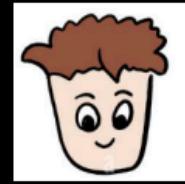


PRINT FROM 1 TO 5

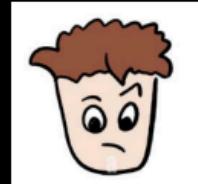
```
#include<iostream>
using namespace std;

int main()
{
    cout << 1 << endl;
    cout << 2 << endl;
    cout << 3 << endl;
    cout << 4 << endl;
    cout << 5 << endl;
}
```



PRINT FROM 1 TO 10

```
int main()
{
    cout << 1 << endl;
    cout << 2 << endl;
    cout << 3 << endl;
    cout << 4 << endl;
    cout << 5 << endl;
    cout << 6 << endl;
    cout << 7 << endl;
    cout << 8 << endl;
    cout << 9 << endl;
    cout << 10 << endl;
}
```



PRINT FROM 1 TO 1000

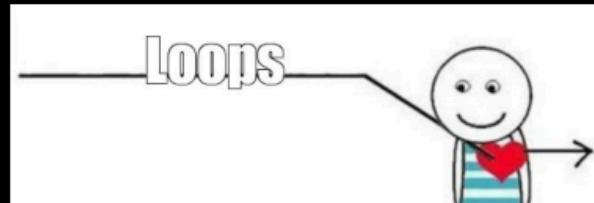
```
int main()
{
    cout << 1 << endl;
    cout << 2 << endl;
    cout << 3 << endl;
    cout << 4 << endl;
    cout << 5 << endl;
    cout << 6 << endl;
    cout << 7 << endl;
    cout << 8 << endl;
    cout << 9 << endl;
    cout << 10 << endl;
    .
    .
    .
    .
}
```



How can we **repeat work without writing the same code again and again?**

LOOPS

When you want to **repeat an action again and again till a certain condition**, we can use **loops**.



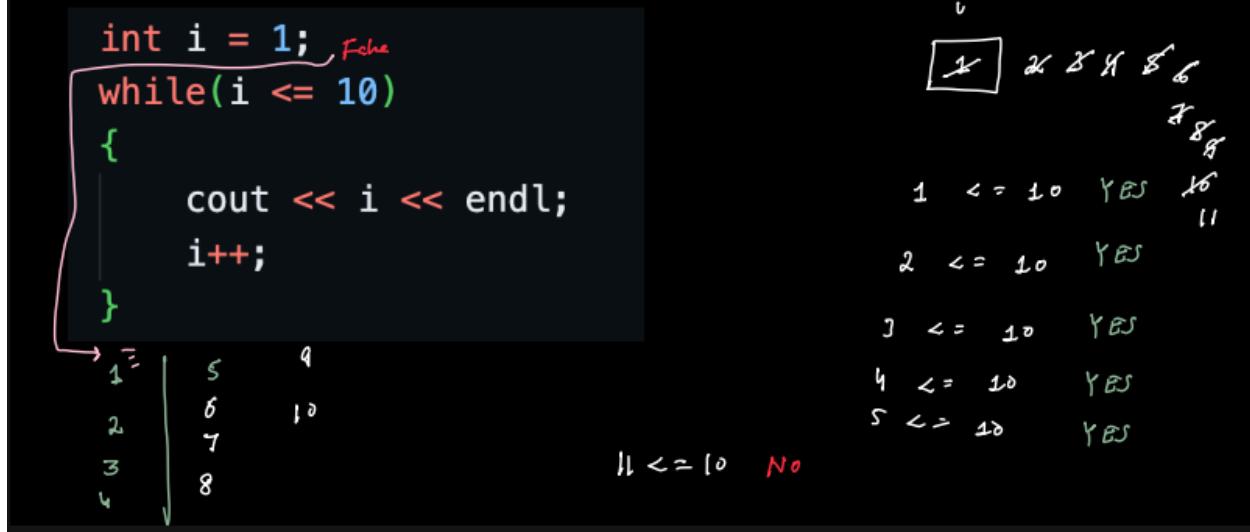
TYPE OF LOOPS

- 1) **While** loop
- 2) **For** loop
- 3) **Do-while** loop

WHILE LOOP

```
initialization;  
  
while(condition)  
{  
    // body  
    update;  
}
```

PRINT FROM 1 TO 10



Print from 1 to n

Screenshot of an online C++ compiler (CodeVisualizer) showing the execution of a program to print from 1 to n.

