LOOP RELATED PROBLEMS

Difficulty-Easy

1.   Read a number (1-9) from the user and print the sequence given in the sample outputs.
You have to identify the pattern using the sample Inputs and outputs. Assume that the user will not Input any invalid number.

Sample Input 1: 4 **Output:** 1234321	Sample Input 2: 8 **Output:** 123456787654321
Sample Input 3: 1 **Output:** 1	**Sample Input 2:** 6 **Output:** 12345654321

2.   Read the value N from the user, and print the first Nth Fibonacci numbers.

Sample Input: 9 **Output**: 0 1 1 2 3 5 8 13 21	**Sample Input:** 5 **Output**: 0 1 1 2 3

3.   Read the value of n from the user and compute the value of the following series:

result = (1**1)/1 + (2**2)/2 + (3**3)/3 + (4**4)/4 + ... +(n**n)/n

(Here, ** indicates power)

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Sample Input: 3
Output: 12

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Sample Input: 5

Output: 701

4.   Take two-year Inputs from the user (Lower bound and upper bound).
 Print all the years that are leap years within that range (inclusive).

Three conditions are used to identify leap years:
- The year can be evenly divided by 4, is a leap year, unless
- The year can be evenly divided by 100, it is NOT a leap year, unless:
- The year is also evenly divisible by 400. Then it is a leap year.

[which implies -
if the year can be divided by 4 and NOT divided by 100, then it's a leap year.
If the year can be divided by 4, divided by 100, and divided by 400, then it's a leap year.]

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Sample Input:
lower_bound= 1980
upper_bound= 2020

Sample Output:
1980 1984 1988 1992 1996 2000 2004 2008 2012 2016 2020

5. Write a python program that takes integer Inputs from the user until the user gives "STOP". Print the product of all the numbers.

Sample Input1: 5 6 -02 7 2 STOP **Sample Output1:** -840	**Sample Input2:** 5 0 2 STOP **Sample Output2:** 0
Sample Input3: STOP **Sample Output3:** 0	

6. Write a Python program that reads a number and displays the multiplication table of the given integer.

Sample Input: 15	**Sample Input**: 2
Sample Output:	**Sample Output**:
15X1=15	2X1=2
15X2=30	2X2=4
…	…
…	…
15X10=150	2X10=20

7.   Imagine you are trying to draw a shape. So, you are taking the lengths of each of the sides of the shape. Now, what shape you need to draw depends on the first Input (1-4).

    a. If no of sides: 1 or 2, a line needs to be drawn
    b. If no of sides: 3, a triangle needs to be drawn
    c. If no of sides: 4, a rectangle needs to be drawn
    d. For any other number of sides, print "Invalid Input"

After deciding what your shape will be, your job is to verify whether the shape can be drawn using the lengths given by the user.

- To draw a triangle, the sum of the lengths of any two sides must be greater than the third.
- To draw a rectangle, the sum of the lengths of any three sides must be greater than the fourth.
- To draw a line, no verification is required.

Sample Input 1:	**Sample Input 2:**
No of sides: 1	No of sides: 2
Sample Output:	**Sample Output:**
A line can be drawn	A line can be drawn
Sample Input 3:	**Sample Input 4:**
No of sides: 3	No of sides: 3
Length of sides:	Length of sides:
2	2
3	3
1	2
Sample Output:	**Sample Output:**
A triangle cannot be drawn	A triangle can be drawn
Sample Input 5:	**Sample Input 5:**
No of sides: 4	No of sides: 4
Length of sides:	Length of sides:
2	2
3	3
1	1
4	7
Sample Output:	**Sample Output:**
A rectangle can be drawn	A rectangle cannot be drawn

8. Imagine you are trying to draw a shape. So, you are taking the angles of the shape. Now, what shape you need to draw depends on the first Input (3 or 4).

    a. If no of angles is 3, a triangle needs to be drawn
    b. If no of angles is 4, a rectangle needs to be drawn
    c. For any other Inputs, print "Invalid Input"

After deciding what your shape will be, your job is to verify whether the shape can be drawn using the angles given by the user.

    ● To draw a triangle, the sum of the angles must be equal to 180 degrees.
    ● To draw a rectangle, the sum of the angles must be equal to 360 degrees.

