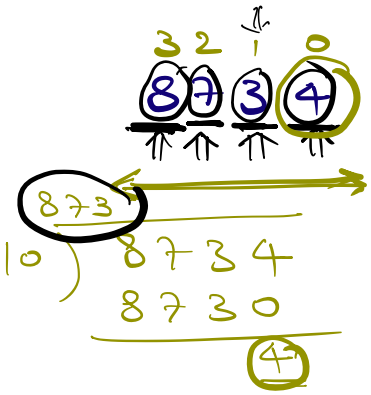
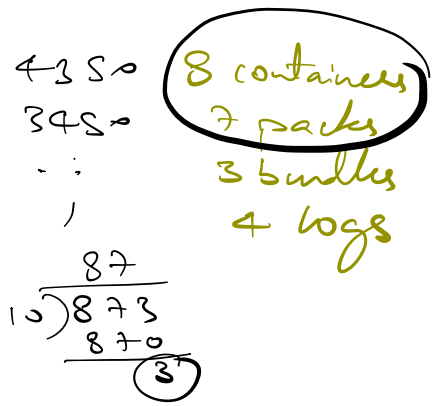


$\Rightarrow$ 8000 + 700 + 30 + 4 = 8734



$8 \times 10^3 + 7 \times 10^2 + 3 \times 10^1 + 4 \times 10^0$

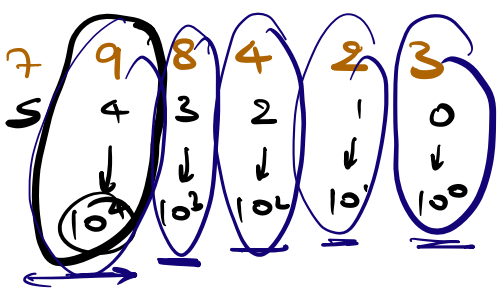
Base = 10

Decimal no. system $\Rightarrow$ [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]

Base = 8

Octal no. system $\Rightarrow$ [0 - 7]

Quiz!

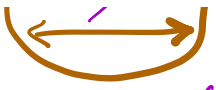


.... $x^{th} \Rightarrow x-1$

Eg

$(0\,1\,3\,2)_8$

$0 \times 8^3 + 1 \times 8^2 + 3 \times 8^1 + 2 \times 8^0$

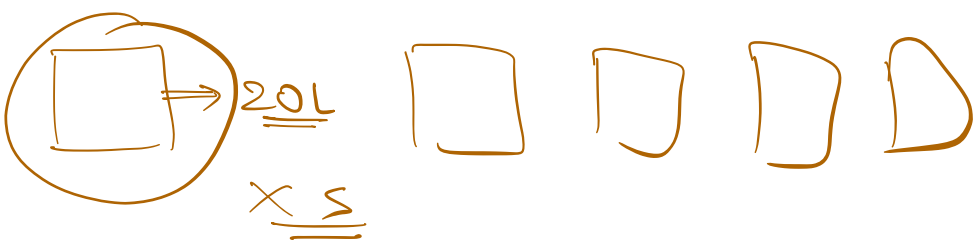


$= 64 + 24 + 2 = (90)_{10}$

	0	1	2	3	4	5	6	7
5 →	0	1	2	3	4	5	6	7
0 →	0	1	2	3	4	5	6	7

₹ 1 Cr ⇒ Cash

Bundles → (20L) × 5



Stone Age (Barter System)

Cut wood in forest

627 pieces of log

Bundles of 10 logs

62 bundles & (7) loose

Bigger pack of 10 bundles

6 packs & 2 bundles & 7 logs + 3 logs

$6 \times 10 \times 10$

6×10^2

2×10^1

10 logs

Bundle

$\times 0$

Base - 3

0, 1, 2

[0 - 2]

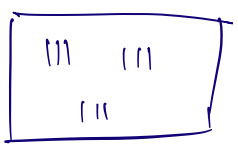
$(1\ 1\ 2\ 0)_3 =$

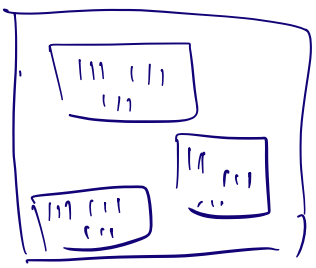
carton Pack

$1 \times 3^3 + 1 \times 3^2 + 2 \times 3^1 + 0 \times 3^0$

$= 27 + 9 + 6 + 0$

$= (42)_{10}$





Quiz $(125)_8$

$= 1\times8^2 + 2\times8^1 + 5\times8^0$

$= 64 + 16 + 5$

$= 85$

Quiz Octal $\Rightarrow$ 8 $\Rightarrow$ [0 - 7] [0, 1]

