

Problem Solving on Loop

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List of Problems Involved

- Positive and Negative
- Prime Numbers
- Loops with break and continue statement
- Single Digit Sum
- Lowercase to Uppercase
- Reverse Pyramid

Positive and Negative

Problem – Given an array of numbers having both positive and negative numbers. Your task is to find the Negative and Positive element. For example –

Input – [1, -2, 3, -5, 7, -3, 9, 30, -23]

Output –

Negative element - -2 -5 -3 -23

Positive element - 1 3 7 9 30

Steps

- 1) Find the length of the given array using in-build method
- 2) Create two array for storing the negative and positive numbers
- 3) Iterate through array from index starting from 0th index to length - 1
- 4) Check if the number is less than 0 then push the number into negative array
- 5) Else push the number into positive number
- 6) Return the Positive and Negative array in space separated

Positive and Negative

```
function findNegativePositive(arr) {  
    const negativeArr = [];  
    const positiveArr = [];  
    for (let i = 0; i < arr.length; i++) {  
        if (arr[i] < 0) {  
            negativeArr.push(arr[i]);  
        }  
        else {  
            positiveArr.push(arr[i]);  
        }  
    }  
    console.log(negativeArr.join(' '));  
    console.log(positiveArr.join(' '));  
}  
  
let inp = [1, -2, 3, -5, 7, -3, 9, 30, -23];  
findNegativePositive(inp);
```

Code Link -
<https://www.ideone.com/e5kHlp>

Prime Numbers

Problem – Given a number N. You need to find all prime numbers less than or equal to N. For example –

Input – 7

Output – 2,3,5,7

Approach – We can traverse through the numbers starting from 2 to N and check if the number is prime number. We can use Loops to iterate through the numbers.

Steps -

- 1) Iterate through 1 to N
- 2) Check if number is prime number
- 3) If yes, print prime number

Prime Numbers

Code Link - <https://jsfiddle.net/2s7dhxqr/>

```
function isPrime(n)
{
    if (n <= 1)
        return false;

    for (let i = 2; i < n; i++)
        if (n % i == 0)
            return false;

    return true;
}

function printPrime(n)
{
    for (let i = 2; i <= n; i++) {
        if (isPrime(i))
            console.log(i + " ");
    }
}

let n = 5;
printPrime(n);
```

Loops with Break and Continue Statement

Problem – Write a program demonstrating break and continue functionality

Steps -

- 1) For loop to iterate through 0 to 9
- 2) Break statement when $i = 5$;
- 3) Step2 will terminate the loop when $i = 5$
- 4) For loop to iterate through 0 to 9
- 5) Continue statement when $i = 5$;
- 6) Step4 will skip printing 5

Loops with Break and Continue Statement

Code Link - <https://jsfiddle.net/grhokgef/>

```
//break statement
for ( i = 0; i < 10; i++) {
  // Terminate the loop when i is 5
  if (i == 5)
    break;
  console.log("i: " + i);
}
console.log("break functionality terminated the loop after printing 4");

//continue statement
for ( i = 0; i < 10; i++) {
  if (i == 5)
    continue;
  console.log("i: " + i);
}
console.log("continue functionality skipped 5 while executing the loop");
```


Single Digit Sum

Problem – Given a number N. You need to find the sum of digits of N until we get a single digit sum. For example –

Input – 12345

Output – 15 (1+2+3+4+5)

Approach – We can traverse through the sum until the sum value is less than or equal to 9. We can use Loops to iterate through the sum. Here we will use while loop for iteration

Steps -

- 1) Initialize sum = 0;
- 2) Verify if sum is less than 9 or $n > 0$ in loop condition
- 3) Fetch last digit of n and add to the sum
- 4) Remove last digit of n
- 5) Repeat step 2 till condition is satisfied
- 6) Return final value of sum

Single Digit Sum

Code Link - <https://jsfiddle.net/9pk8tvay/>

```
let n = 1234;

function getSum(n) {
  let sum = 0;
  while (n > 0 || sum > 9) {
    if(n == 0) {
      n = sum;
      sum = 0;
    }
    sum = sum + n % 10;
    n = Math.floor(n / 10);
  }
  return sum;
}

console.log(getSum(n));
```

Lowercase to uppercase

Problem – Given an string, write a program to convert lowercase word to uppercase word without using in-build function

Input – relevel

Output – RELEVEL

Approach – We can iterate through the string and replace the lowercase letter with uppercase letter

