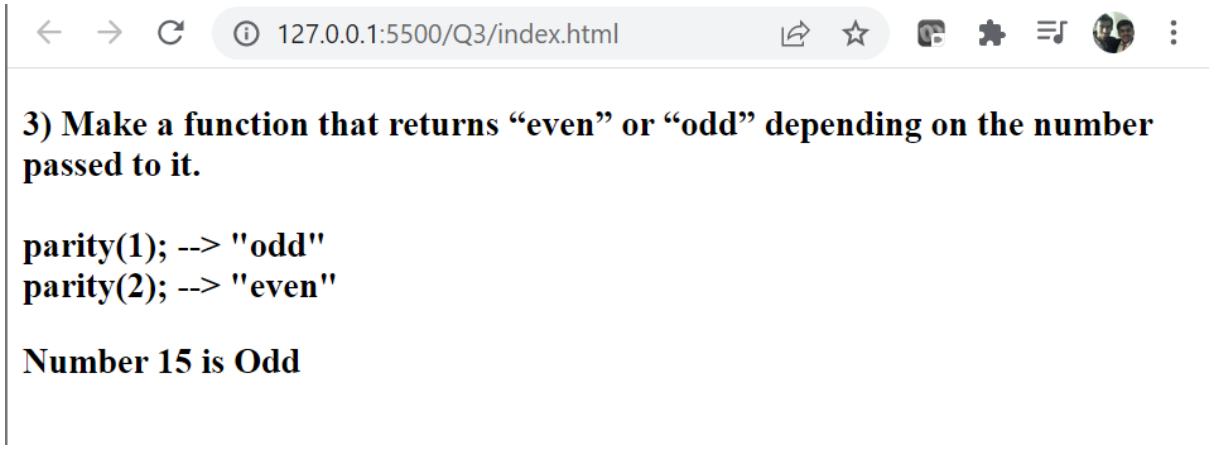
JavaScript Code:

Q3 > index.js > OddEven

```
function OddEven(number) {
  if (number % 2 == 0) {
    return `Number ${number} is Even`;
  } else {
    return `Number ${number} is Odd`;
  }
}

let number = prompt("Enter the number: ");

const element = document.createElement("h3");
element.innerHTML = OddEven(number);

document.body.appendChild(element);

```

Output:





4) Make a function that takes number of flips as parameter and returns the fraction that were

heads

headsRatio(10); --> 0.7

headsRatio(10); --> 0.4

headsRatio(10000); --> 0.5023

headsRatio(10000000); --> 0.4999948

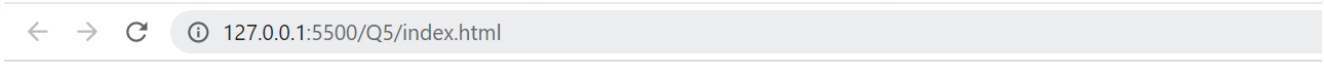
5) Write a program that prints the next 20 leap years.

JavaScript Code:

Q5 > JS index.js > ...

```
let year = 2022;

let count = 0;

let element = document.createElement("h3");

let arr = [];
while (count != 20) {
  if (year % 4 == 0) {
    if (year % 100 == 0) {
      if (year % 400 == 0) {
        arr.push(year);
        count++;
      }
    } else {
      arr.push(year);
      count++;
    }
  }
  year++;
}

element.innerHTML = arr;
document.body.appendChild(element);

```

Output:



5) Write a program that prints the next 20 leap years.

2024,2028,2032,2036,2040,2044,2048,2052,2056,2060,2064,2068,2072,2076,2080,2084,2088,2092,2096,2104

---

6) Write a function that takes a list of strings and prints them, one per line, in a rectangular frame.

For example the list ["Hello", "World", "in", "a", "frame"] gets printed as:

****

* Hello *

* World *

* in *

* a *

* frame *

JavaScript Code:

Q6 > index.js > list.forEach() callback > element3

```
let list = ["Hello", "World", "in", "a", "frame"];

let element1 = document.createElement("h3");
let element2 = document.createElement("h3");

let element4 = document.createElement("h3");

element1.innerHTML = "Output: ";
document.body.appendChild(element1);

element2.innerHTML = "*********";
document.body.appendChild(element2);
list.forEach(function (element) {
  let element3 = document.createElement("h3");
  let str = element;
  str = "*" + element + "*";
  element3.innerText = str;
  document.body.appendChild(element3);
});
element4.innerHTML = "*********";
document.body.appendChild(element4);

```

Output:

6) Write a function that takes a list of strings and prints them, one per line, in a rectangular frame.