$(1000001)_8$

$(65(8)2)$

Q4 $(02(01))$ $\Rightarrow$ Base 3

$0\times3^4 + 2\times3^3 + 1\times3^2 + 0\times3^1 + 1\times3^0$

$= 54 + 9 + 0 + 1$

$= (64)_{10}$

Binary Number System (2 unique digits) [0, 1]

Base = 2

Eg ⇒ $(\underset{4}{1}\ \underset{3}{0}\ \underset{2}{1}\ \underset{1}{1}\ \underset{0}{0})$

$1 \times (2)^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$

$= 16 + 0 + 4 + 2 + 0$

$= (22)_{10}$

Transistor ⇒ 0V, 1V, 2V, 3V, 5V

5V = 5V

0 ⇒ No current (Low, Not Set, OFF, false)

Deplete

1 ⇒ Current present (High, Set, ON, True)

5V as 5V (+V intd.)

Decimal To Binary (2 logs)

$(28)_{10}$

2	28
2	14

0 ⇒ 0th digit

2	7
2	3
2	1
	0

0 ⇒ 1st digit
1 ⇒ 2nd digit
1 ⇒ 3rd digit
1 ⇒ 4th digit

11100

Qu3 37 in binary

2	37
2	18
2	9
2	4
2	2
2	1
	0

1 0 0 1 0 1 ↑

$= (100101)_2$

Q Binary of $(25)_{10}$

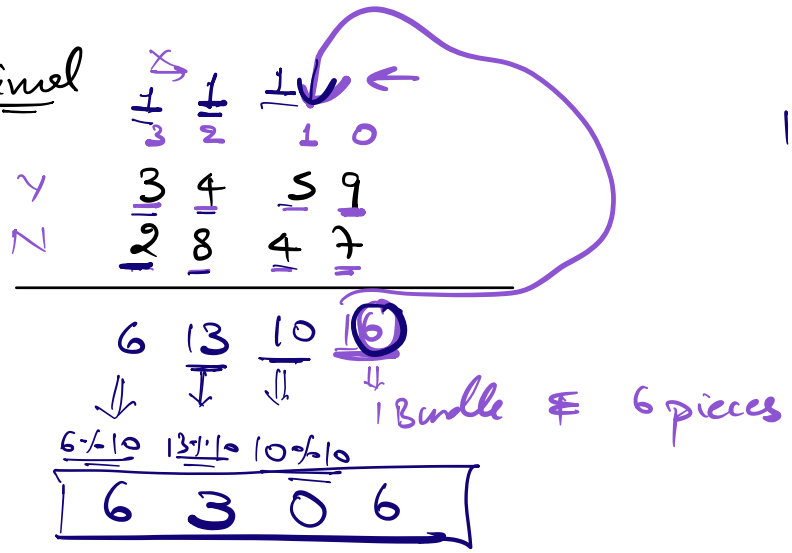
2	25
2	12
2	6
2	3
2	1
	0

1 0 0 1 1 ↑

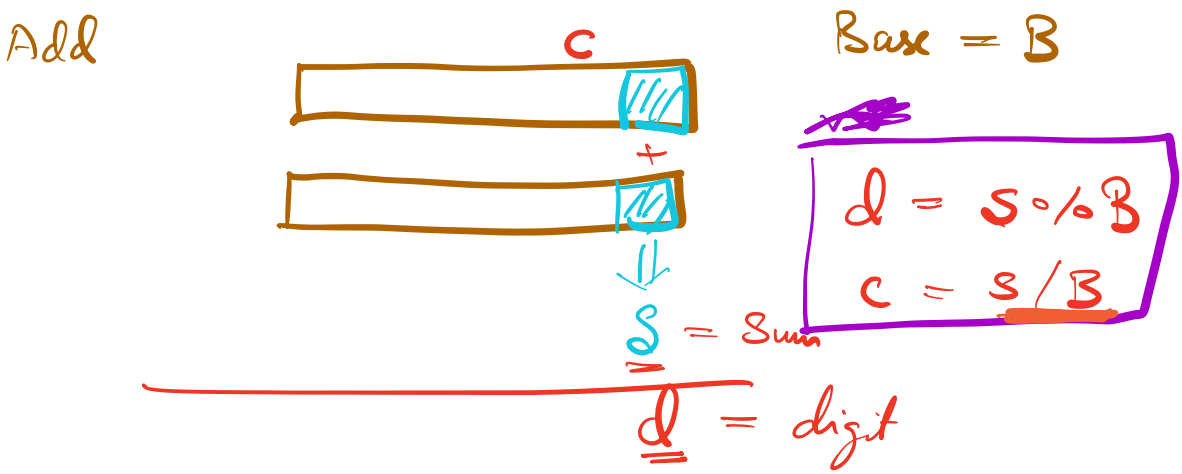
$\rightarrow (11001)_2$

Addition

▷ Decimal

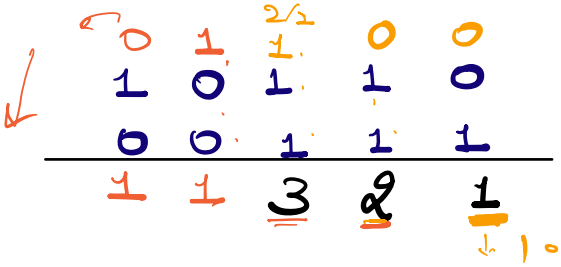


16 %10



Binary Addition

[0, 1] ⇒ Bit < 0 (Not set) / 1 (set)



⇒ 11101

1/2 = 0

2/2

R → 1 1 1 0 1

3%2 2%2

3/2 = 1

1%2

1%2 = 1 1/2 = 0

1/2 = 0

Ques

a = 1 0 0 1 1

b = 0 1 0 0 1

R → 1 1 1 0 0

2 ⇒ C 1 R 0

2%2

