9) Highest XOR values for → 000000 & 111111
→ Without having more than 3 consecutive 1's
↳ 011011 , 100110

Date : / /23

8530 → binary

2	8530	0
2	4265	1
2	2132	0
2	1066	0
2	533	1
2	266	0
2	133	1
2	66	0
2	33	1
2	16	0
2	8	0
2	4	0
2	2	0
	1	

→ 10000101010010

→ 10000101010010

Min number of moves - 3

$\begin{array}{cccccccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \end{array}$

7) Given num → 10110 | 11101 is not palindrome because when reversed it is not equal to the original number

If we ~~switch~~ flip 4 (0) to 1 (or) 5 (1) to 0 we get

4(0) → 1 a palindrome → 1011111101

5(1) → 0 → 1011001101

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
6)	1	0	1	0	1	0	1	1	0	1	0	1	0	0	1	0	1	1	1	0
(1,3,5)	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1	0	1	1	1	0
(8,10,12)	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0
(13,15,19)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Min number of moves - 3

Sequence → Root (0)
Right (1)
Left (0)
Right (1)
Right (1)
Right (1)

Has 4 1's → even number

5) Binary tree

1 → Move to right   0 → move to left

given num = 10111 .

	Root (R)
Start at root	R
Move right	L
Move left =	R
	R
Move right + 3	R

4) 1001 - 9   1111 → 15

1100 - 12   1101 → 13

1110 - 14   1011 → 11

1010 - 10   0110 → 6   unknown weight

0111 - 7   0100 → 4

0101 - 5   0010 → 2

0011 - 3   0001 → 1

First divide into two parts and weigh using the digital balance consider the heavier side and again divide it into further parts and at last we will be left with the heaviest weight

10) The modulo algorithm is used to check if the binary is divisible by 7

rem = (rem × 2 + current bit) mod 7

First rem = 0

For 1st bit

rem = (0×2 + 1) mod 7 = 1

2nd → rem = (1×2+1) mod 7 = 3

3rd → rem = (3×2+0) mod 7 = 6

4th → rem = (6×2+1) mod 7 = 13 mod 7 = 6

5th → rem = (6×2+0) mod 7 = 12 mod 7 = 5

6th → rem = (5×2+1) mod 7 = 11 mod 7 = 4

7th → rem = (4×2+0) mod 7 = 8 mod 7 = 1

Final remainder = 1

Since final remainder is not equal to 0 the binary number is not divisible by 7