For example the list ["Hello", "World", "in", "a", "frame"] gets printed as:

```
*********
* Hello *
* World *
* in *
* a *
* frame *
*********
```

Output:

```
*********
*Hello*
*World*
*in*
*a*
*frame*
*********
```

---

7) Create a Simple page that lets users enter a currency value in dollars and convert the value in other currencies.

E.g.1 dollar is:

a. 74.28 INR (Indian Rupee)

b. 109.14 Yen (Japanese Yen)

c. 0.84 Euro (Euro)

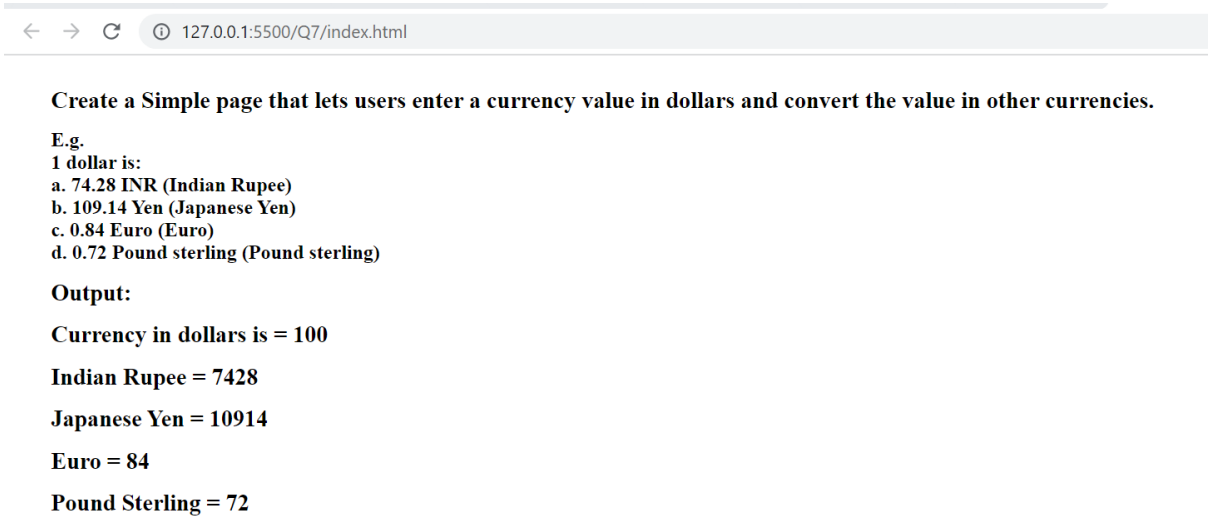
d. 0.72 Pound sterling (Pound sterling).

JavaScript Code:

Q7 > index.js > ...

```js
let currency = prompt("Enter the currency value in dollars: ");
const inr = currency * 74.28;
const yen = currency * 109.14;
const euro = currency * 0.84;
const pound = currency * 0.72;

let arr = {
  "Indian Rupee": inr,
  "Japanese Yen": yen,
  Euro: euro,
  "Pound Sterling": pound,
};

document.write(`<h3>Currency in dollars is = ${currency}</h3>`);
for (const key in arr) {
  document.write(`<h3>${key} = ${arr[key]} </h3>`);
}

```

Output:



8) Write a function that concatenates two arrays [a,b,c], [1,2,3] -> [a,b,c,1,2,3].

JavaScript Code:

index.html index.js

Q8 > index.js > ...

```
1   let arr1 = [1, 2, 3];
2   let arr2 = ["a", "b", "c"];
3
4   let element = document.createElement("h3");
5   element.innerHTML = arr1.concat(arr2);
6   document.body.appendChild(element);
7
```

Output:

127.0.0.1:5500/Q8/index.html

Write a function that concatenates two arrays [a,b,c], [1,2,3] -> [a,b,c,1,2,3].

Output:

1,2,3,a,b,c

---

9) Write a function that combines two lists by alternatingly taking elements

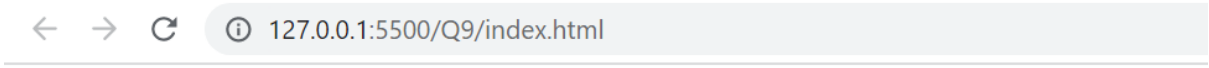
E.g. [a,b,c], [1,2,3] -> [a,1,b,2,c,3].

