CS & IT ENGINEERING

Control Flow Statements

Iterative Statements:More about loops

Programming in C

Lecture:05

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1:More about loops

Perfect Number

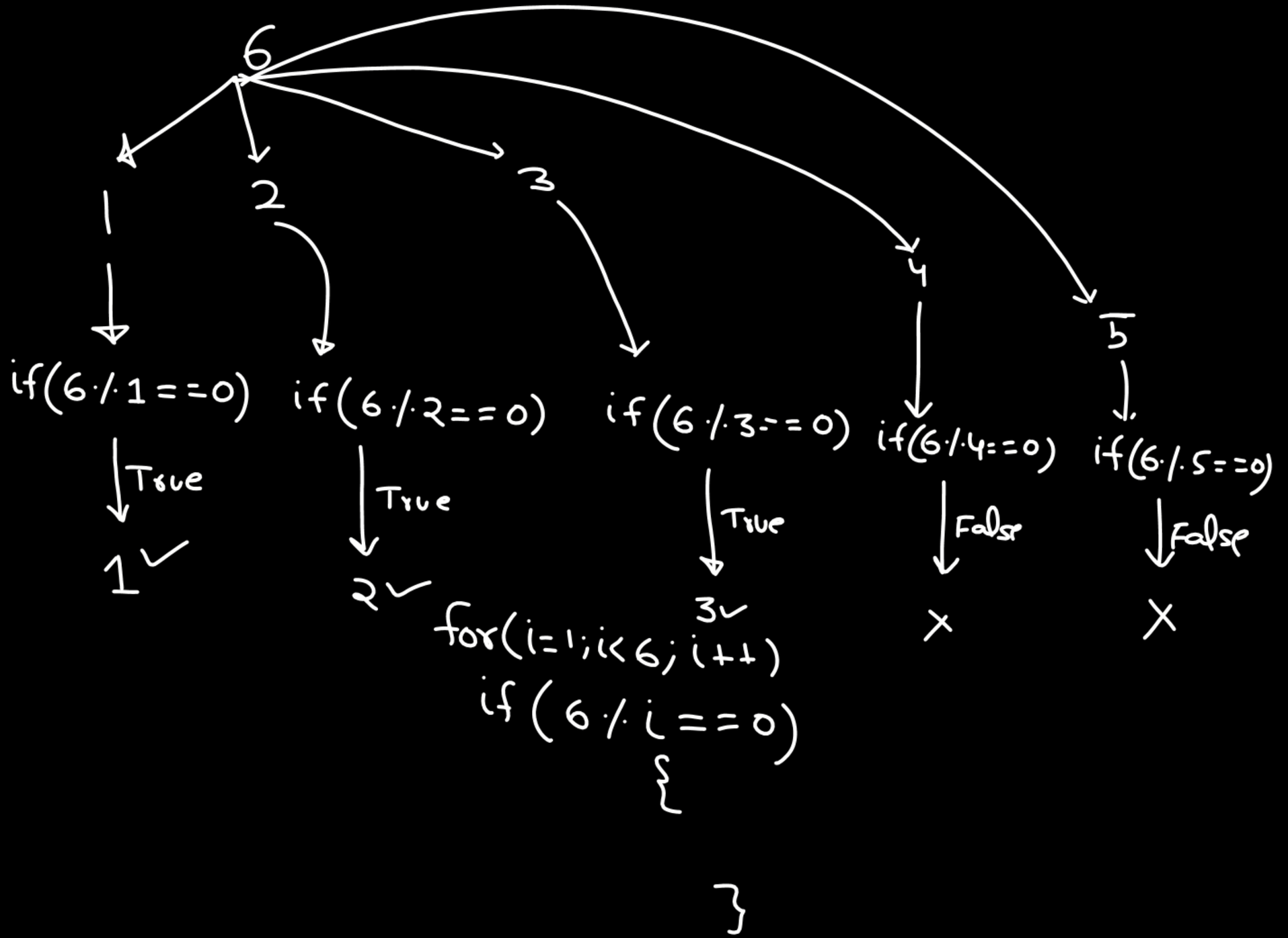
$n = 6 \rightarrow 1, 2, 3, 6$

$1 + 2 + 3 = 6$

4 is a factor of 6 or not

if (6 % 4 == 0)

