[1 1 1 2]

[1, 2, 3, 3 1, 2, 2 1, 3, 5]

2 =

5

[1 2 3 , 2 , 3]

2 → 0 1 0

2 → 0 1 0

~~3~~ 1 → 1 1 (1)

~~3~~ 1 → 1 1 (1)

• 1 → 1 0 1

xor → 0 0 0

• 0 1 0 ^ 0 1 0

0 0 0 ^ 1 1 1

1 1 1 ^ 1 1 1

0 0 0

^ n

0 1 0 1 0

1 1 0 0 0

1 0 0 1 0

~~1~~ 4 [3]

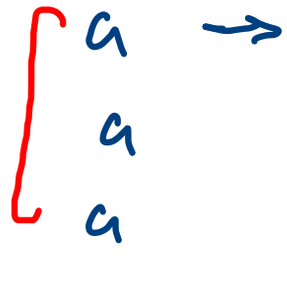
3

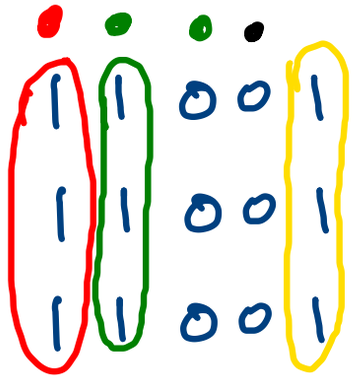
1 0 1

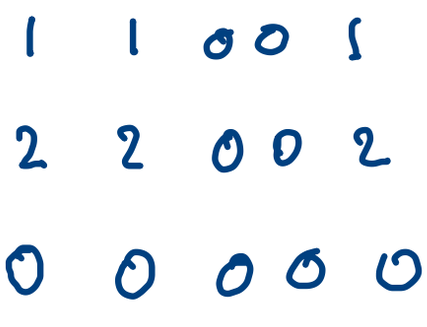
3 repeats

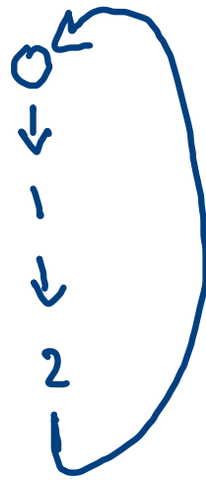
1

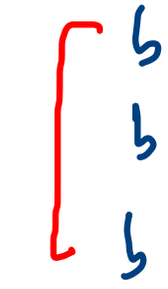
2

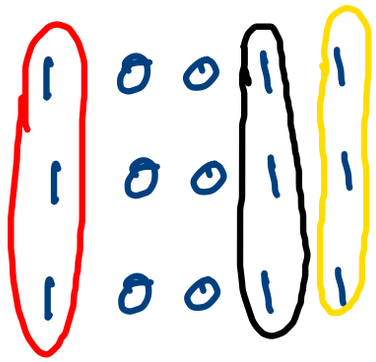


