Algorithm :

1 **Problem 1** : Given an array of positive integer elements.Print out the count of *Prime numbers* and *Narcissistic numbers* from the array and remove those elements from the array.

Sample Input 1 :

10,20,30,40,2,5,7,153,1024,1634,11

Expected Output format :

Prime Numbers Count : 4

Narcissistic Numbers Count : 5

The updated array : 10,20,30,40,1024

2 **Web Challenge :**

Create a Golden Ratio maze that looks like in the picture using HTML,CSS,JS

Note : i) The outermost div box dimensions are 900x555 which are in the ratio of 1:1.62
ii) All the inner div boxes should have 1:1.62

iii) The boxes should be created using Javascript DOM. Do not hardcode with HTML and CSS. Background colors should be generated with Math.Random()

3 Create an interactive command line program that continually takes a command line input from the user until the number is multiple of 11.

Sample Input 1 :

Enter the number : 5

Expected Output format :

5 is not multiple of 11. Try again.

Note : The command line input should not quit until the user enters a number which is multiple of 11. It should keep asking for a new input number.

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4 Web Challenge :

Create a Stopwatch using Javascript and HTML with *start, pause, reset button*.

Note : Try adding audio effects.

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5 Write an Algorithm to encrypt and decrypt an input string using XOR Cipher Algorithm

About XOR Cipher : https://en.wikipedia.org/wiki/XOR_cipher

Sample Input String 1 : abcd
Enter Key : A
Out Encrypted String : #"%

Sample Input String 1 : i can code
Enter Key : M
Out Encrypted String : $m.,#m.")(

- Note : String can be anything. Use ASCII values of string characters to perform XOR. Key could be anything. The same key will be used to decrypt.

- Perform Decryption algorithm as well. The Encrypted string will be given as input and the original input string will be a result with the key used to encrypt.

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6 Write an Algorithm to accept a number as a command line input. Check for the number is a Prime Number or not. If it's a prime number, print the multiplication table of the number.

Sample Input 1 : 2
Sample Output 1 :
2 is a Prime Number.
2 x 1 = 2
2 x 2 = 4
2 x 3 = 6
2 x 4 = 8
2 x 5 = 10
2 x 6 = 12
2 x 7 = 14
2 x 8 = 16
2 x 9 = 18
2 x 10 = 20
Sample Input 2 : 4
Sample Output 2 : 4 is not a prime number.

Note: The input number should be given as a command line. Program should keep asking for numbers until the user terminates with 'N'

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7 Write an Algorithm to take an input String 'S' with length 'N', split the string into two strings based on even and odd indexes while left padding the sub string with '000' and right padding the substring with '111'.

Sample Input 1 :
code.in
Sample Output 1 :
000cd.n111
000oei111

Sample Input 2 :
Hello there

Sample Output 2 :
000Hlotee111
000el hr111

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8 Web Challenge :

Embed any video in HTML File using video tag.

- The Video should autoplay when you open the HTML file.
- The play/pause button and volume controls should be disabled using Javascript/HTML5
- Users should not be able to fast forward or backward it.

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9 Web Challenge :

Write a HTML and JS Code to take the string as input and upon Submit button, alert the ASCII values of characters separated by comma for the input string.

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10 Write an algorithm to sort the given array elements using Bubble sort in descending order and print the number of swaps happening.

- Note : The input array should be given as a command line. First take the length of the array from the user and the elements from the console.
- The elements should be printed in descending order and total number of swaps.