⇒ 4 is a factor

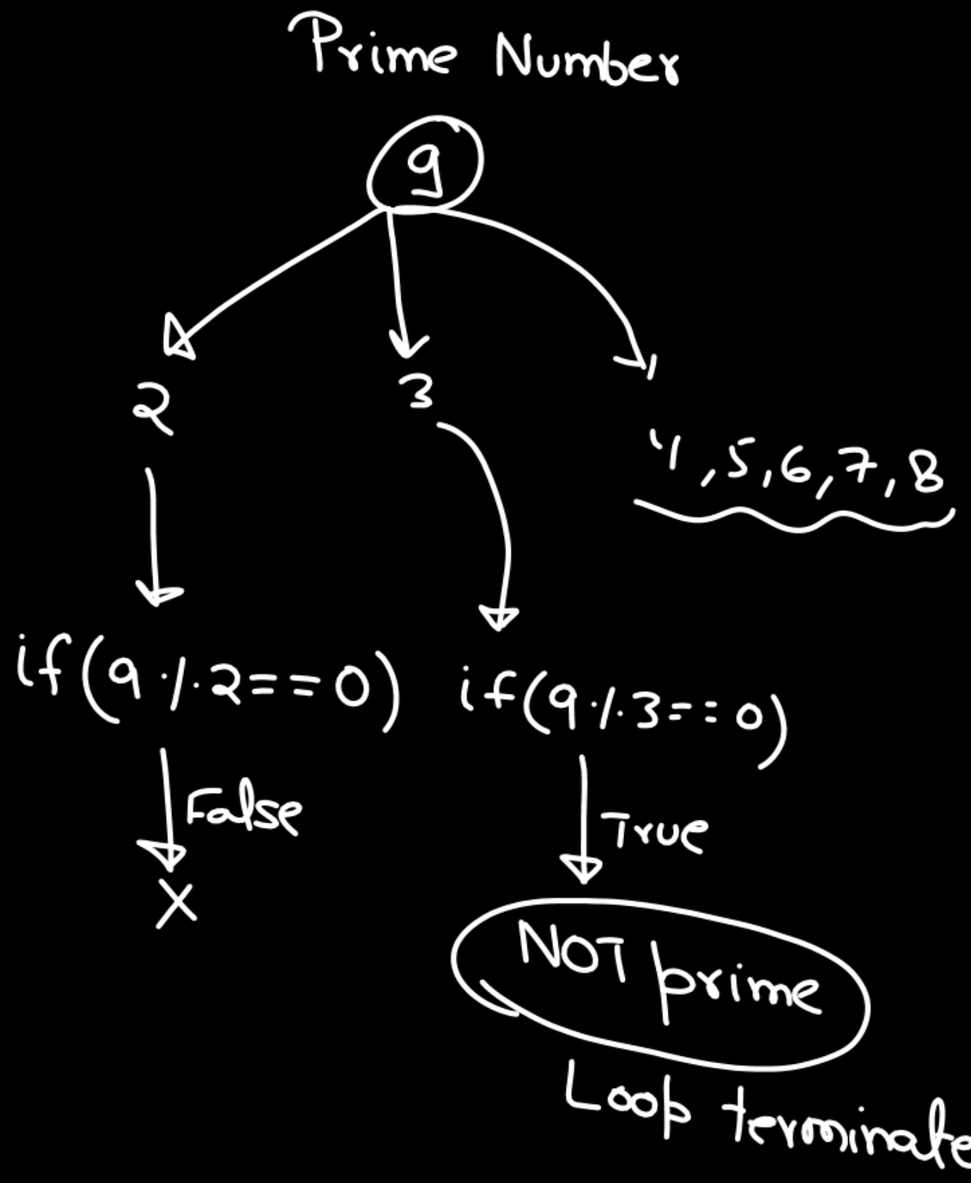

6
1
2
3
4
5
if(6%1==0)
if(6%2==0)
if(6%3==0)
if(6%4==0)
if(6%5==0)
True
True
True
False
False
1
2
3
X
X
for(i=1;i<6;i++)
if(6%i==0)
{
}

1.

```
sum=0;
for(i=1; i<n; i++)
    {
        if(n%i==0)
            {
⇒           // i is a factor of n
                sum = sum+i;
            }
    }
    if(sum==n)
printf("Perfect no.");
```

```
else
printf("Not perfect");
```

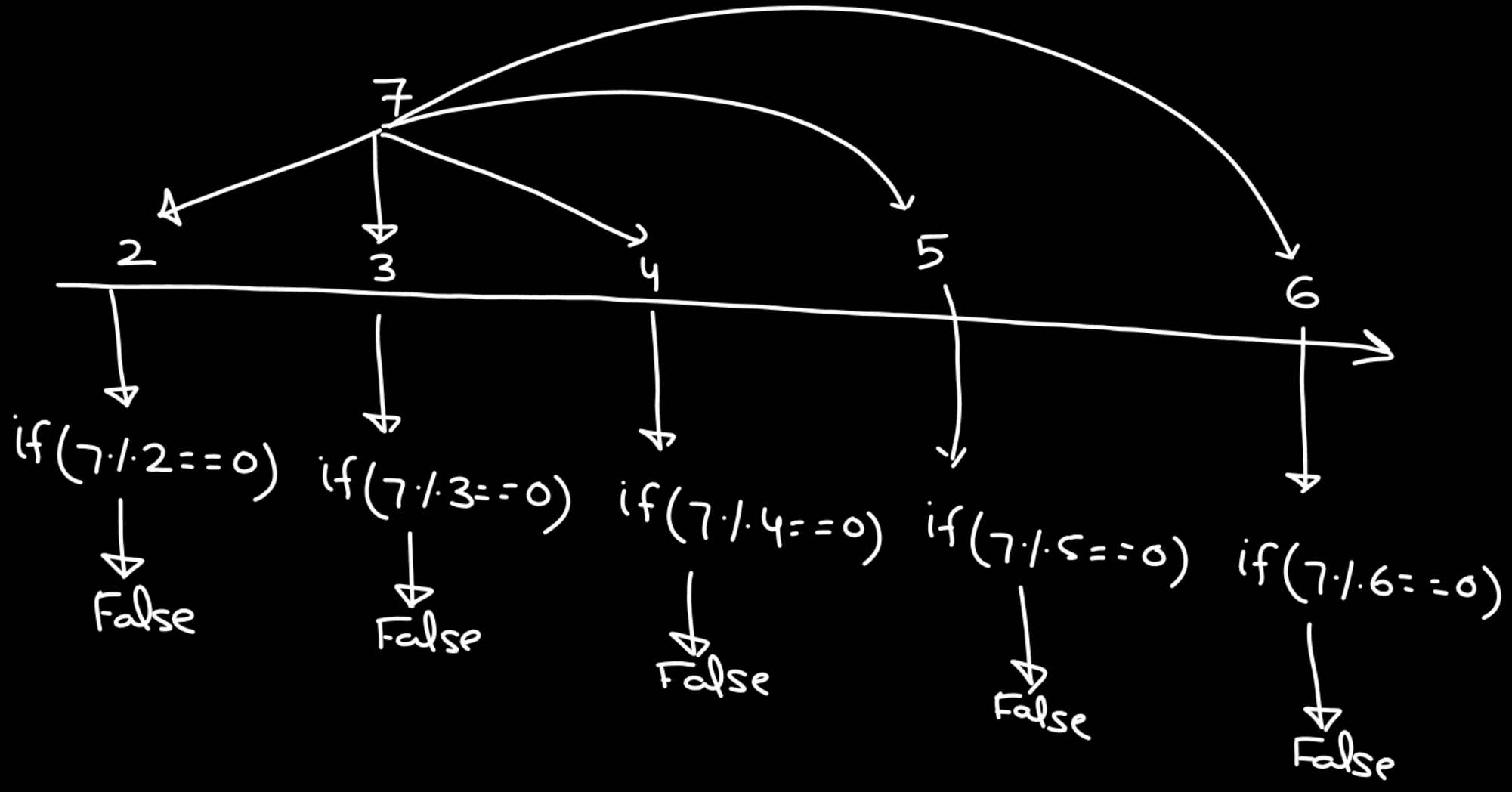
2.