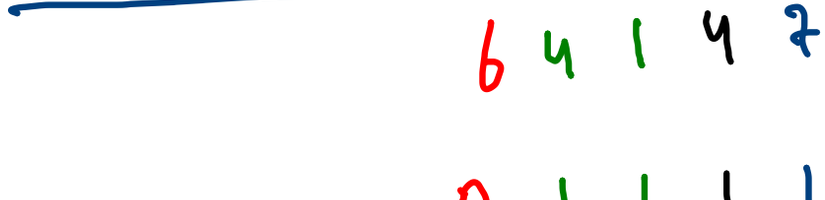


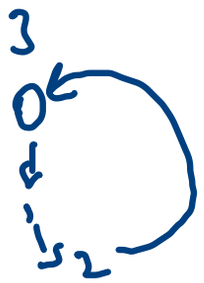


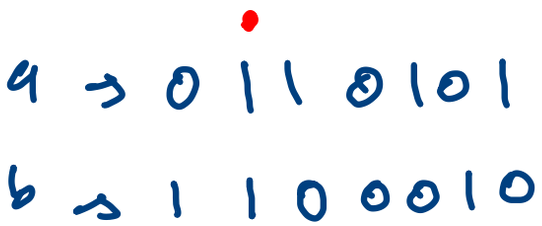


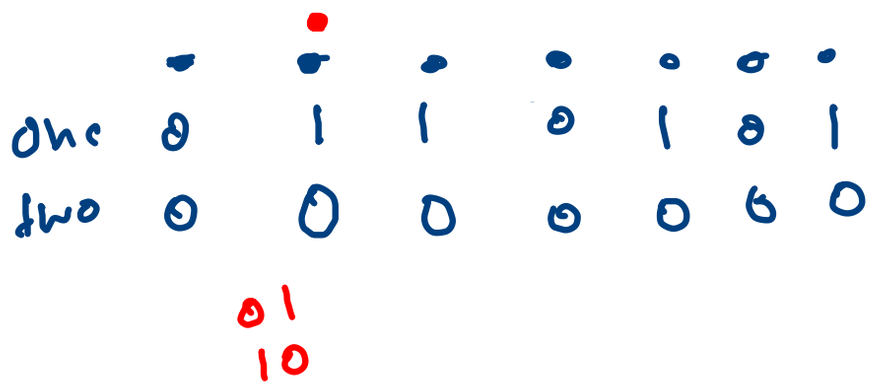


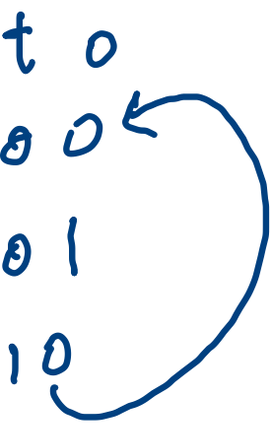


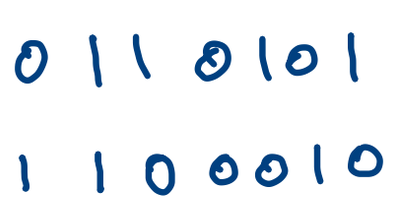


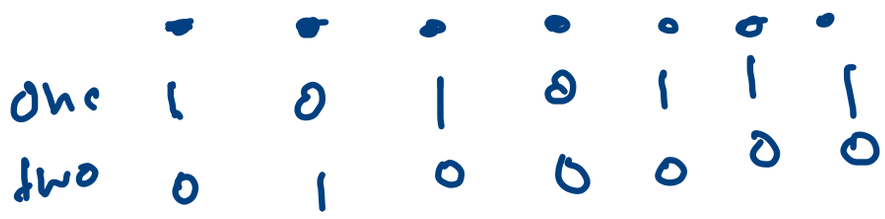


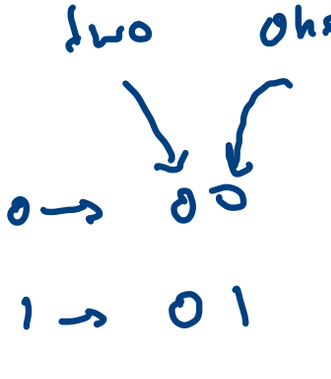


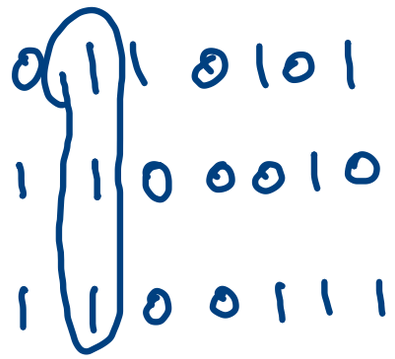


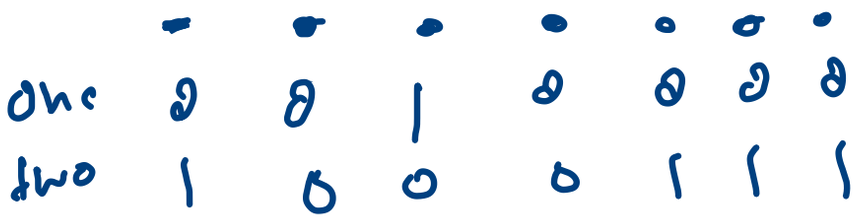












0
↓
1

t 0
0 0
0 1
1 0

a → 0 1 1 0 1 0 1
b → 1 1 0 0 0 1 0

