Algo++ Classroom

Prateek Narang

Lecture 01 - Operators Pointers, Bitwise Operators

Warm Up - Birthday Paradox!

Find number of people in the hall such that the probability atleast 2 have their birthday on same date is atleast 'p'!

For eg - p = 0.5

Brush-up
Address Of Operator
Pointer Variable
Reference Variable

Bitwise Operators

& AND

| OR

^ XOR

~ NOT

Bitwise Operators

& AND

| OR

^ XOR

~ NOT

<< Left Shift

>> Right Shift

Bitwise Operators

And (&):	0 & 0 = 0	1 & 0 = 0	0 & 1 = 0	1 & 1 = 1
Or (|):	0 | 0 = 0	1 | 0 = 1	0 | 1 = 1	1 | 1 = 1
Xor (^):	0 ^ 0 = 0	1 ^ 0 = 1	0 ^ 1 = 1	1 ^ 1 = 0

Left Shift:

Left Shift & Right Shift!

Left Shift is used to Multiply by any power of two and Right bit shifting to divide by any power of two.

Left Shift

 a<<b = a * power(2,b)

Right Shift

a >> b = a/power(2^b)

Example Multiplication by 9?

Example Multiply x by 9 ?

x<<3 + x

Some Basic Operations

- **Get Last Bit**
- **Get ith Bit**
- **Set ith Bit**
- **Count Set Bits**

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua

Time Saving Hack - *Use __builtin_popcount() method to count bits.*

Convert Decimal Into Binary

Print Binary Representation of given number

Convert a Binary Number into Decimal

Time to Try - Incredible Hulk!

The Planet Earth is under a threat from the aliens of the outer space and the Marvel Avengers team is busy fighting against them. Meanwhile, The Incredible Hulk has to defeat an enemy who is N steps above the level where he is standing (assume it as the 0th level). Hulk, because of his incredible jumping ability can take jumps in power of 2. In order to defeat the enemy as quickly as possible he has to reach the Nth step in minimum moves possible. Help Hulk to find the same and contribute in saving the Mother Earth.

Problem - Unique Number-1

Problem - Unique Number-2

You are given a list of numbers where every number is coming twice except two numbers.

Arr[] = {2,3,4,6,4,3,2,7,9,9};

2N + 2

Find out the unique two numbers.

Problem - Unique Number-3

Number Conversion

Write a function to determine the number of bits required to convert integer A to integer B.

Input: 31, 14

Output: 2

Explain this!

Explain what the following code does:

```
while(n>0){

        n = n & (n-1)

}
```

Problem - Not So Easy Math!

--

Replace bits by M

You are given two 32-bit numbers, N and M, and two bit positions, i and j. Write a method to set all bits between i and j in N equal to M (e.g., M becomes a substring of N located at i and starting at j).

EXAMPLE:

Input: N = 10000000000,

M = 10101, i = 2, j = 6

Output: N = 10001010100

Finding Missing Number

An array A[1...n] contains all the integers from 0 to n except for one number which is missing. In this problem, we cannot access an entire integer in A with a single operation. The elements of A are represented in binary, and the only operation we can use to access them is "fetch the jth bit of A[i]", which takes constant time. Write code to find the missing integer. Can you do it in O(n) time?

Homework
Largest & Smallest Number

Given an integer, print the next smallest and next largest number that have the same number of 1 bits in their binary representation.

Question - Sum of XOR of all Subarrays

Given an array containing N positive integers, the task is to find the sum of XOR of all sub-arrays of the array.

Hint - Sum of XOR of all Subarrays

Given an array containing N positive integers, the task is to find the sum of XOR of all sub-arrays of the array.

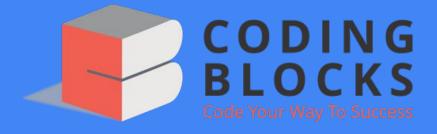https://www.geeksforgeeks.org/sum-of-xor-of-all-subarrays/

Brute Force Complexity - ?

Prefix Array - ?

"There are no secrets to success. It is the result of preparation, hard work, and learning from failure"

- From an expert

- Be Regular
- Solve Assignments
- Work Hard

CODING
BLOCKS
Code Your Way To Success

See you in next class!

Prateek Narang (Mentor)

prateek@codingblocks.com

TA's

- Khushboo Verma
- Deepak
- Sanjeet (Co-mentor)

Online Courses on Deep Learning, Mobile and Webdev

Coding Blocks   **Education**

★ ★ ★ ★ ☆   49

3+

This app is compatible with all of your devices.

Installed