

Practice Programs for T1

1. Python program to count number of trailing zeros in Factorial of number N

Sample input/output:

Input: n = 5

Output: 1

Factorial of 5 is 120 which has one trailing 0.

Input: n = 20

Output: 4

Factorial of 20 is 2432902008176640000 which has
4 trailing zeroes.

Input: n = 100

Output: 24

2. Write a Python Program to Find largest prime factor of a number.

Given a positive integer ($1 \leq n \leq 10^{15}$). Find the largest prime factor of a number.

Input: 6

Output: 3

Explanation

Prime factor of 6 are- 2, 3

Largest of them is '3'

Input: 15

Output: 5

3. Given three angles, a,b and c, write a Python program to check if it is possible to have a triangle of positive area with these angles. If it is possible print “YES” else print “NO”.

The 3 angles form a triangle with positive area if a, b and c are not 0 and the sum of a, b and c is 180 and $(a + b) \geq c$ or $(b + c) \geq a$ or $(a + c) \geq b$.

Examples:

Input : ang1 = 50, ang2 = 60, ang3 = 70

Output : YES

Input : ang1 = 50, ang2 = 65, ang3 = 80

Output : NO

4. Python program to print all happy numbers between 1 and 100

A happy number is a number which eventually reaches 1 when replaced by the sum of the square of each digit.

1) Take any two-digit number: **13**

2) Square the digits, then add:

$$1^2 + 3^2 = 1 + 9 = 10$$

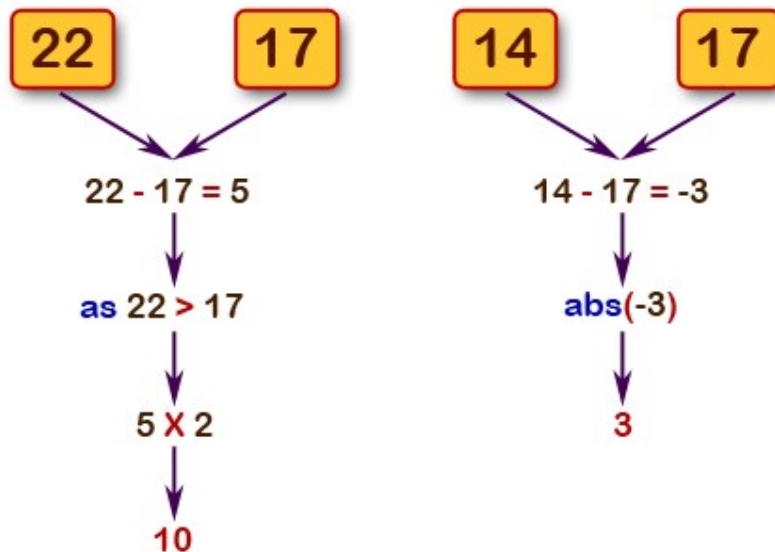
3) Repeat step 2:

$$1^2 + 0^2 = 1$$

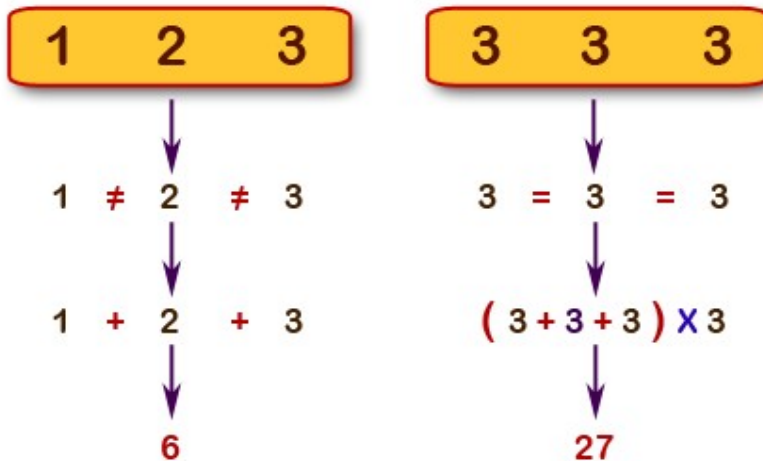
13 is a happy number!
A number is happy if
it eventually reaches 1.



5. Write a Python Program to Get the difference between a given number and 17, if the number is greater than 17 return double the absolute difference



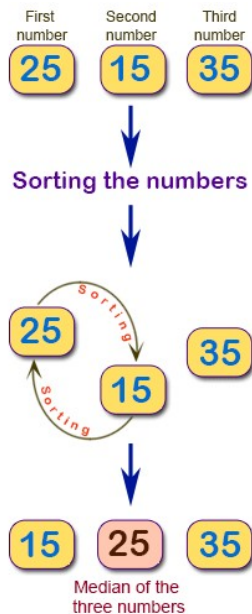
6. Write a Python program to calculate the sum of three given numbers, if the values are equal then return thrice their sum.