Code:

```
#include <iostream>
using namespace std;
int main()
{
    int n;
    cin >> n;
    int i = 1;
    while(i <= n)
    {
        cout << i << endl;
        i++;
    }
}
```

Output:

Sample Input: 400

Status: Successfully executed

Time: 0.0000 secs Memory: 3.532 Mb

Your Output:

```
366
367
368
369
```

PRINT N TO 1

```
int main()
{
    int n;
    cin >> n;

    int i = n;
    while(i >= 1)
    {
        cout << i << endl;
        i--;
    }
}
```



PRINT NUMBERS FROM L TO R

```
int main()
{
    int l, r;
    cin >> l >> r;

    int i = l;
    while(i <= r)
    {
        cout << i << endl;
        i++;
    }
}
```

A screenshot of a C++ IDE interface. On the left, the code for printing integers from l to r is shown:

```
1 #include <bits/stdc++.h>
2 using namespace std;
3
4 int main()
5 {
6     int l, r;
7     cin >> l >> r;
8
9     int i = l;
10    while(i <= r)
11    {
12        cout << i << endl;
13        i++;
14    }
15 }
16 // 4, 5, 6, 7, 8, 9, 10
```

The output window shows the status "Successfully executed" and the sample input "4 10". The output is displayed as:

4
5

PRINT ALL EVEN NUMBERS FROM 1 TO N

n = 5

2

4

n = 6

2

4

6

```
int n;
cin >> n;
int i = 1;
while(i <= n)
{
    if(i % 2 == 0)
        cout << i << endl;
    i++;
}
```

i n
X 5
2
4
6 2
4

PRINT ALL EVEN NUMBERS FROM 1 TO N

n = 5

2

4

```
int n;  
cin >> n;  
  
int i = 2;  
while(i <= n)  
{  
    cout << i << endl;  
    i += 2;  
}
```

n = 6

2

4

6

i n
|X| |5|
2
4
6
2
4

PRINT ALL UPPERCASE ALPHABETS (A - Z)

```
char ch = 'A';
```

```
while(ch <= 'Z')  
{  
    cout << ch << endl;  
    ch++;  
}
```

ASCII Value

'A' → 65	'a' → 97
'B' → 66	'b' → 98
'C' → 67	'c' → 99
⋮	⋮

PRINT MULTIPLICATION TABLE

n = 5

```
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
```

n = 6

```
6 x 1 = 6
6 x 2 = 12
6 x 3 = 18
6 x 4 = 24
6 x 5 = 30
6 x 6 = 36
6 x 7 = 42
6 x 8 = 48
6 x 9 = 54
6 x 10 = 60
```

`i = 1;`

`while (i <= 10)`

`{`

`cout << n << " x " << i << " = " <<`

`i++;`

`}`

`(n+i) << endl;`

PRINT NUMBER IN REVERSE

n = 512

215

`int n;`

`cin >> n;`

n = 1950

n = 1927

7291

`while (n != 0)`

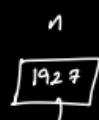
`{`

`cout << n % 10;`

`}`

n = 3429

9243



192
↓
19
↓
1
↓
0

Continue...

$$N = 12469$$

Last digit?

$$(N \mod 10)$$

```
int main()
{
    int n;
    cin >> n;
```

$$\begin{array}{r} 1246 \\ 10 \sqrt{12469} \\ \underline{-10} \\ 24 \\ \underline{-20} \\ 46 \\ \underline{-40} \\ 69 \\ \underline{-60} \\ 9 \end{array}$$

$$N = 12469$$

Last digit?

$$(N \mod 10)$$

```
int main()
{
    int n;
    cin >> n;
```

$$\begin{array}{r} 1246 \\ 10 \sqrt{12469} \\ \underline{-10} \\ 24 \\ \underline{-20} \\ 46 \\ \underline{-40} \\ 69 \\ \underline{-60} \\ 9 \end{array}$$

$$12469 = 1246 \times 10 + 9$$

$N \% 10 \rightarrow$ last digit

$N / 10 \rightarrow$ Remove the last digit



DIGITS SUM

$$n = 512 \Rightarrow 5 + 1 + 2 = 8$$

8

$$n = 1927 \Rightarrow 1 + 9 + 2 + 7 = 19$$

19

$$n = 3429 \Rightarrow 3 + 4 + 2 + 9 = 18$$

18

DIGITS SUM

$$n = 512 \Rightarrow 5 + 1 + 2 = 8$$

8

$$n = 1927 \Rightarrow 1 + 9 + 2 + 7 = 19$$

19

$$n = 3429 \Rightarrow 3 + 4 + 2 + 9 = 18$$

18

sum
[0]

int sum = 0; // DSA Concepts

int n;
cin >> n;

while (n != 0)