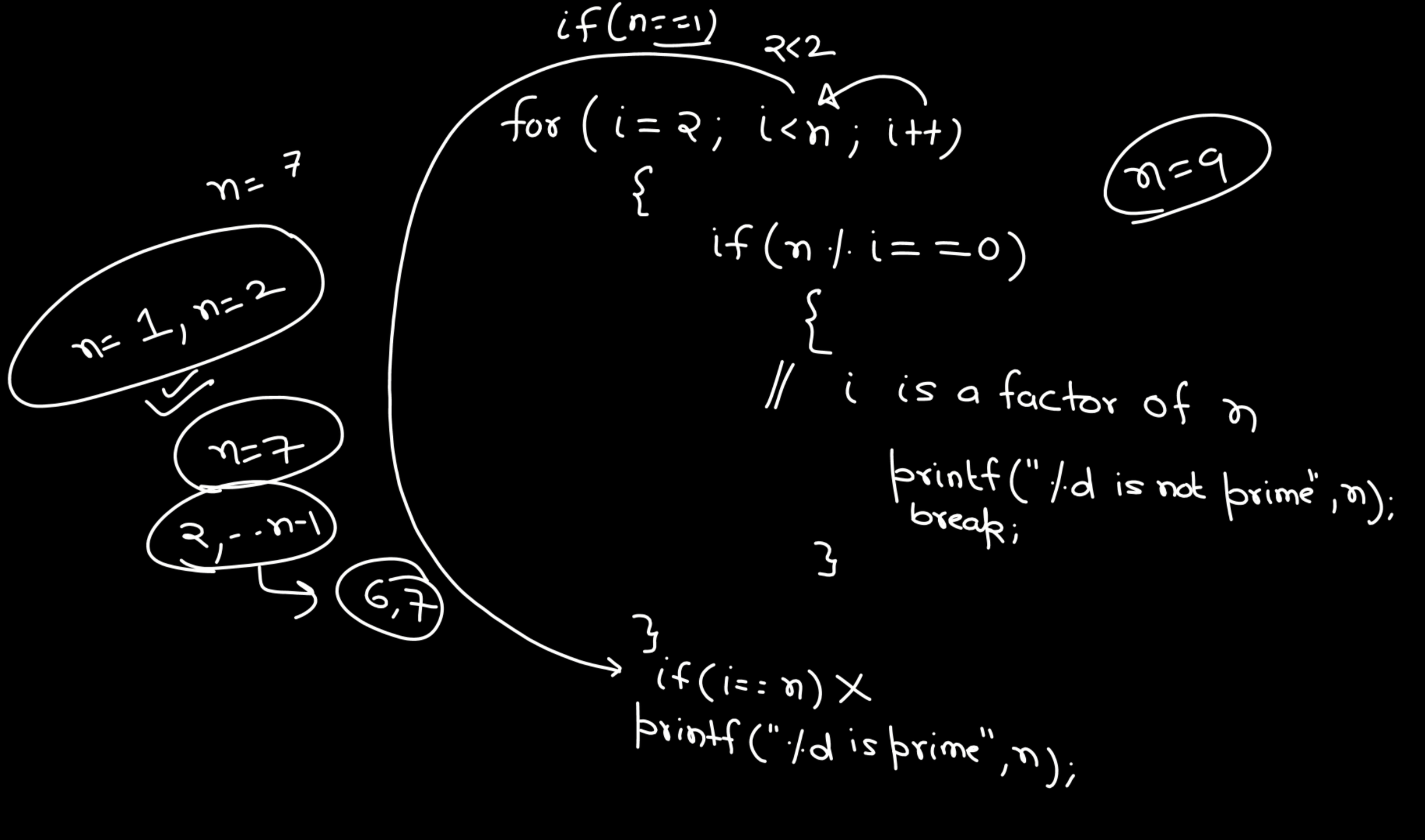


n <! n

not prime

→ 2,3,4,...n-1


7
2
3
4
5
6
if(7%2==0)
if(7%3==0)
if(7%4==0)
if(7%5==0)
if(7%6==0)
False
False
False
False
False


if(n==1)
2<2
for (i=2; i<n; i++)
{
if (n % i == 0)
{
// i is a factor of n
printf("%d is not prime", n);
break;
}
}
if(i==n)
printf("%d is prime", n);
n=9
n=7
n=1, n=2
n=7
2,...n-1
6,7

count ⇒ factors other than 1, n

count = 0;

count ⇒ 0 Prime

count → != 0 Not prime

```
for(i=2; i<n; i++)
{
    if(n%i==0)
    {
        count++;
    }
}
```