JavaScript Program:

Q9 > JS index.js > ...

```
let arr1 = [1, 2, 3];
let arr2 = ["a", "b", "c"];

let i = 0;
let arr3 = [];

while (i < arr1.length && i < arr2.length) {
  arr3.push(arr1[i], arr2[i]);
  i += 1;
}

document.write(`<h3>Array 1 = ${arr1}`);
document.write(`<h3>Array 2 = ${arr2}`);
document.write(`<h3>${arr3}</h3>`);
```

Output:



9) Write a function that combines two lists by alternatingly taking elements E.g. [a,b,c], [1,2,3] -> [a,1,b,2,c,3].

Output

Array 1 = 1,2,3

Array 2 = a,b,c

1,a,2,b,3,c

10) Write a function that computes the list of the first 100 Fibonacci numbers. The first two

Fibonacci numbers are 1 and 1. The n+1-st Fibonacci number can be computed by adding the n-th and the n-1-th Fibonacci number. The first few are therefore 1, 1, 1+1=2, 1+2=3, 2+3=5, 3+5=8.

JavaScript Code:

index.html index.js

Q10 > index.js > arr.forEach() callback

```
let arr = [1, 1];
count = 2;

while (count != 100) {
  let a = arr[arr.length - 1];
  let b = arr[arr.length - 2];

  arr.push(a + b);
  count++;
}

arr.forEach(function (element) {
  document.write(` <b>${element}, `);
});

```

Output:

The list of the first 100 Fibonacci numbers.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811, 514229, 832040, 1346269, 2178309, 3524578, 5702887, 9227465, 14930352, 24157817, 39088169, 63245986, 102334155, 165580141, 267914296, 433494437, 701408733, 1134903170, 1836311903, 2971215073, 4807526976, 7778742049, 12586269025, 20365011074, 32951280099, 53316291173, 86267571272, 139583862445, 225851433717, 365435296162, 591286729879, 956722026041, 1548008755920, 2504730781961, 4052739537881, 6557470319842, 10610209857723, 17167680177565, 27777890035288, 44945570212853, 72723460248141, 117669030460994, 190392490709135, 308061521170129, 498454011879264, 806515533049393, 1304969544928657, 2111485077978050, 3416454622906707, 5527939700884757, 8944394323791464, 14472334024676220, 23416728348467684, 37889062373143900, 61305790721611580, 99194853094755490, 160500643816367070, 259695496911122560, 420196140727489660, 679891637638612200, 1100087778366101900, 1779979416004714000, 2880067194370816000, 4660046610375530000, 7540113804746346000, 12200160415121877000, 19740274219868226000, 31940434634990100000, 51680708854858330000, 83621143489848430000, 135301852344706760000, 218922995834555200000, 354224848179262000000,

11) Write function that reverses an array of random values, preferably in place.

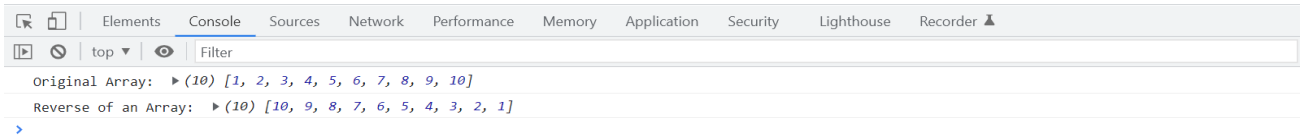
Program:

Q11 > index.js > ...

```
function reverseArray(arr1) {
  let n = arr1.length;

  for (let i = 0; i < n / 2; i++) {
    [arr1[i], arr1[n - i - 1]] = [arr1[n - i - 1], arr1[i]];
  }

  return arr1;
}

let arr = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
console.log("Original Array: ", arr);

let arr1 = reverseArray(arr);
console.log("Reverse of an Array: ", arr1);
```

Output:

Write function that reverses an array of random values, preferably in place.



12) Write a function that, given a string, will return the longest token (consecutive string of characters) that contains neither an a nor a b.