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

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

one	0	1	1	0	1	0	1
two	0	0	0	0	0	0	0

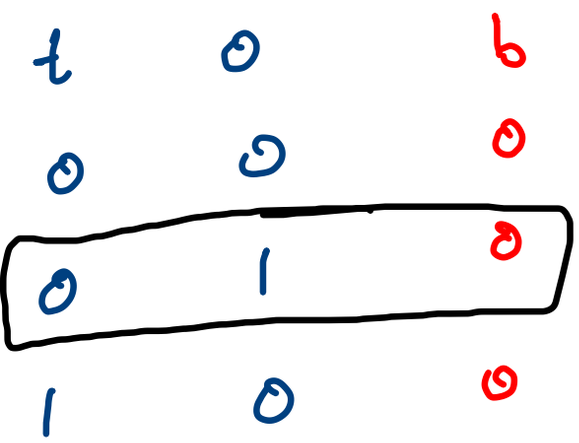
01
10

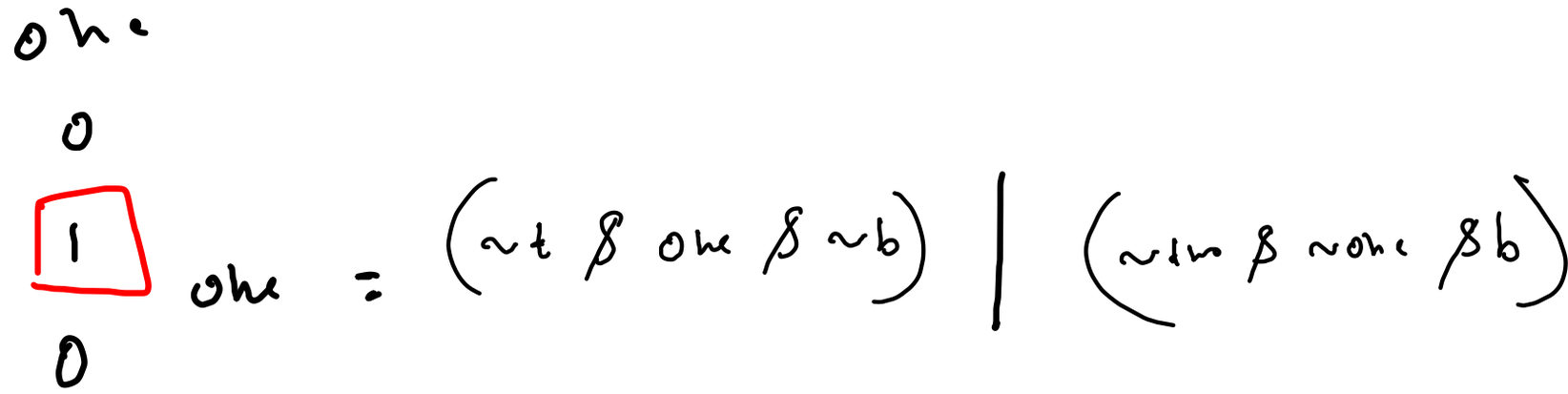
one	1	0	1	0	1	1	1
two	0	1	0	0	0	0	0

one	0	0	1	0	0	0	0
two	1	0	0	0	1	1	1

two one

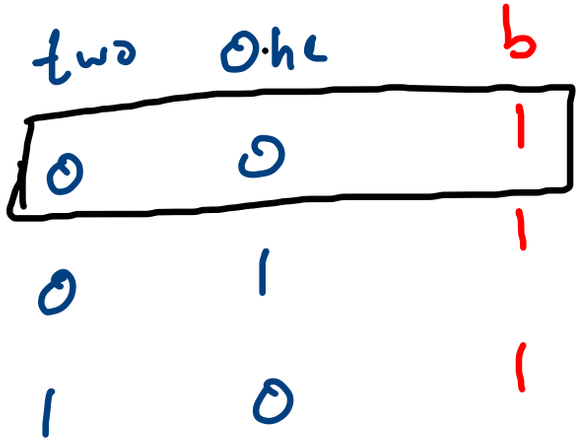
0 → 0 0
1 → 0 1
2 → 1 0

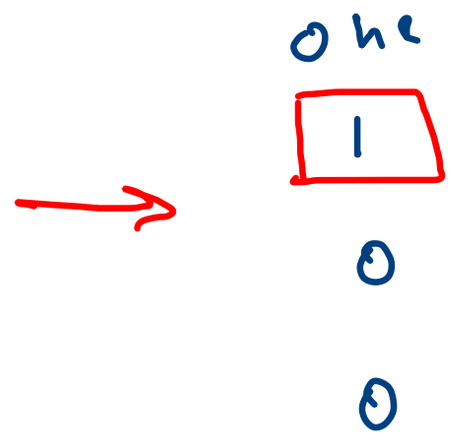

t o b
0 0 0
0 1 0
1 0 0


one
0
1
0
one = (~t & one & ~b) | (~t & ~one & b)