2/2

S = 1 C 0 R 1

1/2 = 0

R = 1%2

S = 3 C 1 R 1

Bit Manipulation (&, |, ^, ~, <<, >>)

a , b

0 1 0 1

	a	b	a & b	a | b	a ^ b
1	0	0	0	0	0
2	0	1	0	1	1
3	1	0	0	1	1
4	1	1	1	1	0

& ⇒ (a & b) is True (1) when both the bits are 1

a & b & c & d & e & f .... ⇒ True if all bits are true.

| ⇒ (a | b) ⇒ True if atleast 1 is true

a | b | c | d | e | f .... ⇒ True if atleast one is 1

^ ⇒ True if exactly 1 bit is True

a ^ b

a ^ b ^ c ^ d ^ e ^ f .... (do some time)

Integer ⇒ 32 bits

INT (Assume # bits = 4)

a = 4 , b = 3

3 2 1 0

a & b a = 0100 ⇒ 0

$b = 0011$

0000

a|b

$a = 0100$

$b = 0011$

0111

$2^2\ 2^1\ 2^0$

$4+2+1 = 7 \Rightarrow 7$

a^b

$a = 0100$

$b = 0011$

$0111 \Rightarrow 7$

Quiz

$a = 13$

$b = 10$

28 = 0

1101

1010

1000

$1\ 1\ 1\ 1$

$\Rightarrow 8$

2	13
2	6
2	3
2	1
	0

1 0 1 1

a|b = 1111 ⇒ 15

a^b = 0111 ⇒ 7

(4 digits)

Quiz

11 ⇒ 1011 −

10 ⇒ 1010 −

440

082

2	1
0	1

1011

0001

$1010 \Rightarrow 11$

Somdatta

1011

1010

0001

$1011 \Rightarrow 11$

$(a\ b\ c\ d\ e\ f)_2$ (6 bit number)

$f = 0$ (Even)

$f = 1$ (odd)

$a \times 2^5 + b \times 2^4 + c \times 2^3 + d \times 2^2 + e \times 2^1 + f$

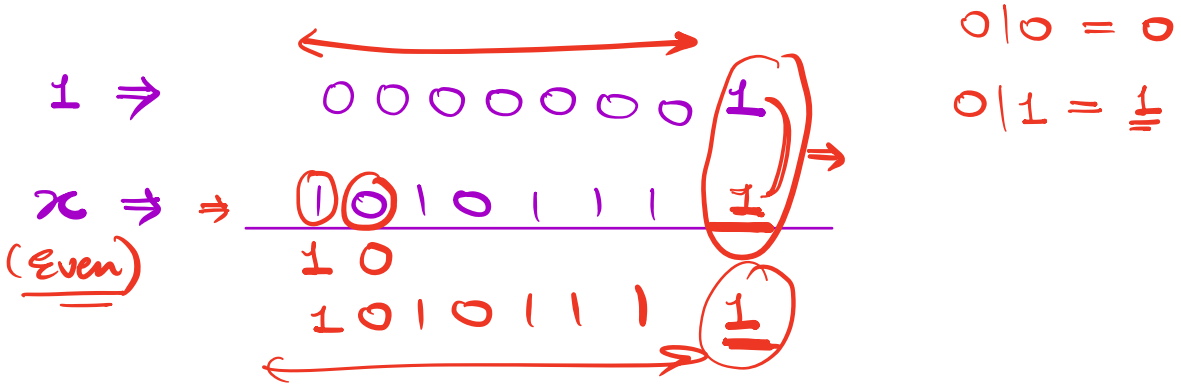
$2^1(a \times 2^4 + b \times 2^3 + c \times 2^2 + d \times 2^1 + e) + f$