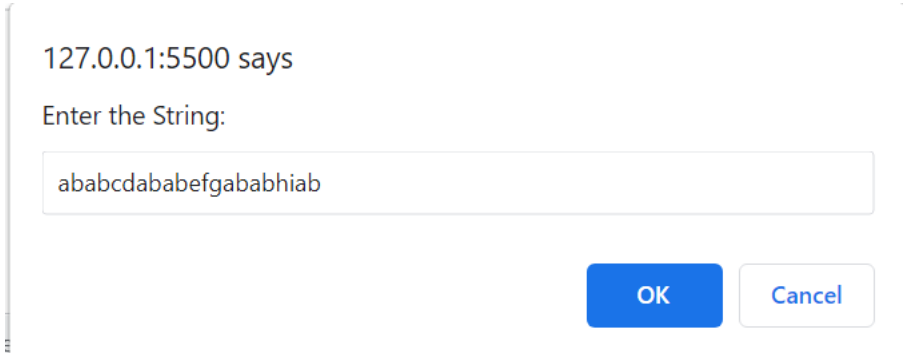
longestToken("ababcdababefgababhiab"); --> "efg"

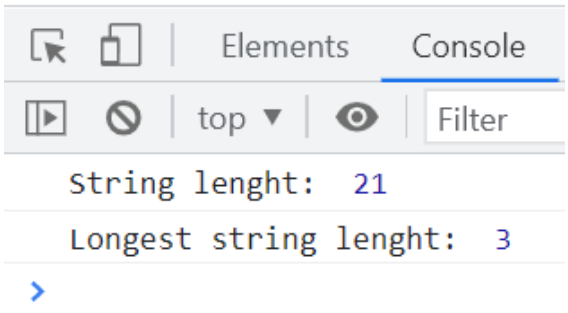
longestToken("aba"); --> "".

JavaScript code:

```
function longestToken(str) {
  let prev_Len = 0,
    curr_Len = 0;
```

```
  let finalStr = null;
  let i = 0,
    j = 0;

  console.log("String lenght: ", str.length);
  for (i = 0; i < str.length; i++) {
    curr_Len = 0;
    if (str[i] != "a" || str[i] != "b" || str[i] != "c") {
      for (j = i + 1; j < str.length; j++) {
        if (str[j] == "a" || str[j] == "b" || str[j] == "c") {
          break;
        }
        curr_Len += 1;
      }
    }
    prev_Len = Math.max(prev_Len, curr_Len);
  }

  return prev_Len;
}

let str = prompt("Enter the String: ");
console.log("Longest string lenght: ", longestToken(str));
```



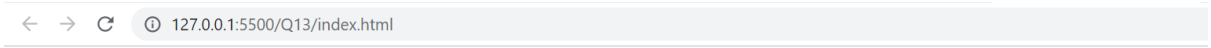


13) Write three functions that compute the sum of the numbers in an array: using a. a for-loop, b. a while-loop c. a do-while-loop

JavaScript Code:

```
let arr = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];

document.write(`<h1>Using for loop: </h1>`);

let sum = 0;

for (let i = 0; i < arr.length; i++) {
  sum += arr[i];
}

document.write(`<h1>Sum of all the elements in array: ${sum}`);

document.write(`<h1>Using while loop: </h1>`);

sum = 0;
let i = 0;

while (i < arr.length) {
  sum += arr[i];
  i++;
}

document.write(`<h1>Sum of all the elements in array: ${sum}`);

document.write(`<h1>Using do while loop: </h1>`);

sum = 0;
i = 0;

do {
  sum += arr[i];
  i++;
} while (i < arr.length);

document.write(`<h1>Sum of all the elements in array: ${sum}`);
```

Output:



Write three functions that compute the sum of the numbers in an array:

Using for loop:

Sum of all the elements in array: 55

Using while loop:

Sum of all the elements in array: 55

Using do while loop:

Sum of all the elements in array: 55

14) Create an array containing 100 random numbers.

