Binary Maze

Initial State: 1|1|00|0|0|1111|00|0

II Logical Gates Room

1.) AND Gate

Given Number: 10|0||00|0|0||01

```
  1|1|00|0|0|1|1|00|0
And 1|0|01|1|00|0|0|1|01
```

Result: 1000|000|0|00000

2.) OR Gate

Previous Result: 1000|000|0|00000

Given Number: 0|||00||00||00||

```
   1|0|0|0|1|0|0|0|0|0|0|0|0
OR 0|1|1|1|0|0|1|1|0|0|1|1|0|0|1|1
```

Result: 1|1|1|1|1|0|1|1|0|1|0|0|1|1

3.) XOR Gate

Previous Result: 1.||||0|||0||0011

Given Number: ||0||10|||00|||0

1 1 1 1 1 0 1 1 1 0 1 1 0 0 1 1

XOR 1 1 0 1 1 1 0 1 1 1 0 0 1 1 1 0

Result: 0 0 1 0 0 1 1 0 0 1 1 1 1 1 0 1

4) NOT Crate

Previous Result: 0 0 1 0 0 1 1 0 0 1 1 1 1 1 0 1

0 0 1 0 0 1 1 0 0 1 1 1 1 1 0

Not

Result: 1 1 0 1 1 0 0 1 1 0 0 0 0 0 1 0

III Binary Conversion Room

→ After Converting the result of the previous room into decimal, we get 55,362.

→ Ans + 123 = 55,485

→ Ans * 7 = 3,88,395

Converting the final answer of this room into binary, we get 1 0 1 1 1 1 0 1 1 0 0 1 1 1 0 1 0 1 1.

IV Weighted Binary Balancing

After converting the 15 binary weights into decimal, we get:

1001 = 9
1100 = 12
1110 = 14
1010 = 10
0111 = 7
0101 = 5
0011 = 3
1111 = 15
1101 = 13
1011 = 11
0110 = 6
0100 = 4
0010 = 2
0001 = 1

→ By comparing all the weights we can see that 1111 (15) is the heaviest weight.

V Binary Tree Navigation

To get to the leaf node that corresponds to the binary no. 10111, we need to follow the path.

Right → left → Right → Right → Right

We know that,

Right corresponds to 1
left corresponds to 0.

⇒ The path we chose contain 4 1's, which is even.

VI Binary Sequence Game

Given Binary Number: 10101101010010110

We can convert all the 0's to 1's by using the following steps

Step-1: Flipping bits at positions 2,4,6

Result: 11111111010010110

Step 2: Flipping bits at positions 9,11,13

Result: 11111111111110100110

Step-3: Flipping bits at positions 14,16,20

Result: 11111111111111111111

VII Binary Palindromes

Given Binary Number: 101101101

→ the given no. is not a palindrome

→ We can convert it into a palindrome by flipping 1 bit

Transformed Binary Number: 1011111101

VIII Complex Binary Patterns

Some of the required Binary Numbers are as follows,

1111000000

1101100000

1100110000

1011100000

Decimal Forms

1111000000 = 960

1101100000 = 864

1100110000 = 816

1011100000 = 752

IX Binary XOR Pairs with constraints

Given,

Array = [10|010, 011011, 110100, 001101, 100110, 111111, 000000]

After applying XOR operation to the array, we can see that 011011 and 100110 give the maximum result.

→ This pair of numbers also do not contain more than 3 consecutive 1's, ∴ they satisfy the required condition.

∴ The required pair is [011011, 100110].

X Binary Multiples and Remainders

Given,

Binary Number = 1101010

Decimal form = 106

To check if 106 is a multiple of 7, we divide 106 by 7.

→ If the remainder is 0, 106 is a multiple of 7.

→ Otherwise 106 is not a multiple of 7.

106 ÷ 7 gives us a remainder of 1.

So, the binary number 1101010 is not a multiple of 7.