{ sum += n % 10;

n = n / 10;

cout << sum << endl;

28th Jan
Wednesday
8:10 AM

PRINT NUMBER IN REVERSE

$$n = 512$$

215

int n;
cin >> n;

$$n = 1950$$

$$n = 1927$$

7291

while (n != 0)

{

cout << n % 10;

}

n = n / 10;

$$n = 3429$$

9243

1927
↓
192
↓
19
↓
1
↓
0

PRINT NUMBER IN REVERSE

```

n = 512 → ③
215
n = 1927 → ④
7291
n = 3429 → ⑤
9243
    
```

int count = 0; *n = 1950*

int n;
cin >> n;
while (n != 0) {
 count++;
 n = n / 10;
}
cout << count;

REVERSE AND STORE IN A VARIABLE

n = 512

ans = 215

n = 1927

ans = 7291

n = 3429

ans = 9243

int ans = 0;

int n;

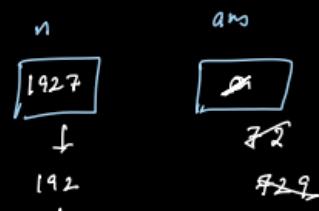
cin >> n;

while (n != 0)

*{ ans = (ans * 10) + n % 10;*

n = n / 10;

cout << ans << endl;



7291

Continue...

The screenshot shows a C++ development environment. The code in the editor is:

```
1 #include <bits/stdc++.h>
2 using namespace std;
3
4 int main()
5 {
6     int n;
7     cin >> n;
8
9     if(n == 0)
10    {
11        cout << 0;
12    }
13
14    while(n != 0)
15    {
16        cout << n % 10;
17        n = n / 10;
18    }
19 }
```

The output window shows the status "Status : Successfully executed" and the output "0".

The screenshot shows a C++ development environment. The code in the editor is:

```
3
4 int main()
5 {
6     long long n;
7     cin >> n;
8 }
```

The screenshot shows a C++ development environment. The code in the editor is:

```
1 #include <bits/stdc++.h>
2 using namespace std;
3
4 int main()
5 {
6     long long n;
7     cin >> n;
8
9     long long ans = 0;
10
11    while(n != 0)
12    {
13        ans = (ans * 10) + (n % 10);
14        n = n / 10;
15    }
16
17    cout << ans << endl;
18 }
19 }
```

The output window shows the status "Status : Successfully executed" and the output "748096000000".

PALINDROME

n = 12321

YES rev = 12321

n = 1927

NO rev = 7291

n = 1

YES rev = 1

int rev = 0;

int n;

cin >> n;

int temp = n;

while (n != 0)

{ rev = (rev * 10) + n % 10;

 n = n / 10;

}

if (rev == temp) { what will be the value of N? 10

{ cout << "YES";

}

else

{

}

FOR LOOP

cout << "No";

```
for(initialization; condition; update) {  
    // code  
}
```

int i = 1;

while (i <= 100)

{ cout << i << endl;

 i++;

i
EX2)

for (int i=1; i<=100; i++)

{

 cout << i << endl;

}

```
1 #include <bits/stdc++.h>
2 using namespace std;
3
4 int main()
5 {
6     int n;
7     cin >> n;
8
9     int m;
10    cin >> m;
11
12    for(int i = 1; i <= n; i++)
13    {
14        // cout << "****" << endl;
15        // we have to print star 'm' times
16        for(int j = 1; j <= m; j++)
17        {
18            cout << "*";
19        }
20        cout << endl;
21    }
22 }
23
```

10 3

Output

Status : Successfully executed

Time: 0.0000 secs Memory: 3.568 Mb

Sample Input

10

Your Output


```
1 #include <bits/stdc++.h>
2 using namespace std;
3
4 int main()
5 {
6     int n;
7     cin >> n;
8
9     for(int i = 1; i <= n; i++)
10    {
11        // we have to print star 'n' times
12        for(int j = 1; j <= n; j++)
13        {
14            cout << "*";
15        }
16        cout << endl;
17    }
18 }
19
```

5

Output

Status : Successfully executed

Time: 0.0000 secs Memory: 3.52 Mb

Sample Input

5

Your Output

Note:

- **Digit based problem use While loop ex: n=102030**
- **Range based problem use for loop**