a. Print the largest number amongst the 100

b. Print the smallest number amongst the 100

c. Print which count is high even count or odd count

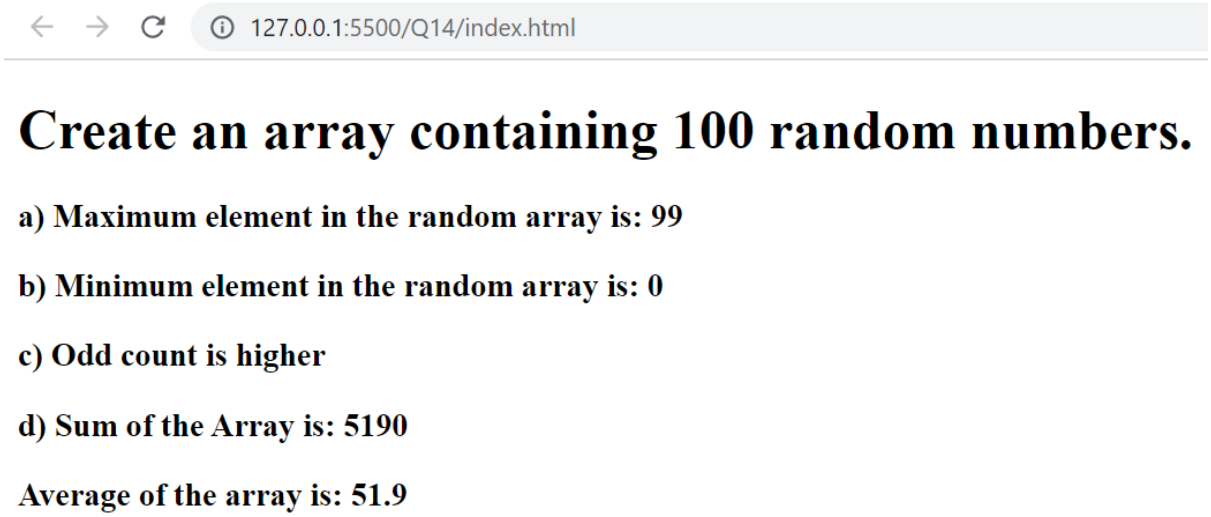
d. Print the sum and average value

JavaScript Program:

```
let randomArray = Array.from({ length: 100 }, () =>
  Math.floor(Math.random() * 100)
);

console.log(randomArray);

let max = randomArray[0];
let min = randomArray[0];

for (let i = 1; i < randomArray.length; i++) {
  max = Math.max(max, randomArray[i]);
  min = Math.min(min, randomArray[i]);
}

document.write(`<h3>a) Maximum element in the random array is: ${max}</h3>`);

document.write(`<h3>b) Minimum element in the random array is: ${min}</h3>`);
```

```
let oddCount = 0,
  evenCount = 0,
  sum = 0;

for (let i = 0; i < randomArray.length; i++) {
  if (randomArray[i] % 2 == 0) {
    evenCount++;
  } else {
    oddCount++;
  }
  sum += randomArray[i];
}

if (evenCount > oddCount) {
  document.write(`<h3>c) Even count is higher</h3>`);
} else if (oddCount > evenCount) {
  document.write(`<h3>c) Odd count is higher<h3>`);
} else {
  document.write(`<h3>c) Odd and Even Counts are same`);
}

document.write(
  `<h3>d) Sum of the Array is: ${sum}</h3>\n<h3>Average of the array is: ${
    sum / 100
  }</h3>`
);
```

Output:



15) Given an array of size 20 filled with random positive values. Implement the following sorting

Algorithms:

a. Bubble sort.

JavaScript:

Q15 > index.js > ...

```
function BubbleSort(randomArray) {
  for (let i = 0; i < randomArray.length; i++) {
    for (let j = i + 1; j < randomArray.length; j++) {
      if (randomArray[i] > randomArray[j]) {
        [randomArray[i], randomArray[j]] = [randomArray[j], randomArray[i]];
      }
    }
  }
  return randomArray;
}

let randomArray = Array.from({ length: 20 }, () =>
  Math.floor(Math.random() * 100)
);

document.write(`<h2>Original Array is`);
document.write(`<h2>${randomArray}</h2>`);

document.write(`<h2>Array After Sorting in Ascending order: </h2>`);
document.write(`<h2>${BubbleSort(randomArray)}</h2>`);

```

Output:

127.0.0.1:5500/Q15/index.html

Given an array of size 20 filled with random positive values. Implement the following sorting

Using Bubble Sort

Original Array is

18,30,26,38,79,94,61,17,22,23,75,3,31,11,50,73,58,60,52,43

Array After Sorting in Ascending order:

3,11,17,18,22,23,26,30,31,38,43,50,52,58,60,61,73,75,79,94

16) Create an HTML page that will Prompt the user:

It should take input for the number of rows and the number of columns

Then it should create a table (HTML table) with the given number of row and columns Each

cell of the table should contain the cell id (row#, col#).