Sample Input 1: No of angles: 1 **Sample Output:** Invalid number of angles	**Sample Input 2:** No of angles: 2 **Sample Output:** Invalid number of angles
Sample Input 3: No of angles: 3 Angles: 60 90 50 **Sample Output:** Triangle cannot be drawn	**Sample Input 4:** No of sides: 3 Angles: 60 90 30 **Sample Output:** A triangle can be drawn
Sample Input 5: No of angles: 4 Angles: 60 80 70 150 **Sample Output:** A rectangle can be drawn	**Sample Input 6:** No of angles: 4 Angles: 60 80 70 130 **Sample Output:** A rectangle cannot be drawn

9. Imagine you are playing a game with your friend which is quite similar to ludo. The player who crosses throughout the board of exactly 25 boxes wins. Each of you gets to roll the dice and can get from 1-6.
If a player crosses 24 boxes, he/she has to get exactly 1 after rolling the dice in order to win. Otherwise, he/she will stay in the same place. The one who gets to the 25th box **first** will win.
Until a winner is decided, the dice will be rolled between the players and the game will continue.

Sample Input 1: Player 1: 6 Player 2: 4 Player 1: 5 Player 2: 5 Player 1: 6 Player 2: 4 Player 1: 4 Player 2: 6 Player 1: 3 Player 2: 6 **Sample Output:** Player 2 wins	**Sample Input 2:** Player 1: 6 Player 2: 3 Player 1: 6 Player 2: 2 Player 1: 6 Player 2: 6 Player 1: 5 Player 2: 6 Player 1: 3 Player 2: 4 Player 1: 5 Player 2: 5 Player 1: 1 Player 2: 6 Player 1: 3 Player 2: 2 Player 1: 1 **Sample Output:** Player 1 wins

Difficulty-Hard

10. Imagine you are playing a game with your friend which is quite similar to ludo. The player who crosses throughout the board of 25 boxes wins. Each of you gets to roll the dice and can get from 1-6.

If both players converge on the **same box,** the player's avatar coming to this <u>box previously will get eaten</u> and the <u>player will lose</u>.

There are certain checkboxes in the board where the avatars cannot be eaten. The checkpoints are 10th and 20th.

Until a player's avatar gets eaten or he/she crosses the 25th box, the dice will be rolled between the players and the game will continue.

Sample Input 1: Player 1: 6 Player 2: 4 Player 1: 3 Player 2: 5 **Sample Output:** Player 1 died Player 2 wins	**Sample Input 2:** Player 1: 2 Player 2: 3 Player 1: 1 **Sample Output:** Player 2 died Player 1 wins
Sample Input 3: Player 1: 5 Player 2: 4 Player 1: 5 Player 2: 6 Player 1: 6 Player 2: 3 Player 1: 4 Player 2: 3 Player 1: 5 **Sample Output:** Player 1 wins	

11. You will be given three Inputs **M, N,** and **P. M** indicates the number of chocolates you have. And there is a shop where you can get **P** new chocolates if you return **N** empty chocolate packets. You need to find out the total number of chocolates that you can have and print it.

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Sample Input 1:
100
4
1

Sample Output 1:
133

Explanation 1:
In this Input, the shop will return 1 new chocolate for every 4 empty packets. So, if you have 100 chocolates in the beginning, you can have more chocolates through the following steps.
    1. **Eat 100 chocolates** -> 100 empty packs.
    2. 100 empty packs -> 25 new chocolates. 125
    3. **Eat 25 chocolates** -> 25 empty packets.
    4. 25 empty packets -> 6 new chocolates and 1 empty packet.
    5. **Eat 6 chocolates** -> (6 + 1 remaining) = 7 empty packs.
    6. 7 empty packets -> 1 new chocolate and 3 empty packets.
    7. **Eat 1 chocolate** -> (1 + 3 remaining) = 4 empty packs.
    8. 4 empty packs -> 1 new chocolate.
    9. **Eat 1 chocolate** -> 1 empty packet.
No new chocolate can be obtained using only 1 packet.
Now counting all the chocolates, you have eaten you'll get (100 + 25 + 6 + 1 + 1) = 133 chocolates in total.
So, the output is 133.

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Sample Input 2:
100
10
3

Sample Output 2:
139

Explanation 2:
In this Input, the shop will return 3 new chocolates for every 10 empty packets. So, if you have 100 chocolates in the beginning, you can have more chocolates through the following steps.
    1. **Eat 100 chocolates** -> 100 empty packs.
    2. 100 empty packets -> 30 new chocolates. (3 for each 10)
    3. **Eat 30 chocolates** -> 30 empty packs.
    4. 30 empty packs -> 9 new chocolates. (3 for each 10)

5. **Eat 9 chocolates** -> 9 empty packs.
You can't get any more new chocolates with 9 empty packs since 9 is less than 10.
Now counting all the chocolates, you have eaten. You'll get (100 + 30 + 9) = 139 chocolates in total.
So, the output is 139.