Step:

- 1) Store the both uppercase and lowercase character in the variable
- 2) Iterate the input string using map method and then find the index of the letter
- 3) Then replace the equivalent uppercase letter using the index
- 4) Adding the each letter in the variable and print

Lowercase to Uppercase

```
const LOWER_ALPHABET = 'abcdefghijklmnopqrstuvwxyz';
const UPPER_ALPHABET = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ';

const upperCase = (arr) => {
  const lowerArr = LOWER_ALPHABET.split('');
  const upperArr = UPPER_ALPHABET.split('');

  let newStr = '';
  arr.split('').map(item => {
    let index = LOWER_ALPHABET.indexOf(item);
    if (index >= 0) {
      newStr += UPPER_ALPHABET[index];
    }
    else {
      newStr += item;
    }
  })

  console.log(newStr);
}

upperCase('relevel')
```

Code Link -
<https://www.ideone.com/ZETI3L>

Maximum Profit Stock

Efficient Approach –Instead of using nested loops, we will use a single loop here.

STEPS -

`{100, 180, 260, 310, 40, 535, 695}`

- 1) Initialize maximumProfit = 0;
- 2) Iterate from 1 to length of array
- 3) Check if current stock price is greater than previous price
- 4) If yes, save difference of current and previous to the maximum Profit

Maximum Profit Stock

Code Link - <https://jsfiddle.net/etropv1h/>

```
function maximumProfit(prices , size) {  
  
    var maxProfit = 0;  
  
    for (i = 1; i < size; i++)  
        if (prices[i] > prices[i - 1])  
            maxProfit += prices[i] - prices[i - 1];  
    return maxProfit;  
}  
  
var price = [ 100, 180, 260, 310, 40, 535, 695 ];  
var n = price.length;  
  
// function call  
console.log(maximumProfit(price, n));
```

Reverse Pyramid

Problem – Given a number N. You need to print a reverse pyramid having N rows using numbers 1 to N. For example –

Input – 6

Output –

```
1 2 3 4 5 6
 2 3 4 5 6
  3 4 5 6
   4 5 6
    5 6
     6
```

Approach –

Intuition - Since, it is printing numbers N times, it's obvious that we need to use the loop concept here. Now, based on the pattern in the problem, we need to decide the pattern of calling loops.

Steps -

- 1) Outer loop - iterate from 1 to N - variable i
- 2) Inner loop 1 - print space (iterate from 1 to i) - variable j
- 3) Inner loop 2 - print number (iterate from i to N) - variable j
- 4) Print new line

Reverse Pyramid

Code Link -> <https://jsfiddle.net/h8gsz7pk/>

```
var rows = 6;    // Number N

//Print the pattern
for ( i = 1; i <= rows; i++)    // outer loop
{
    for ( j = 1; j < i; j++)    // inner loop 1
    {
        document.write("&nbsp;");
    }
    for ( j = i; j <= rows; j++)    // inner loop 2
    {
        document.write(j + " ");
    }
    document.write("<br>");
}
```


Practice Questions

- 1) Write a javascript program to print below pattern having numbers in pyramid form along with its mirror image

```
1 2 3 4 5 6 7
 2 3 4 5 6 7
  3 4 5 6 7
   4 5 6 7
    5 6 7
     6 7
      7
     6 7
    5 6 7
   4 5 6 7
  3 4 5 6 7
 2 3 4 5 6 7
1 2 3 4 5 6 7
```

- 2) Write a program to find the second smallest number from array using loops concept

Input -> [11,34,54,22,13,78]

Output -> 13

MCQ Questions

1) Which operations are performed inside a for loop?

- A) Initialization
- B) Updation
- C) Testing
- D) All of the above [Correct Answer]

2) What is the functionality of a continue statement in a loop?

- A) Restarts the loop
- B) End the loop
- C) Skips the rest of the code in the loop iteration [Correct Answer]
- D) None

3) Which of the following executes the block once before evaluating the conditional statement?

- A) Do while Loop [Correct Answer]
- B) While loop
- C) For loop
- D) None

MCQ Questions

4) Which of the following are examples of loops?

- A) For loop
- B) While Loop
- C) Do While Loop
- D) All of the above [Correct Answer]

5) What is the functionality of the break statement?

- A) Jumps over to the next iteration
- B) Jumps out from the loop [Correct Answer]
- C) Skips the rest of the code inside the loop iteration
- D) None

Thank you