

```

int i = 1;
while (i <= 10) {
    i = i * i;
    sop(i);
    i++;
}

```

i	i <= 10	i = i * i	o/p	i++
1	T	1	1	2
2	T	4	4	5
5	T	25	25	26
26	F	→ out of loop		

1, 4, 25

Q → Bowl balls of an over in cricket
6 ball in an over.

```

int count = 1;
while (count <= 6) {
    // bowl
    count++;
}

```

Correct

→ count = 1, 2, 3, 4, 5, 6
while (count <= 6);
// bowl
"

Q2) Given a number, find the last digit of that number

6387 → 7
Most significant digit ← 6 → least significant bit

638(7)

$$6387 = 6000 + 300 + 80 + 7$$

(6380) → 10?

remainder → 0

6387 (7) → 10

6380

7 → (7)

$$916 = 900 + 10 + 6$$

(910) + (6)

10 (R)

$$916 \% 10 \rightarrow 6$$

$$638 \rightarrow 8$$

$$916 \rightarrow 6$$

$$72 \rightarrow 2$$

$$9 \rightarrow 9$$

divisor 10) 916 → dividend
- 90
16
- 10
6
R2

$$72 = \frac{70}{10} + \frac{2}{R}$$

$$2 \% 10 \rightarrow \underline{\underline{2}}$$

$$72 \% 10 \rightarrow 2.$$

$$q = \frac{(000 + 00 + 9)}{10} \frac{R}{R}$$

$$9 \% 10 \rightarrow 9$$

```
int num = sc.nextInt();
sol(num % 10);
```

Q3) Given a number, print all the digits from right to left.

$$\begin{array}{c} 916 \rightarrow 6 \\ \quad \quad 1 \\ \quad \quad 9 \end{array} \quad \begin{array}{c} 431 \rightarrow 1 \\ \quad \quad 3 \\ \quad \quad 4 \end{array}$$

$$6381 \% 10 \rightarrow 1$$

$$6381 \% 100 \rightarrow 81 \times$$

$$6381 \% 1000 \rightarrow 381$$

$$\begin{array}{l} 638110 \\ \quad \quad ? \rightarrow \left(\begin{array}{l} 6381 \% 10 = 1 \\ 638 \% 10 = 8 \\ 63 \% 10 = 3 \\ 6 \% 10 = 6 \end{array} \right. \\ 638110 \\ \quad \quad \rightarrow \left(\begin{array}{l} 638 \% 10 = 8 \\ 63 \% 10 = 3 \\ 6 \% 10 = 6 \end{array} \right. \\ 63110 \\ \quad \quad \rightarrow \left(\begin{array}{l} 63 \% 10 = 3 \\ 6 \% 10 = 6 \end{array} \right. \\ 6110 \\ \quad \quad \rightarrow \left(\begin{array}{l} 6 \% 10 = 6 \end{array} \right. \end{array}$$

$$\begin{array}{r} \textcircled{4} \rightarrow n/10 \\ \textcircled{638} \\ \underline{10 \} 6381 -} \\ \quad 60 \\ \quad \underline{\quad} \\ \quad 381 \\ \quad \underline{30} \\ \quad \quad 81 \\ \quad \quad \underline{80} \\ \quad \quad \quad 1 \% \\ \quad \quad \quad \textcircled{1} \end{array}$$

$$6381 - 1 = 6380$$

6381

1) take modulo. by 10 Pr
2) divide the number by 10.

```
int
n = sc.nextInt();
while (n > 0) {
    int d = n % 10;
    sop(d);
    n = n / 10;
}
```

n	n > 0	d	o/p	n = n / 10
6381	T	1	1	638
638	T	8	8	63
63	T	3	3	6
6	T	6	6	0
0	F	→ come out of while loop		

Q → Given n, print sum of all digits.

6381 → 6 + 3 + 8 + 1 = 18

```
int n = sc.nextInt();
int sum = 0;
while (n > 0) {
    int d = n % 10;
    sum = sum + d;
    n = n / 10;
}
sop(sum);
```

n	n > 0	d	sum	n = n / 10
6381	T	1	1	638
638	T	8	9	63
63	T	3	12	6
6	T	6	18	0
0	F	→ come out loop		

o/p → 18

n = 0;

while (n >= 0)

0/10 → 0/10 →

Ques-22

$n = n / 10 \rightarrow$
 } will never end;
infinite loop

// break

10: 30 // \rightarrow .

(6) 7 8 9 \rightarrow H.W

while loop as a concept

solving problem
 using while loop
 \rightarrow with practice

$N = 34562$

$count = 0$

while ($N \geq 0$) { -T

• $N = N / 10$

• $count++$ $\rightarrow count =$

} stop(count);

$N = 34562$

$N \geq 0$

3456

345

34

3

0

0

...

0

0

$0 / 10 \rightarrow 0$

\rightarrow the loop will never stop

Q5) Given a number n , print perfect squares.

from 1 to n .

\rightarrow square root of that
 number is a complete
integer

$\sqrt{4} \rightarrow 2$

P.S.N

$\sqrt{10} \rightarrow 3.16$
 \downarrow
X.P.S.

$N = 50$

$[1, 4, 9, 16, 25, 36, 49] 50$

$N = 100 \rightarrow 1, 4, 9, 16, 25, 36, 49, 64, 81, 100$

int i = 1; $N = 18 \rightarrow 1, 4, 9, 16$ sq

while (i <= n) {

sq = i * i;

cout << sq;

i++

i i <= n o/p i++

1 T 1 2

2 T 4 3

3 T 9 4

4 T 16 5

5 T 25 6

6 T 36 7

7 T 49 8

...