3. Given a integer, find the no. of digits in the number.

n : 124	n : 1567	n : 1	n : 15642
o/p : 3	o/p : 4	o/p : 1	o/p : 5

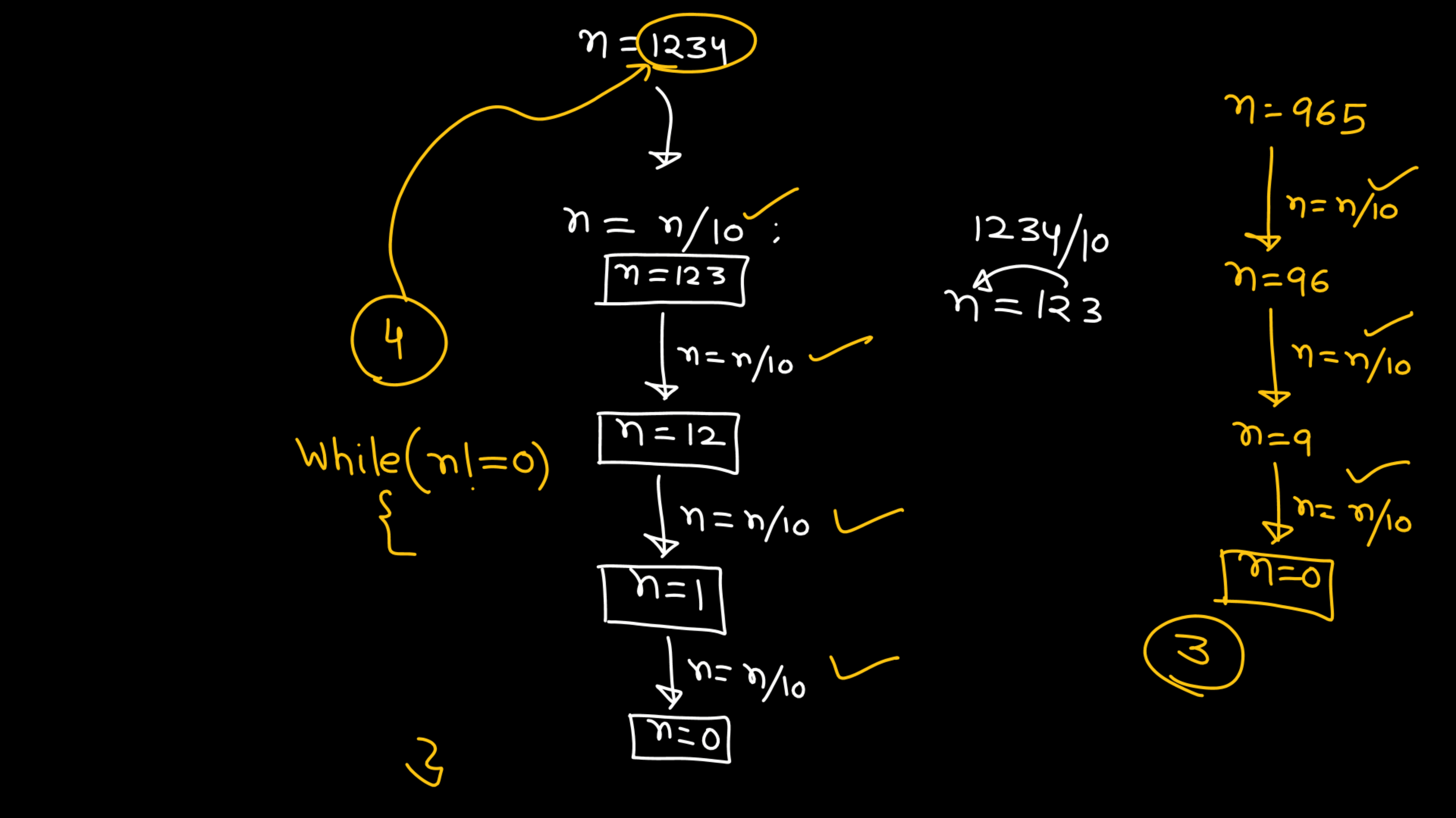
/ :/ जाय, वीरू

① 1234 :/ 10 = 4

1234 / 10 = 123
int int

② 1234 :/ 100 = 34

1234 / 100 = 12


n = 1234
n = n/10 ;
n = 123
n = n/10
n = 12
n = n/10
n = 1
n = n/10
n = 0
4
While(n!=0)
{
3
1234/10
n = 123
n = 965
n = n/10
n = 96
n = n/10
n = 9
n = n/10
n = 0
3