Even

$2q + f\ (1/0)$

$f = 1 \Rightarrow 2q+1$ Even + 1 = odd

$f = 0 \Rightarrow 2q+0 \Rightarrow$ Even + 0 = Even



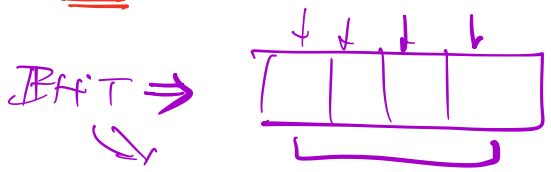
$x \Rightarrow$ Even + Last bit (0)

+ Last bit (1)

$x|1 \Rightarrow x+1$ (If x is even)

x is odd

$x|1 \Rightarrow$ Same $\Rightarrow x$



Quiz INT a = x ??

a & 1 1 ⇒

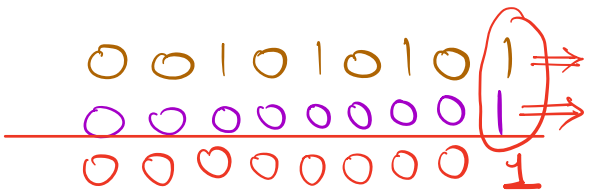
a is Even a ⇒

1 ⇒

x & 0 ⇒ 0

a & 1 = 0

a is odd



a & 1 = 1

21, 32

.00

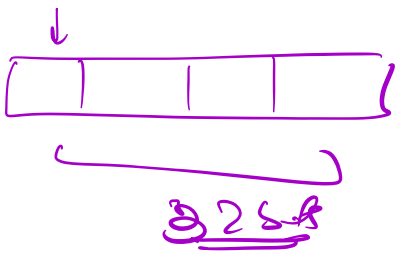
Given an integer a.

Find if its even or odd ?!

(a & 1) → 0 if even, 1 if odd (More efficient)

(a % 2 == 0) X

Doubt

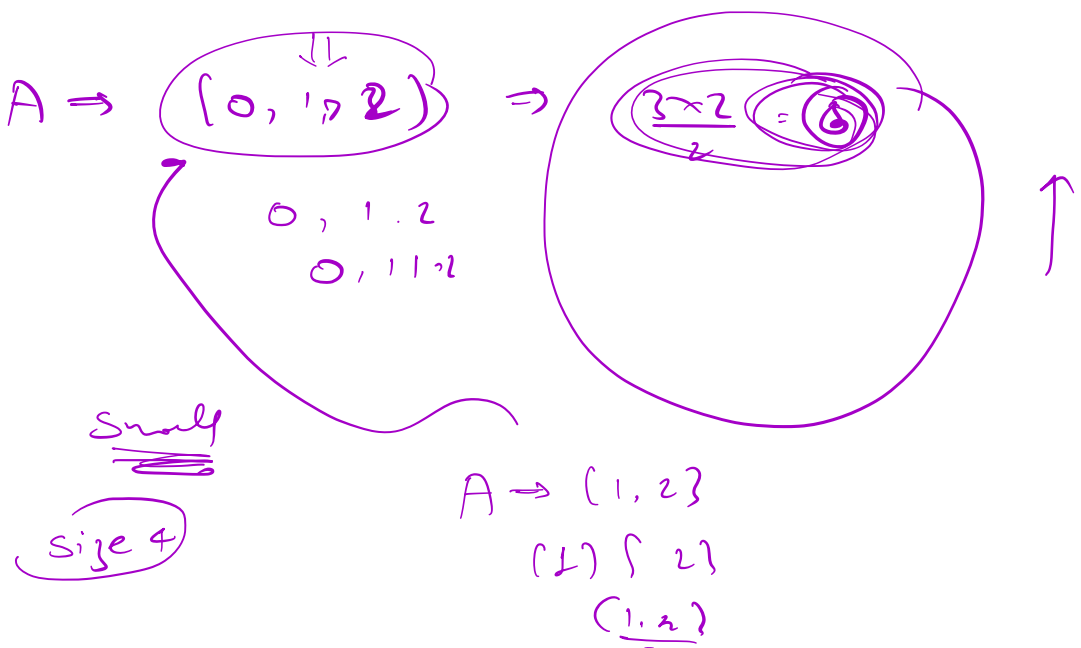


24.31 X

24 \ 1 ⇒

A & 1

1 ⇒ 0000000000000000000000000000000000
001



Wednesday
Thursday
] 3 to 5 PM (calender slots
(15 mins)
per

Q

Array of size N.

1 0 0 1 0 1 0 1 0