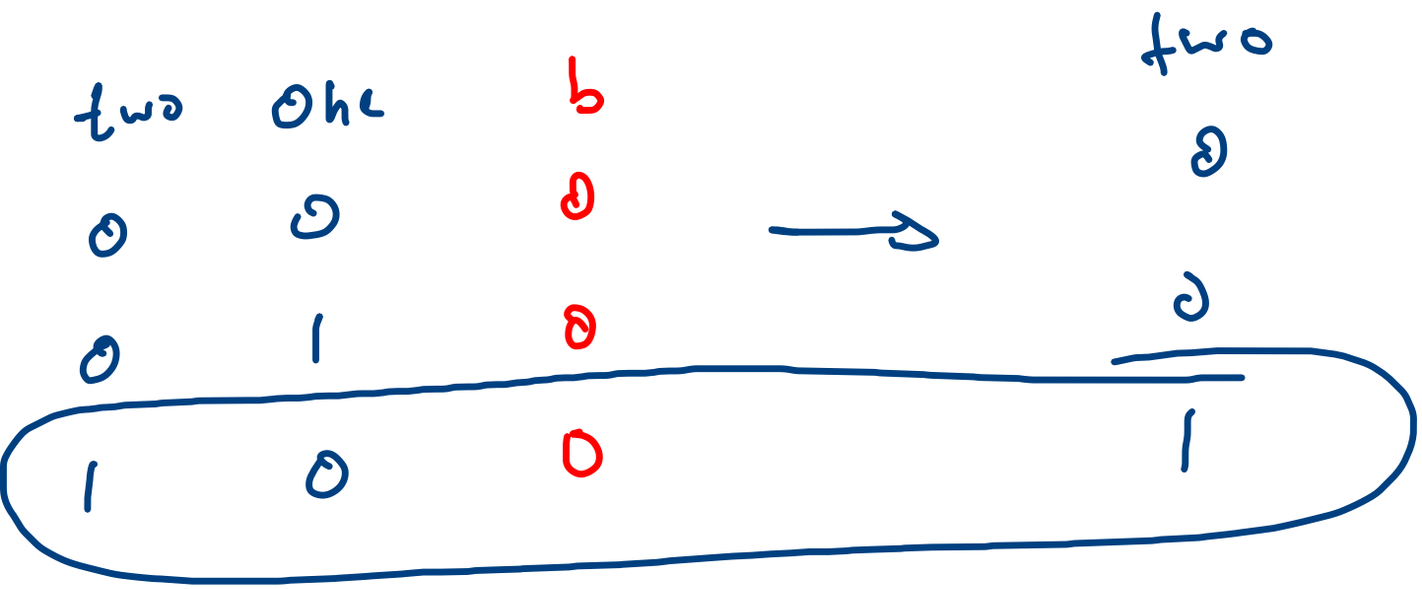
~t & o & ~b

o = (~t&o&~b) | (~t & ~o & b)


two one b
0 0 1
0 1 1
1 0 1

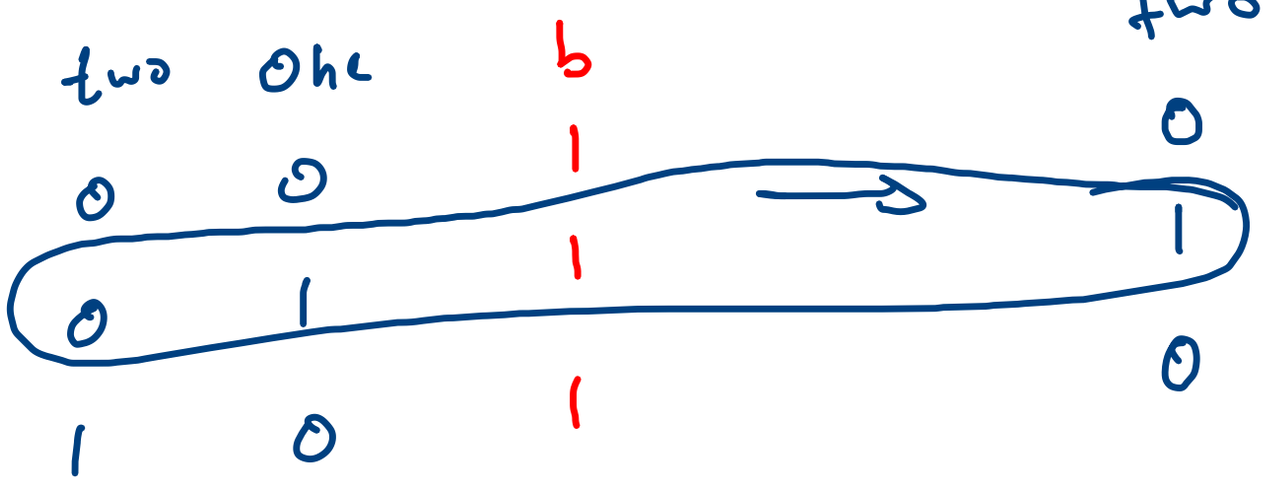

one
1
0
0

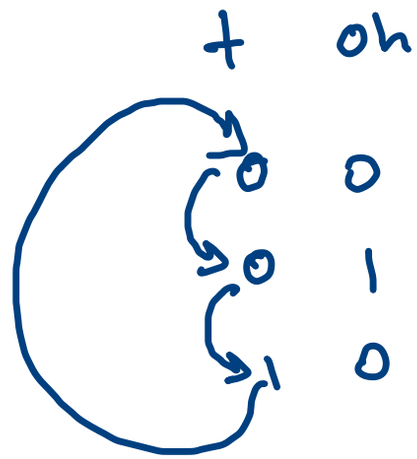
t one
0 0
0 1
1 0



$$two = (t \,\&\, \sim o \,\&\, \sim b) \mid (\sim t \,\&\, o \,\&\, b)$$

t = (t&~o&~b) | (~t & o & b)





```java
int o=0;
int t=0;

for(int v: arr){
    int oo = (~t&o&~v) | (~t & ~o & v);
    int tt = (t&~o&~v) | (~t & o & v);

    o = oo;
    t = tt;
}

System.out.println(o);
```

a 1 0 1 0

a 1 0 1 0

a 1 0 1 0

b 1 1 0 0

c 0 1 1 1

c 0 1 1 1

c 0 1 1 1

0 0 → 0 0 0 0

{1 → 0 0 0 0

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

0 0 0 0

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

0 0 0 0

0 1
(0

$\_\ \_\ \_\ \ 2^3 = 8$

$h \to 1$

0

1 =

1

[0 1]