$n \geq 0$

```
count = 0;
While (n > 0)
{
    n = n/10;
    count ++;
}
```

$n = 0$ Special case

Problem

$n = 123$

① $123 > 0 \rightarrow$ True
$n = 12$
Count = 1

② $12 > 0 \rightarrow$ True
$n = 1$
Count = 2

③ $1 > 0 \rightarrow$ True
$n = 1/10 = 0$
Count = 3

④ $0 > 0 \rightarrow$ False

Modulas

$n \geq 0$

10 ⇒ 1 0

n : 1234

1+2+3+4 = 10 ⇒ 1+0 = 1

o/p : 1

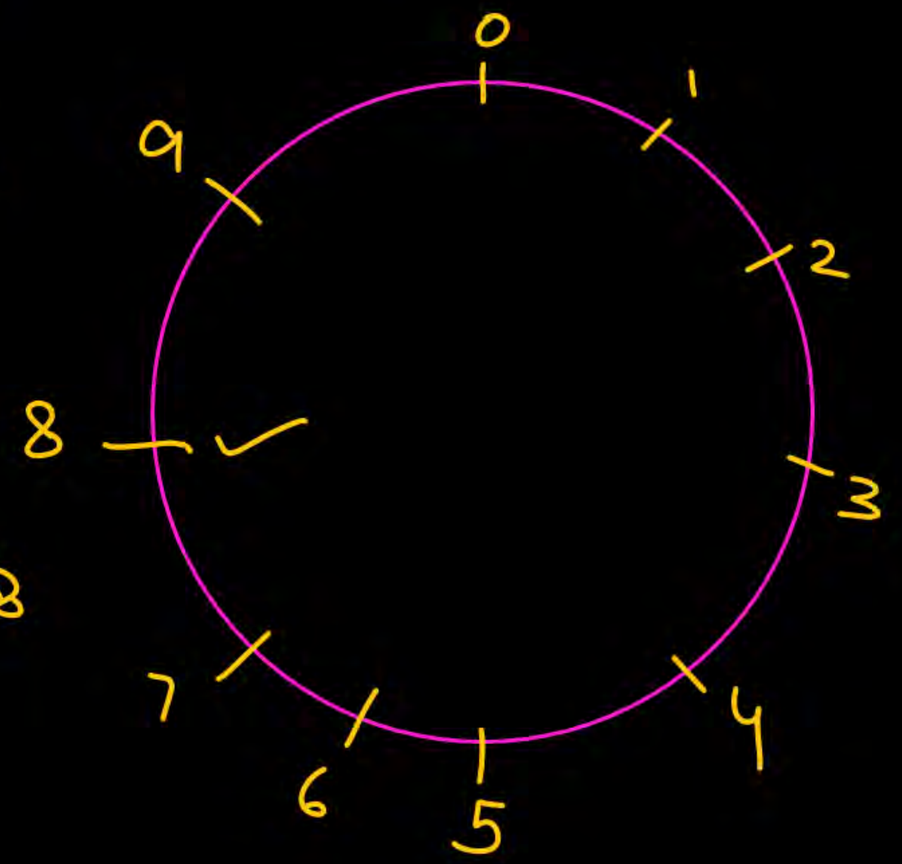
n : 34532

3+4+5+3+2 = 17 = 1+7 = 8

o/p : 8

n : 99999 ⇒ 9+9+9+9+9 = 45 = 4+5 = 9

o/p : 9



n : 9992

o/p : 2

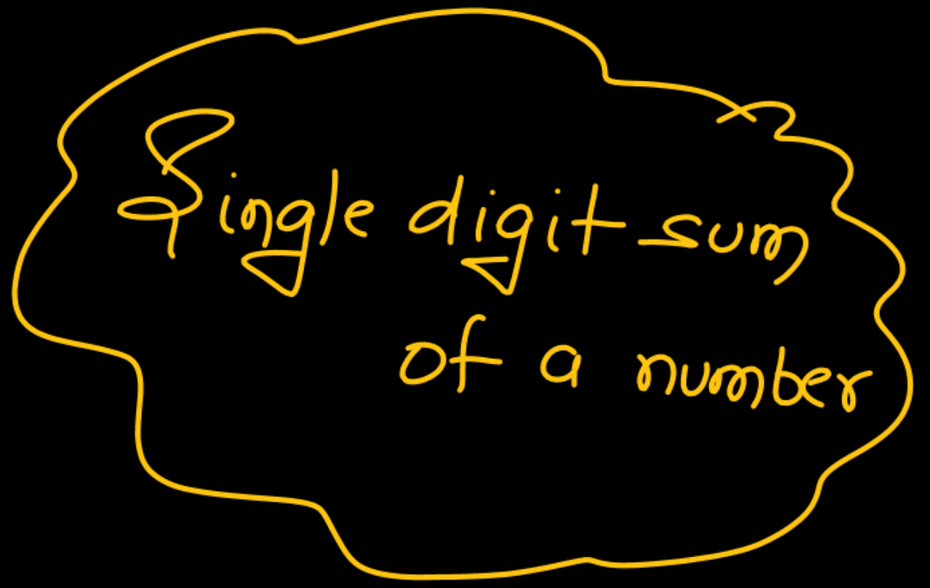
9+9+9+2

29

2+9 = 11

= 1+1

= 2



n : 999999

9+9+9+9+9+9

= 45 single digit X

= 4+5

= 9

29

2+9 = 11 single digit

= 1+1 = 2

>=2 digit ⇒ ?