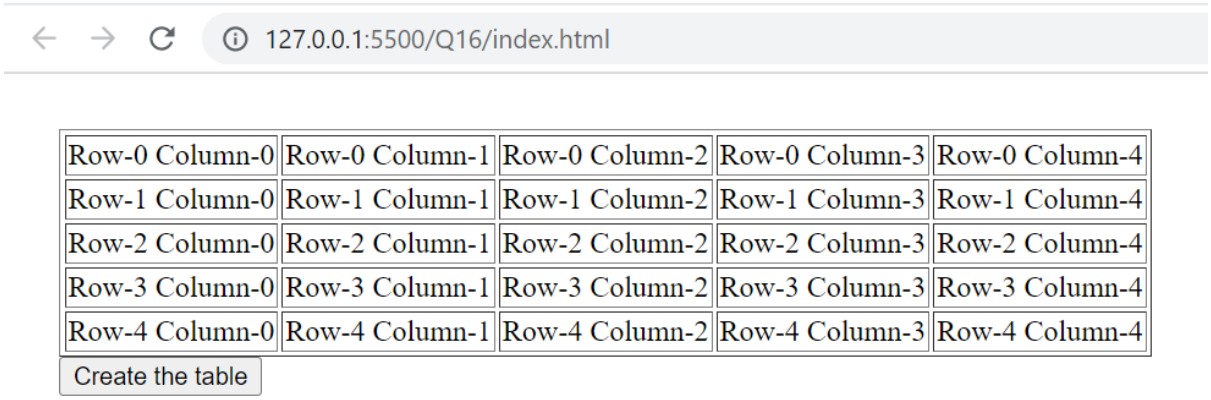
HTML Code:

```
<!DOCTYPE html>
<html>

<head>
    <meta charset=utf-8 />
    <title>Create a table</title>
    <style type="text/css">
        body {
            margin: 30px;
        }
    </style>
</head>

<body>
    <table id="myTable" border="1">
    </table>
    <form>
        <input type="button" onclick="createTable()" value="Create the table">
    </form>
    <script src="index.js"></script>
</body>

</html>
```

JavaScript Code:

```
function createTable() {
  rn = window.prompt("Input number of rows", 1);
  cn = window.prompt("Input number of columns", 1);

  for (var r = 0; r < parseInt(rn, 10); r++) {
    var x = document.getElementById("myTable").insertRow(r);
    for (var c = 0; c < parseInt(cn, 10); c++) {
      var y = x.insertCell(c);
      y.innerHTML = "Row-" + r + " Column-" + c;
    }
  }
}
```

Output:



17) Write a function that rotates a list by k elements. For example [1,2,3,4,5,6] rotated by two becomes [3,4,5,6,1,2]. Try solving this without creating a copy of the list. How many swap or move operations do you need?

JavaScript Code:

```
function RightRotate(a, n, k) {
  k = k % n;

  for (let i = 0; i < n; i++) {
    if (i < k) {
      document.write(`${a[n + i - k]} `);
    } else {
      document.write(a[i - k] + " ");
    }
  }
  document.write("<br>");
}

let arr = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
let N = arr.length;
let K = 2;

RightRotate(arr, N, K);
```

Output:

127.0.0.1:5500/Q17/index.html

17) Write a function that rotates a list by k elements.

For example [1,2,3,4,5,6] rotated by two becomes [3,4,5,6,1,2].

Try solving this without creating a copy of the list. How many swap or move operations do you need?

9 10 1 2 3 4 5 6 7 8

18) Write function that translates a text to Pig Latin and back. English is translated to Pig Latin by taking the first letter of every word, moving it to the end of the word and adding 'ay'.

E.g. "The quick brown fox" becomes "Hetay uickqay rownbay oxfay"

Code:

index.html | index.js

Q18 > index.js > finalStr

```
1   let str = prompt("Enter the string: ");
2   let finalStr = "";
3   const array = str.split(" ");
4
5   for (let i = 0; i < array.length; i++) {
6     let char = array[i].slice(0, 1);
7     let char2 = char.concat("ay");
8     let result = array[i].slice(1).concat(char2);
9
10    finalStr += result + " ";
11  }
12
13  document.write(`<h1>${finalStr}</h1>`);
14
```

Output:

E.G. “The Quick Brown Fox“ Becomes “Hetay Uickqay Rownbay Oxfay”

HeTay Uickqay Rownbay Oxfay