ACM RECRUITMENT TASKS:

BINARY MAZE CHALLENGE

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Initial number : 1100101011110010

Logical gates room:

AND gate with 1010110010101101:

Ans) 1000100010100000

OR gate with 0111001100110011:

Ans) 1111101110110011

XOR gate with 1101110111001110:

Ans) 0010011001111101

NOT gate with 0010011001111101

Ans) 1101100110000010

Binary conversion room:

1·2^15+1·2^14+0·2^13+1·2^12+1·2^11+0·2^10+0·2^9+1·2^8+1·2^7+0·^26+0·2^5+0·2^4+0·2^3+0·2^2+1·2^1+0·2^0

= 32768+16384+0+4096+2048+0+0+256+128+0+0+0+0+1+0

=55682

Adding 123 to 55682:

55682+123=55805

Multiplying with 7,

55805*7=390635

Converting to binary,

1011111101010010101011

Weighted binary balancing:

1. 1001:9
2. 1100:12
3. 1110:14
4. 1010:10
5. 0111:7
6. 0101:5
7. 0011:3
8. 1111:15
9. 1101:13
10. 1011:11
11. 0110:6
12. 0100:4
13. 0010:2
14. 0001:1
15. Heavier unknown binary number

From the info, we understand that the unknown number is 8, or 1000 in binary

Binary tree navigation:

Binary number:101111

Here, 0 represents left and 1 represents right.

Path taken is right => left => right => right =>right

Binary sequence game:

Given binary number: 10101011010100101110

1. Flipping bits 2,4,6: 11111111010100101110

2. Flipping bits 9,11,13: 11111111111110101110
3. Flipping bits 14,16,20: 11111111111111111111

Therefore, all the bits can be turned into 1 with a minimum of 3 moves.

Binary palindrome:

Given binary number: 1011011101

Reversing this number, we get : 1011101101

Flipping bits 5,6, we get: 1011011101

This number equals the reverse of the initial number

Therefore minimum number of bits flipped to obtain the palindrome is 2.

Transformed binary number is : 1011011101

Complex binary patterns:

```
x=int(input("enter 10 bit binary number:"))
y=x
z=[]
for i in range(10):
  rem=y%10
  z.append(rem)
  x=x//10
print(z)
if z.count(1)==4 and len(z)==10:
  dec=0
  count=0
  while x>0:
    rem=x%10
    x=x//10
```

```
    dec=dec+rem*2**count
    count+= 1
  print(decimal)
else:
  print("entered number is invalid")
```

Binary XOR Pairs with Constraints:

Considering different pairs obeying given constraints, with XOR gate, we get:

01010 XOR 011011 → 110001(49)

011011 XOR 110100 → 101111(47)

011011 XOR 100110 → 111101(61)

110100 XOR 001101 → 111001(57)

001101 XOR 100110 → 101011(43)

Max value obtained is 111101 (61)

Given by 011011 XOR with 100110

Therefore pair is [011011,100110]

Binary multiples and remainders:

Given binary number: 1101010

Checking for divisibility by 7, convert from binary to decimal

We get 1101010= 106

Checking for divisibility by 7, we see that 106 is not a multiple of 7

Therefore, 1101010 is not divisible by 7.

Goal :

Final answer: 1101010

Converting to decimal, 1101010=106

Multiplying by 5, we get: 530

Converting 530 into binary, we get: 1000010010

Therefore, final answer=1000010010