Print powers of 2 less than n

n = 20

Series :- 2^0, 2^1, 2^2, 2^3, 2^4, ~~2^5~~

1 2 2×2 2×2×2 2×2×2×2

```
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();

    for (int i = 1; i < n; i *= 2) {
        System.out.print(i + " ");
    }
}
```

o/p ⇒ 1 2 4 8 16 32 64

i = 1, (1 < 100) ✓
i = 2, (2 < 100) ✓
i = 4, (4 < 100) ✓
i = 8, (8 < 100) ✓
i = 16, (16 < 100) ✓
i = 32, (32 < 100) ✓
i = 64, (64 < 100) ✓
i = 128, (128 < 100) ✗

Print n/3

"Write a program that takes an integer input from the user. The program should keep **dividing** the integer by **3** and printing the resultant value on each iteration until the value is greater than **0**.

loop

from where to start = n
when to stop = n > 0
how to move = n /= 3

code

```
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();

    for (int i = n; i > 0; i /= 3) {
        System.out.print(i + " ");
    }
}
```

Multiples of 3, 5 and Both 3 and 5

$n = 20$

from 1 to n by +1 (i)

- i %. 3 == 0 && i %. 5 == 0 ✓
- i %. 3 == 0 ✓
- i %. 5 == 0 ✓

which operator

A	B	result
T	F	T
F	T	T
T	T	T

Code

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int n = scn.nextInt();

    for (int i = 1; i <= n; i++) {
        if ( (i % 3 == 0) || (i % 5 == 0) ) {
            System.out.print(i + " ");
        }
    }
}
```

O/p :- 3 5 6 9 10 12 15 18 20

dry run

n = 20

i = 1,
i = 2,
i = 3, divisible by 3
i = 4,
i = 5, divisible by 5
i = 6, divisible by 3
i = 7,
i = 8,
i = 9, divisible by 3
i = 10, divisible by 5
i = 11,
i = 12, divisible by 3
i = 13,
i = 14,
i = 15, divisible by 5 && divisible by 3
i = 16,
i = 17,
i = 18, divisible by 3
i = 19,
i = 20, divisible by 5

⟹ While loop

Syntax :-

```
initialization
while (cond.) {
    // Statement
    upgradation
}
```

Note :- Every task that can solved using for loop, can also be solved using while loop and vice versa is also true

Ex:- print from 1 to 10

Code

```
int i=1 ;
while (i<=10) {
    Syso(i);
    i++
}
```

Note:- we can access i variable outside the loop as well.

Print 0 to n

n = 5

print

0
1
2
3
4
5

Code

```
int i = 0;
while ( i <= n ) {
    Syso(i);
    i++;
}
```

Printing 5 to N(While Loop)

n = 7

```
int i = 5;
while(i <= n){
    Syso(i);
    i++;
}
```

Ex:-

```
for ( int i = 1 ; true ; i++ ) {

}
```

∞

```
int i = 1;
while ( true ) {

    i++;
}
```

∞

⟹ do - while loop

Syntex

```
int i = 1;
do {
    // statement
    i++;
} while (i < n);
```

Note:-

do while loop always executes atleast 1 time

Ex:- print from 1 to 10

```
int i=1;
do{
    Syso(i);
    i++;
}while(i<=10);
```