2

00

01

10

11

00 → 0

01 1 → 1

11 → 3

10 1 → 2

3

n 2 1	
000	0
001	1
011	3
010	2
110	6
111	7
101	5
100	4

h=1 → [0 1]

h=2 → [00 01 11 10]

1<<(1)

10

h=3 → [000 001 011 010]

100 101 111 110

1<<(2)

100

val | mask

1<<(3)

n → 0110001010

or mask 0000100000

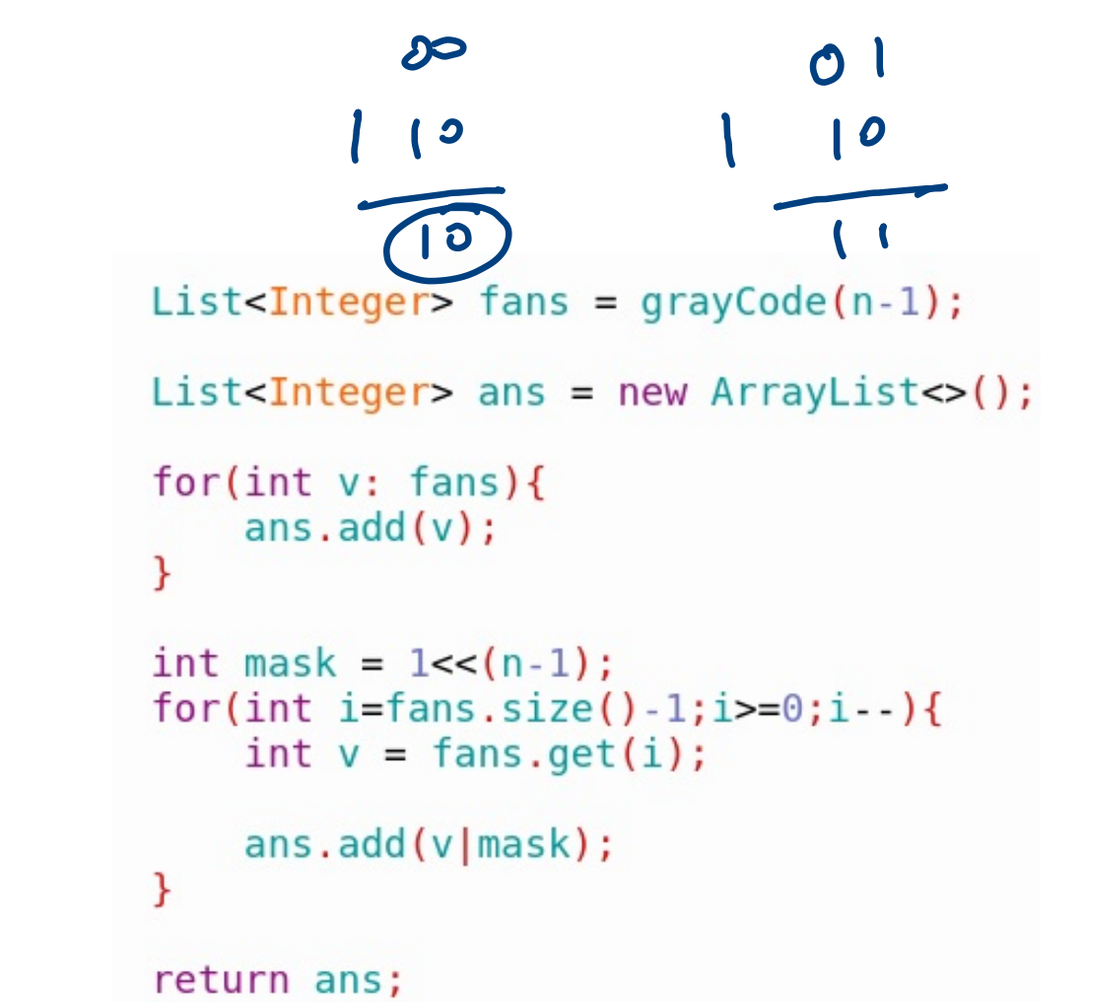
0110101010

001

1<<(3-1) = 100

h=4

```
List<Integer> fans = grayCode(n-1);

List<Integer> ans = new ArrayList<>();

for(int v: fans){
    ans.add(v);
}

int mask = 1<<(n-1);
for(int i=fans.size()-1;i>=0;i--){
    int v = fans.get(i);

    ans.add(v|mask);
}

return ans;
```



Jeaum 5 (a b c d e) _ _ _ e d c b a

4

e	d	c	b	a				
0	0	0	1	0	1	0	a	c
0	0	1	0	1	0	1	b	d
	1	0	1	0	0	2	c	e
	1	1	1	0	0	3	d	c e

[0 , 3 , 1]

[a , c , d , e , b]

