Level 0:

1. Write a C program that calculates and displays the area of various shapes using enum.
   Test case 1

```
0:·Circle⏎

1:·Square⏎

2:·Rectangle⏎

3:·Triangle⏎

Choose·a·shape:·0

radius:·4

Area·of·circle:·50.24⏎
```

2. Write a C program that uses typedef and takes input from the user to calculate the area of a rectangle.

Input Format:
Prompt the user to enter the following details:
    length: {length}
    width: {width}
Output Format:
Display the following information:
    Area of the rectangle: < Area > square units
    Test case 1

```
length:·5.0

width:·4.0

Area·of·the·rectangle:·20.00·square·units⏎
```

3. Write a C program that uses bit fields and takes input from the user to store, calculate their total and average. Display student's scores, total and average.

```
Math·score·(0-31):·25

Physics·score·(0-31):·18

Chemistry·score·(0-31):·29

Entered·Scores:⏎

Math:·25⏎

Physics:·18⏎

Chemistry:·29⏎

Total·Score:·72⏎

Average·Score:·24.00⏎
```

4. Write a C program that uses pre-processor directives to define and use constants, and it takes input from the user to calculate the area of a circle.

```
radius:·4

Area·of·the·circle:·50.24·square·units
```

5. Write a C program that uses preprocessor directives to define macros for calculating the sum and product of two numbers entered by the user.

```
n1:·3

n2:·8

Sum:·11.00⏎

Product:·24.00
```

Level 1:

1. Write a program given two numbers, the task is to use alternative bits within two numbers to create result. We take first bits of second number,

then second bit of the first number, third bit of second number and take the fourth bit of a first number and so on and generate a number with it.

```
Examples :
Input : n = 10, m = 11
Output : 11
Start from right of second number
Binary representation of n = 1 0 1 0
                               ^  ^
Binary representation of m = 1 0 1 1
                                ^  ^
Output is              = 1 0 1 1
Input : n = 20, m = 7
Output : 5
Start from right of second number
binary representation of n = 1 0 1 0 0
                              ^  ^
binary representation of m = 0 0 1 1 1
                             ^  ^  ^
Output is              = 0 0 1 0 1
```

2. Write a Program to Count the Number of Trailing Zeroes in the binary representation of a given positive Integer n.

Question Description : Given an integer, for n = 12, its binary representation is 1100 (used bits) and number of trailing zero bits is 2. Another Example is n = 8 and the output = 3, binary of 8 is 1000 (Used bits), so there are three trailing zero bits.
Constraints: 1 <= n <= 10^3
Instruction: To run your custom test cases strictly map your input and output layout with the visible test cases.
Test case 1

```
10
```

```
1
```

3. Write a program We have given a large number now we can easily find out the factorial of this large number. programmers who need more precision than 64 bits.

```
Examples:
Input : 100
Output : 933262154439441526816992388562667004-
     907159682643816214685929638952175999-
     932299156089414639761565182862536979-
     208272237582511852109168640000000000-
     00000000000000
Input :50
Output : 30414093201713378043612608166064768844-
```

```
     437764156896051200000000000000
```

```
Sample Input and Output-1:
  Enter a number : 50
  30414093201713378043612608166064768844377641568960512000000000000
```

Level 2:

1. Write a program given a non-negative integer n, the problem is to reverse the bits of n and print the number obtained after reversing the bits.

Note that the actual binary representation of the number is being considered for reversing the bits, no leading 0's are being considered.

Constraint: The entered number n is a positive integer.
Examples:

```
Input:
11
Output:
13
Explanation :
      (11)10 = (1011)2.
      After reversing the bits we get: (1101)2 = (13)10.

Input:
10
Output :
5
Explanation :
      (10)10 = (1010)2.
      After reversing the bits we get: (0101)2 = (101)2 = (5)10.
```

2. Write a program given a number n, the task is to Toggle all even position bits of a number.

Constraint: The entered number n is a positive integer.
Examples:

```
Input:
10
Output:
0
Explanation :
      binary representation of 10 is =  1 0 1 0
              After toggling even bits =  0 0 0 0
So the equivalent decimal value is = 0

Input:
20
Output :
30
```

```
Explanation :
      binary representation of 20 = 1 0 1 0 0
                            After toggle  = 1 1 1 1 0
   So the equivalent decimal value is = 30
```

3. Write a program to add two numbers.While adding two binary numbers by hand we keep the carry bits in mind and add it at the same time. But to do same thing in program we need a lot of checks. Recursive solution can be imagined as addition of carry and a^b (two inputs) until carry becomes 0.

```
Sample Input and Output-1:
  Enter any two numbers : 45 45
  90
Sample Input and Output-2:
  Enter any two numbers : 4 78
  82
```