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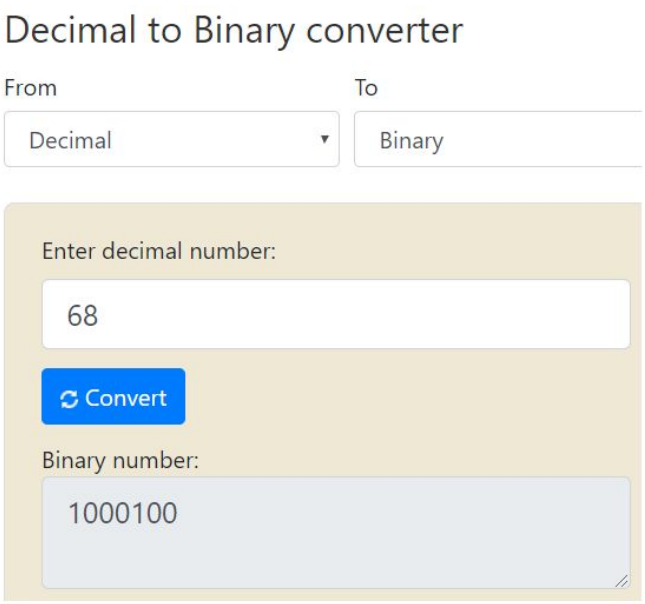
11 Web Challenge :

Create a Decimal to Binary Calculator using HTML, CSS, Javascript
Decimal to Hexa Decimal

Sample Output : You can style as you like as long the decimal to binary functionality is working.



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12 : Write an algorithm to find given a matrix, check whether it's magic square or not. (HINT:A Magic square is whose sum of elements diagonally,vertically,horizontally are equal)

Note : Input Matrix will be given to NxN elements. 2X2, 3X3, 4X4 etc., N should be taken from the command line.

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13 : Write An Algorithm to check if a given number is in the following series:

4,16,64,256,1024,4096,16384.,....., 4^N

Note : Output will be yes/no

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14 Write an algorithm to check if a given matrix is an identity matrix or not.

https://en.wikipedia.org/wiki/Identity_matrix

Output Format : Yes/No

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15 Write an Algorithm to check the frequency(count) of odd numbers and even numbers in the given input matrix.

Note:

1. Input should ask for size of matrix i.e (MXN) M rows, N col
2. All matrix elements should be taken as command line inputs

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16 Write an algorithm to print the below pattern.
Note : Number of lines should be taken as input.

Sample Input : 5
Sample Output:

```
1
21
321
4321
54321
```

17

A. Crack the series 2 15 41 80 132 197 275 366 470 587 ……
B. Write an algorithm to produce the above number series until ‘N’ where N is a positive integer.

Note : Input N should be taken as command line input.

18

A. Crack the series 1 2 3 6 9 18 27 54 ……
B. Write an algorithm to produce the above number series until ‘N’ where N is a positive integer.

Note : Input N should be taken as command line input.

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19 Web Challenge :

Build a Simple Alarm Clock using HTML, CSS, JavaScript.

1. HTML Input form takes Alarm input set time and date.

2. When it meets the time, the alarm should ring with some mp3 music.

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20 Write an algorithm to check

1. Whether the given input number is a multiple of 10.
2. If it is *multiple* of 10, Multiply given input with number 10 without using addition and multiplication operators. (NO * +)
3. If it is *not multiple* of 10, Multiply given input with number 8 without using addition and multiplication operators. (NO * +)

(Hint : Left Shift operator)

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21 Write an Algorithm, Given an integer x, Write a function that multiplies x with 3.5 and returns the integer result.
You are not allowed to use %, /, *.
Input: 5
Output: 17 (Ignore the digits after decimal point)

22
Write an algorithm to rotate the bits of a given input number.

Bit Rotation: A rotation (or circular shift) is an operation similar to shift except that the bits that fall off at one end are put back to the other end.

In left rotation, the bits that fall off at left end are put back at right end.
In right rotation, the bits that fall off at right end are put back at left end.
Example :
Left Rotation of 16 by 2 is 64
Right Rotation of 16 by 2 is 4

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23 Write an algorithm to remove duplicate elements in a given input array and print the total number of elements removed.

Sample Input : [1, 2, 2, 3, 4, 4, 4, 5, 5]

Sample OutPut : [1, 2, 3, 4, 5]

Number of Elements Removed : 4