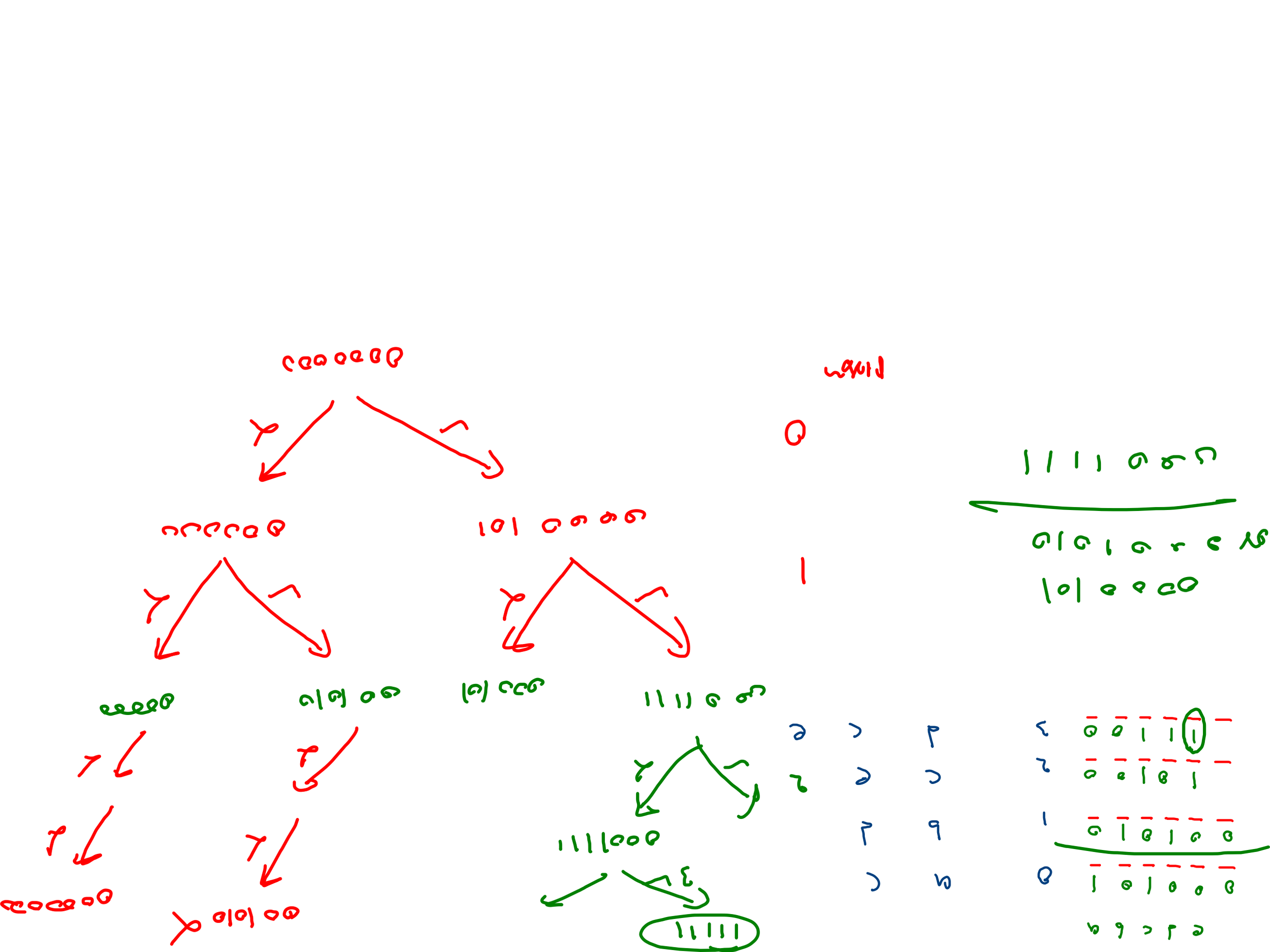
subsequence

0
3
1

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

0 1 1 1 1 1

or



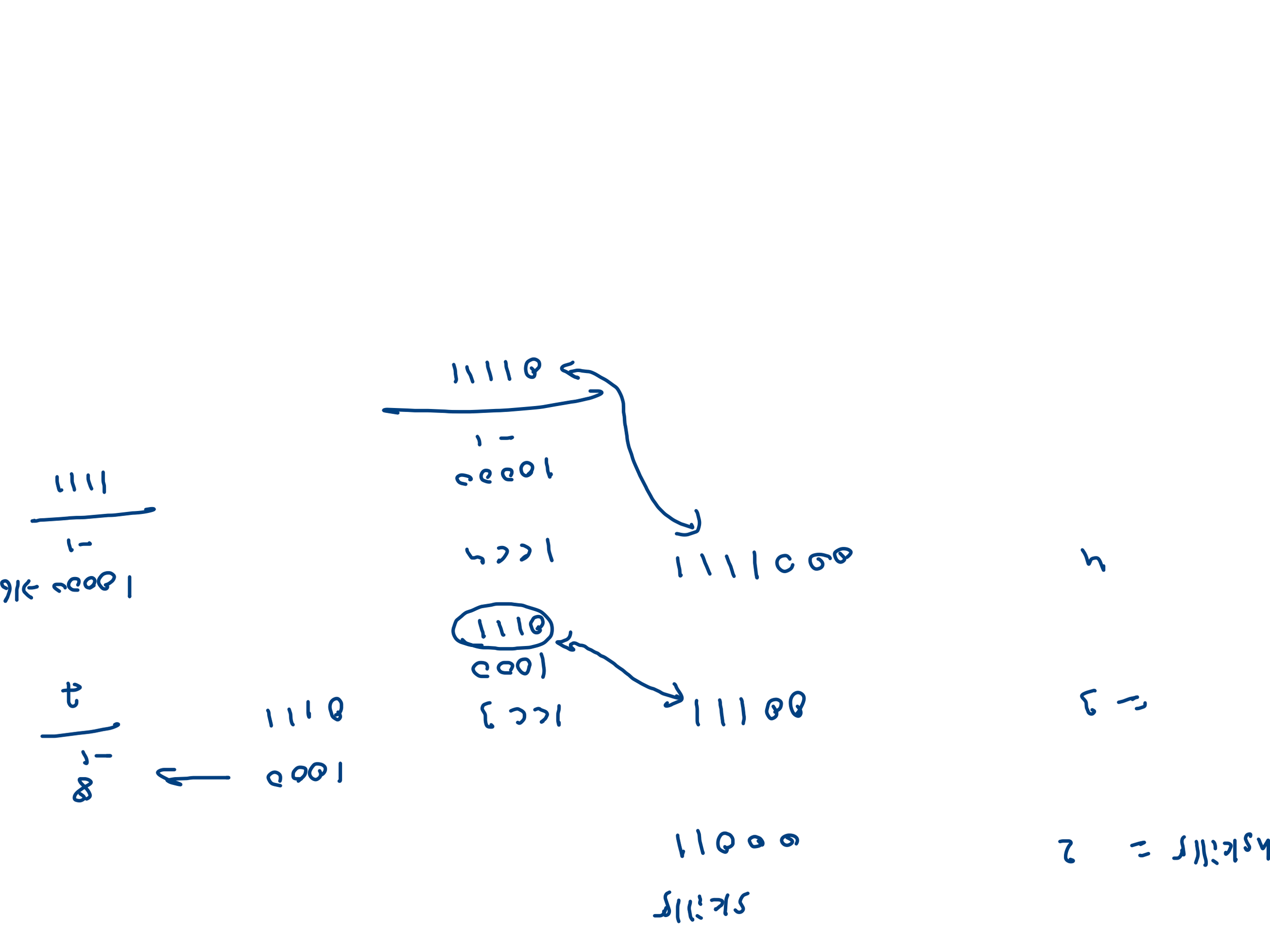
hskills = 4

skills = 001111

1<<4

10000
- 1
01111

10000 → 16
- 1
15



1 5 2 1 2

1 ↑ 1
1 ↑ 5
1 ↑ 2
1 ↑ 1
1 ↑ 2

5 ↑ 1
5 ↑ 5
5 ↑ 2
5 ↑ 1
5 ↑ 2

2 ↑ 1
2 ↑ 5
2 ↑ 2
2 ↑ 1
2 ↑ 2

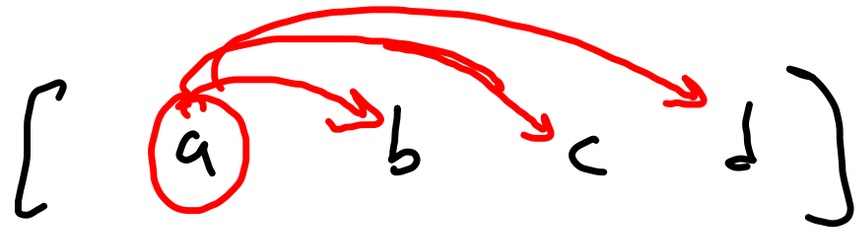
1 ↑ 1
1 ↑ 5
1 ↑ 2
1 ↑ 1
1 ↑ 2

2 ↑ 1
2 ↑ 5
2 ↑ 2
2 ↑ 1
2 ↑ 2

h

$O(h)$

xor → 2 ^ 6 ^ 3 ^ 2 ^ 3 ^ 6 ^ 10 ^ 7 ^ 6 ^ 7 ^



$(a \neq a) \wedge (a \neq b) \wedge (a \neq c) \wedge (a \neq d) \wedge (b \neq a) \wedge (b \neq b) \wedge (b \neq c)$

$(b \neq d) \quad (c \neq a) \quad (c \neq b) \quad (c \neq c) \quad (c \neq d) \quad (d \neq a) \quad (d \neq b)$