10 ⇒ 9 (+1) ⇒ 1

18 ⇒ 9 + (9) ⇒ 9

18 − 9 ⇒

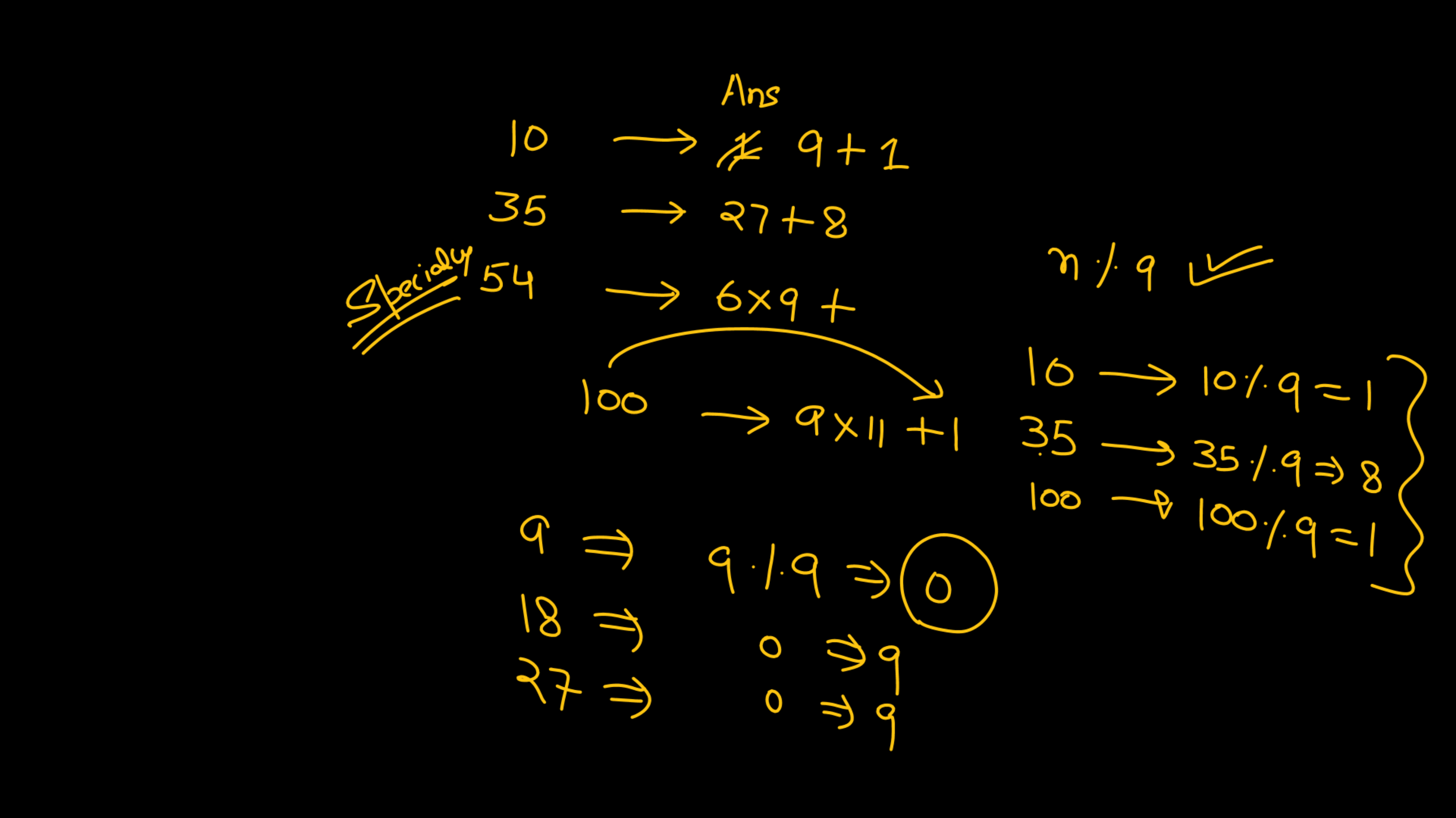
10 − 9 ⇒ 1

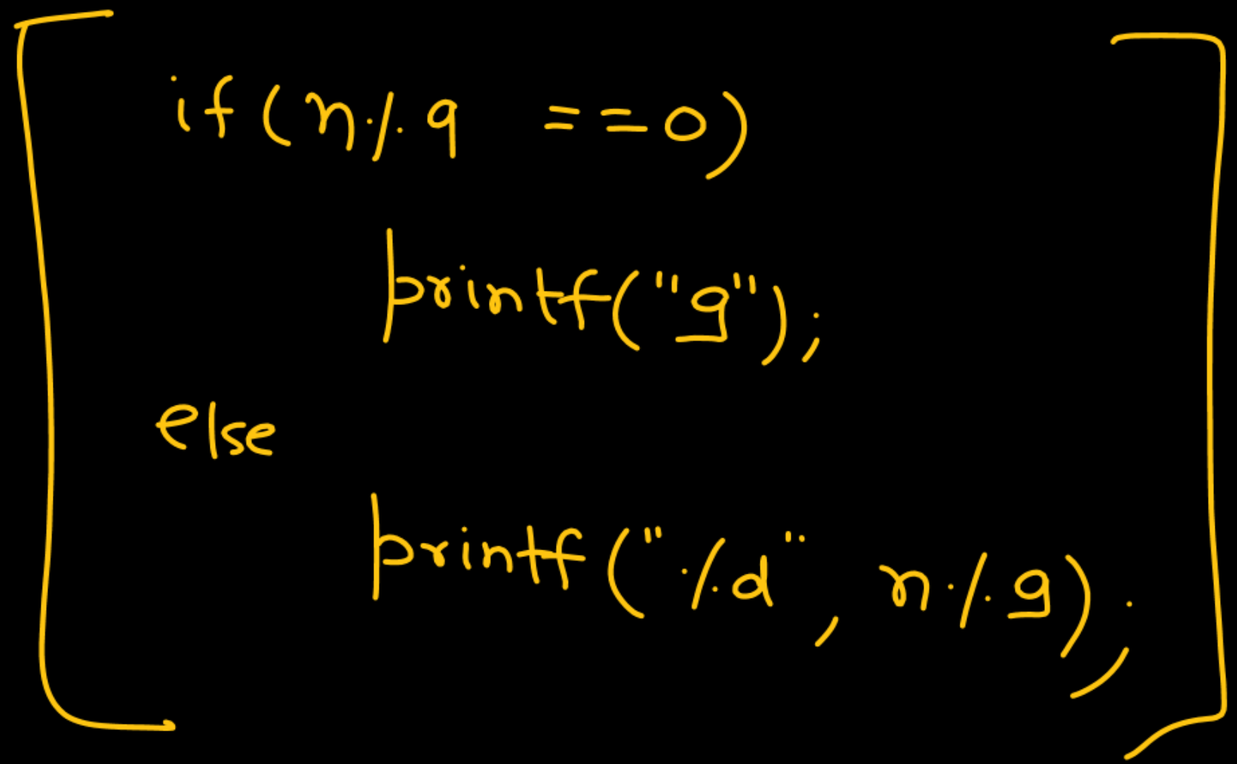
35 − 9

= 26 − 9

= 17 − 9

= (8)


Ans
10 → 9+1
35 → 27+8
Specially 54 → 6×9+
100 → 9×11+1
n % 9
10 → 10 % 9 = 1
35 → 35 % 9 ⇒ 8
100 → 100 % 9 = 1
9 ⇒ 9 % 9 ⇒ 0
18 ⇒ 0 ⇒ 9
27 ⇒ 0 ⇒ 9


if(n%9 ==0)
printf("9");
else
printf("%d", n%9);

Sum ⇒ Concept ✓

1 X 2 X 3 X 4 X 5 ⇒ Abtakka Prod ✓

```
for (i = 1; i <= 5 (6); i++)
  AbtakkaProd = AbtakkaProd x i;   (i: 4, 5)
```

$$\frac{5 \times 5 \times 5 \times 5 \times 5}{4 \times 4 \times 4 \times 4 \times 4 \times 4} = 4^6$$

$a>0$
$b>0$

Pow( )

$a^b = a \times a \times a \times \ldots a$ (b times)

$3^{10} = 3 \times 3 \times \ldots 3$ (10 times)

```
Prod=1
for(i=1 ; i<=10; i++)
        Prod = Prod x 3 ;
```

logic

$a^b = a \times a \times \ldots a$ (b times)

```
Prod=1
for(i=1; i<=b; i++)
  {
  Prod=Prod xa;
  }
```