18 T 324 19

2> int i = 1; N = 18

int sq = 0;

while (sq <= n) {

sq = i * i;

i++

i sq sq <= n i * i sq o/p i++

1 0 T 1 1 2

2 1 T 4 4 3

3 4 T 9 9 4

4 9 T 16 16 5

5 16 T 25 25 6

```

int i = 1
while (i * i <= n) {
    sop(i * i);
    i++;
}

```

6	25	F → come out	
	18		1 extra
i	$i \times i \leq n$	o/p	i++
1	T	1	2
2	T	4	3
3	T	9	4
4	T	16	5
5	F → out of the loop		

multiple testcases | multiple i/p

T → is no of i/p
we have 1 test cases

```

int n = sc.nextInt();
int n1 = sc.nextInt();
: 5 :

```

Custom i/p

T → 5

3

22

23

26

121

124

2
Hello
world

```

→ int T = sc.nextInt();
while (T > 0) {
    → int n = sc.nextInt();

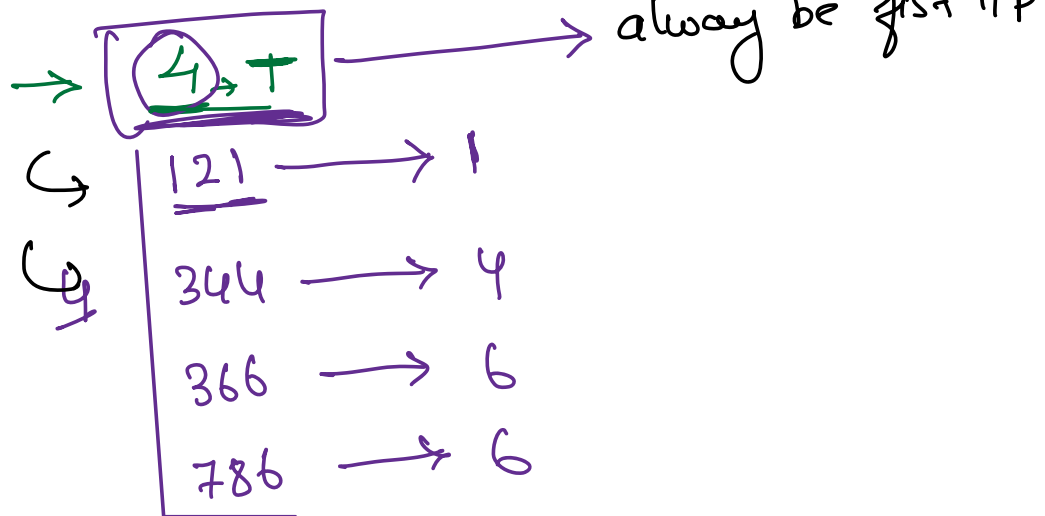
    T--;
}

```

5	T=5	
T	T > 0	n
5	T	22
4	t	23
3	t	26
2	t	121
	.	124

! | t
0 | f → out of loop

Q → Print the last digit of each number in T testcase.



int T = sc.nextInt();

while (T > 0) {

4 times → int num = sc.nextInt();

sop(num % 10);

T--;

4

121 → 3

123 →

445 →

667X

420

4 → more number ✓

4 → tak less number X

No next element

T	T > 0	num	O/p sop	T--
4	T	121	1	3

3	T	123	3	2
2	T	445	5	1
G 1	T	→ 667	7	0
0	F	→ out of loop		
G .				

Do not

Perfect square number

$\sqrt{\text{num}} \rightarrow 3.25$

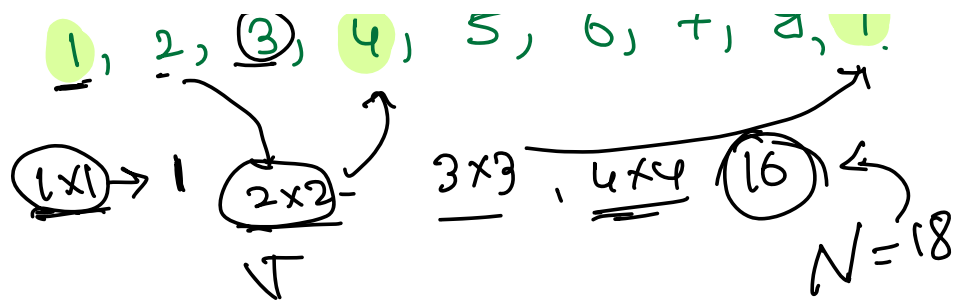
$\sqrt{9} \rightarrow (3)$

Perfect number

$\sqrt{10} \rightarrow (3.1) \times$

$1^2 \rightarrow 1$ (2×2) $\sqrt{4} \rightarrow 2$

$(2 \times 2) = \sqrt{4} \rightarrow 2$



$a = 2$ $b = 3$ $a^b \rightarrow 2^3 \Rightarrow 2 \times 2 \times 2 \rightarrow 8$

$a = 2$ $b = 5$ $a^b \rightarrow 2^5 \Rightarrow 2 \times 2 \times 2 \times 2 \times 2 \Rightarrow 32$

multiply $a \rightarrow b$ times \rightarrow repeat

```
int pow = 1;
while (b > 0) {
    pow = pow * a;
}
```

$a = 10$ $b = 2$

$10^2 = \frac{10 \times 10}{100}$

```
b--;
}
return pow;
```