$(d \neq c) \quad (d \neq d)$

$4 \wedge 4 \rightarrow 0$

3 2 1 0

N = 0 0 0 0 | 1 1 0 0 → 12

5

0	0 0 0 0
1	0 0 0 1
2	0 0 1 0
3	0 0 1 1
4	0 1 0 0
5	0 1 0 1
6	0 1 1 0
7	0 1 1 1
8	1 0 0 0
9	1 0 0 1
10	1 0 1 0
11	1 0 1 1
→ 12	1 1 0 0
13	1 1 0 1

0 _ _ _

$^3C_2 = 3$

000 1 1 00

0000 _ _ _

000
001

010
011

100
101

110

111

$\boxed{3}$

n → 10 10000 → 2^6

0 _ _ _ _ _ _

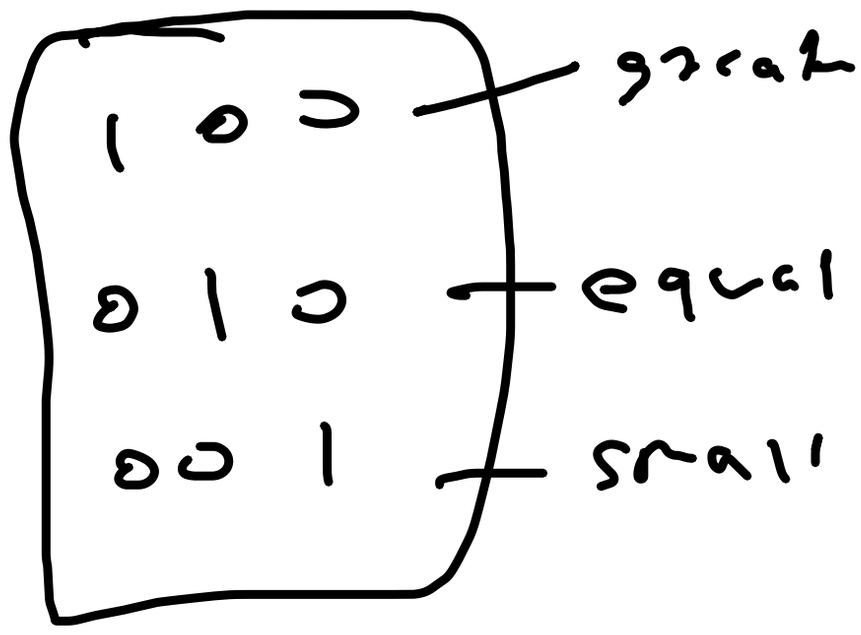
11 0000
0011000
0100100

$^6C_2$

1 0 1 0

↓

1 - - -



0 (- - -) → $^{3}C_{2}$

1 0 0 0

1 0 0 1

1 0 1 0

1 0 1 1

1 1 0 0

1 1 0 1

1 1 1 0

1 1 1 1

$^nC_r \to \frac{n!}{!r \times (n-r)}$

$\frac{3 \times \cancel{2}}{\cancel{2} \times 1}$

$\frac{4 \times \cancel{3 \times 2 \times 1}}{\cancel{3 \times 2 \times 1} \times 1}$

1 0 1 1 0 1 0 → 0 - - - - - - $^6C_4$

↓

8

1 0 f(11010) - - - - - -

8 11 010 → 0 - - - - $^4C_3$ ← 4

↓

4 ↑ 1 - - - f(1010) 4

16 8 4 2 1

11010 →

1010 → 0 - - - $^3C_2$ ← 3

↓

1 ↑ 1 - - - f(010)

↓

26

010 = f(10) 1

↓

10 → 0 - $^1C_1$ ← 1

↓

0 ↑ 1 - f(0)

0
1
2
3
4
5
6
7
8
9
10
11
12
13

14
15
16
17
18
19

$n \to 1\,0\,1\,1\,0\,1\,0 \longrightarrow 0 \; - - - - - -$

$^{6}C_4$

$\boxed{k=2}$

$s \quad i \quad k-1 \quad i \quad C_k$

$1 \; - - - - - -$

$1\,1\,0\,1$

$1 \; - - - - - -$

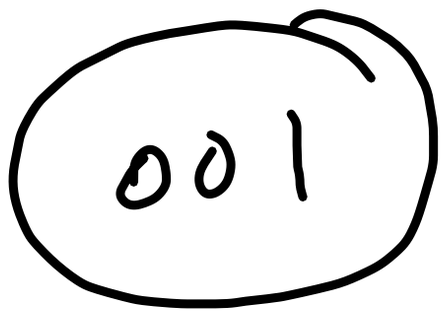
$\downarrow$

0

$11010 \leftarrow$ small $\quad 3$

hcr

010 small 1



$$3 \quad 2 \quad 1 \quad 9$$

$$\downarrow$$

$$1 \quad 1 \quad 0 \quad 0 \qquad 0 \quad - - -$$

$$0$$

$$1$$

$$0 < x$$

$$1 < 0$$