a^b

Armstrong No

- Easy version
- Actual version

153

$1^3+5^3+3^3$

$= 1+125+27$

$= 153$

Sum of cubes of digits in no = N

n = 153

n = 0

① last_digit = n % 10
= 3

n = n/10

② n = 15

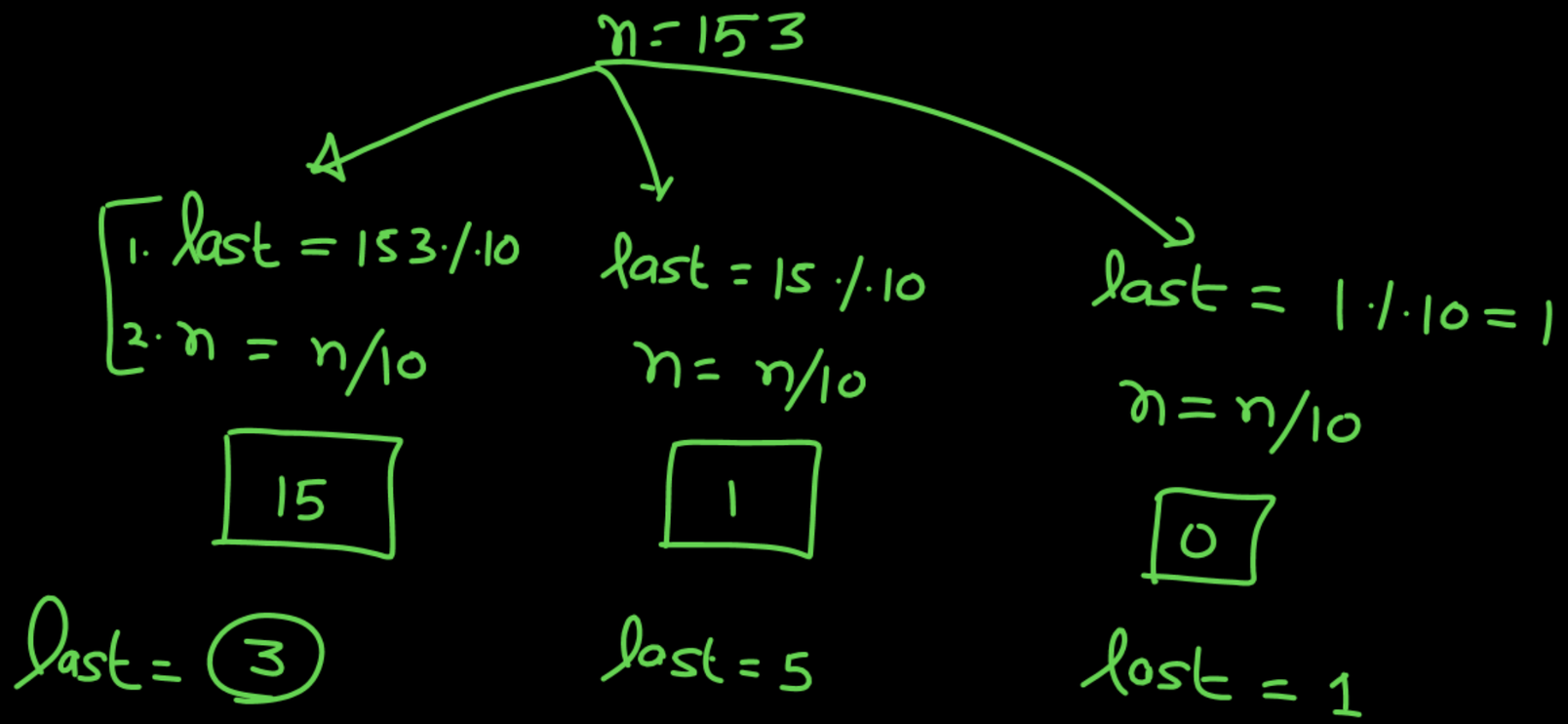
last_digit = 15 % 10 = 5

n = n/10

③ n = 1

last_digit = 1 % 10 = 1

n = n/10


n = 153
1. last = 153 % 10
2. n = n/10
15
last = 3
last = 15 % 10
n = n/10
1
last = 5
last = 1 % 10 = 1
n = n/10
0
last = 1

n = 153

```
sum = 0;
While(n != 0)
  {
    last = n % 10;
    n = n/10
```

last = 3

sum → cubes का

Sum = 0

Sum = sum + last x last x last

Sum = sum + (last X last x last);

```
}
```

Easy version

n = 153

a = n;

sum = 0;

While(n != 0)

{

last = n % 10;

Sum = sum + last x last x last

n = n / 10

}

last = 3

① 153 != 0 True

last = 3, n = 15

sum = 0 + 3 x 3 x 3 = 27

② 15 != 0 True

last = 5, n = 1

sum = 27 + 5 x 5 x 5 = 152

③ 1 != 0 True

last = 1 (n = 0)

Sum = 152 + 1 x 1 x 1 = 153

sum = sum + (last X last x last);

if(sum == n) X 0 हो चुका

if(sum == a)

n: abcd

$a^4 + b^4 + c^4 + d^4 = n$

x^y → code

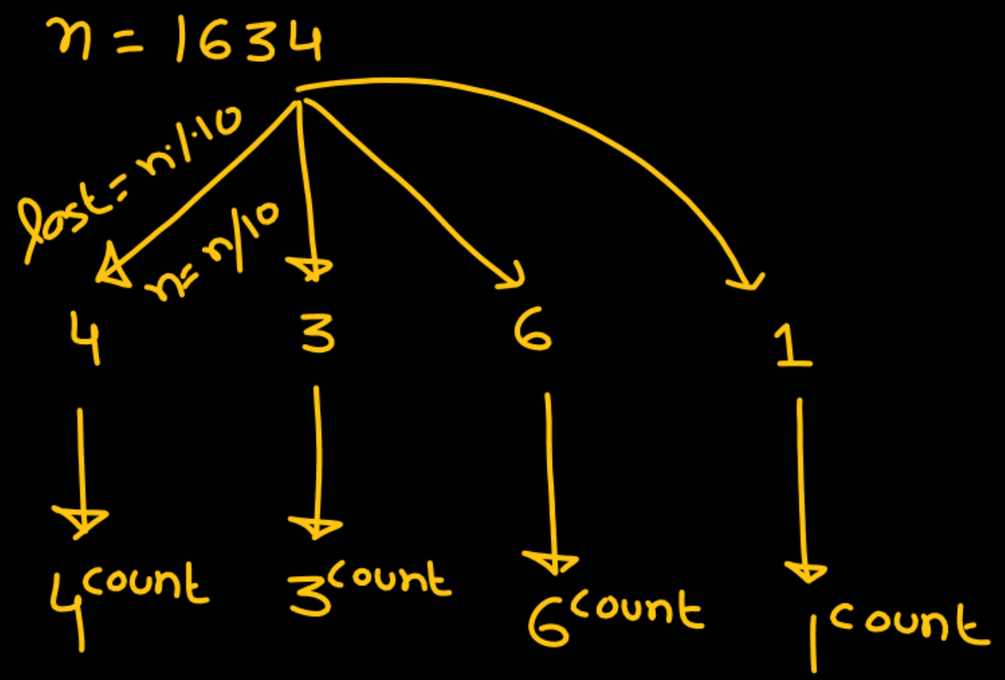
① No. of digits → code

```
count = 0;
While( n != 0)
   {
      n = n/10;
      Count++;
   }
```

count → no. of digits

① No. of digits
⇒ count

②



n = 1634
b = a = n;

```
count = 0;
While (n!=0)
  {
    n = n/10;
    count++;
  }
```

{ count = 4
  n = 0 }

a = 1634
last = 4
a = 163

```
sum = 0;
While (a!=0)
{
  last = a % 10;
  a    = a/10;
```

```
Prod = 1;
for(i=1;i<=count;i++)
    Prod = Prod x i;
sum = sum + Prod;
}
```

a^b ⇒

```
Prod = 1
for(i=1;i<=b;i++)
    Prod = Prod x a
```

Prod = 4^4
= 256

```
if(sum==b)
    ——— Bahubali;
else
    ——— Not Bahubali;
```

Patter printing


Recursion


THANK YOU GW
SOLDIERS !