7. Write a Python program to compute the greatest common divisor (GCD) of two positive integers.

The greatest common divisor (GCD) of two nonzero integers a and b is the greatest positive integer d such that d is a divisor of both a and b ; that is, there are integers e and f such that $a = de$ and $b = df$, and d is the largest such integer. The GCD of a and b is generally denoted $\text{gcd}(a, b)$. For example, the greatest common factor of 15 and 10 is 5, since both the numbers can be divided by 5.

8. Write a Python program to find the median among three given numbers.



9. Write a Python program to compute the amount of the debt in n months. The borrowing amount is \$100,000 and the loan adds 5% interest of the debt and rounds it to the nearest 1,000 above month by month.

Sample Input/Output:

An integer n ($0 \leq n \leq 100$)

Input number of months: 7

Amount of debt: \$144000

10. Write a Python program to compute and print sum of two given integers (more than or equal to zero). If given integers or the sum have more than 80 digits, print "overflow".

11. Write a Python program to compute the product of the odd digits in a given number, or 0 if there aren't any.

Input:
123456789
Output:
945

Input:
2468
Output:
0

Input:
13579
Output:
945

12. Write a Python program which iterates over the integers from 1 to 50. For multiples of three print "Fizz" instead of the number and for the multiples of five print "Buzz". For numbers which are multiples of both three and five print "FizzBuzz".

13. Write a Python program to calculate a dog's age in dog's years.

Note: For the first two years, a dog year is equal to 10.5 human years. After that, each dog year equals 4 human years.

Sample Input/Output:

Input a dog's age in human years: 12
The dog's age in dog's years is 61

14. Write a Python program to convert month name to number of days.

Sample Input/Output:

Input: January

Output: 31

Input: February

Output: 28

15. Write a Python program that reads one integer representing a month and prints the season for that month.

Pictorial Presentation:



16. Write a Python program to get next day of a given date.

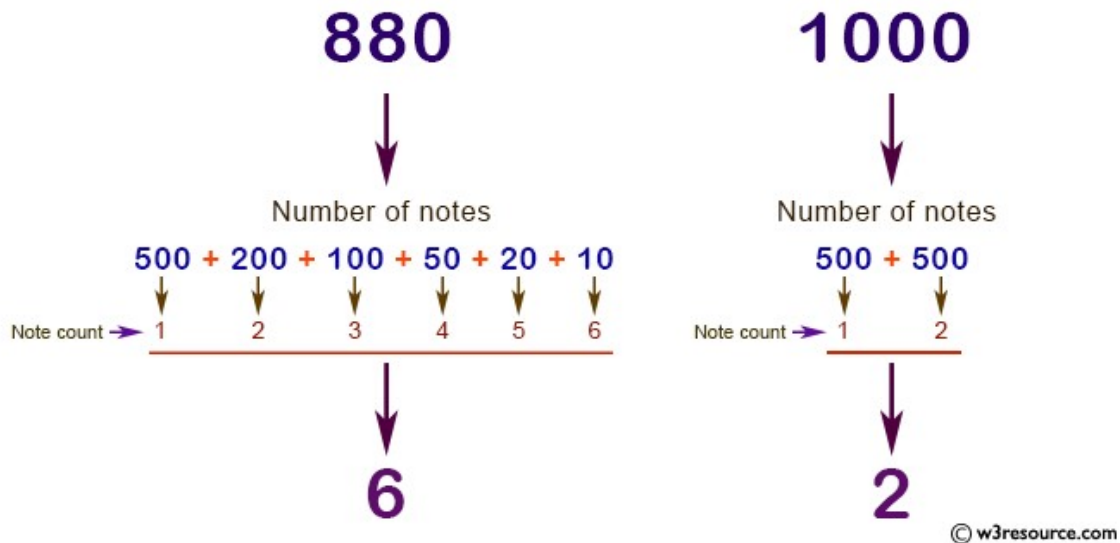
Sample:

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Input a year: 1974
Input a month [1-12]: 2
Input a day [1-31]: 15
The next date is [yyyy-mm-dd] 1974-2-16.
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17. Write a Python program to find the number of notes (Sample of notes: 10, 20, 50, 100, 200 and 500) against a given amount.

Range - Number of notes(n) : n ($1 \leq n \leq 1000000$).

Pictorial Presentation:



18. Write a Python program to create a sequence where the first four members of the sequence are equal to one, and each successive term of the sequence is equal to the sum of the four previous ones. Find the Nth member of the sequence.

Example of the sequence: 1, 1, 1, 1, 4, 7, 13, ...

Sample input/output:

Input: 5

Output: 4

Input: 7

Output: 13

19. Write a Python program to create maximum number of regions obtained by drawing n given straight lines.

If you draw a straight line on a plane, the plane is divided into two regions. For example, if you pull two straight lines in parallel, you get three areas, and if you draw vertically one to the other you get 4 areas.

Formula: number of regions = $((N^2 + N + 2) // 2)$

Where N is the number lines on a plane

Sample Input/Output:

Input number of straight lines:

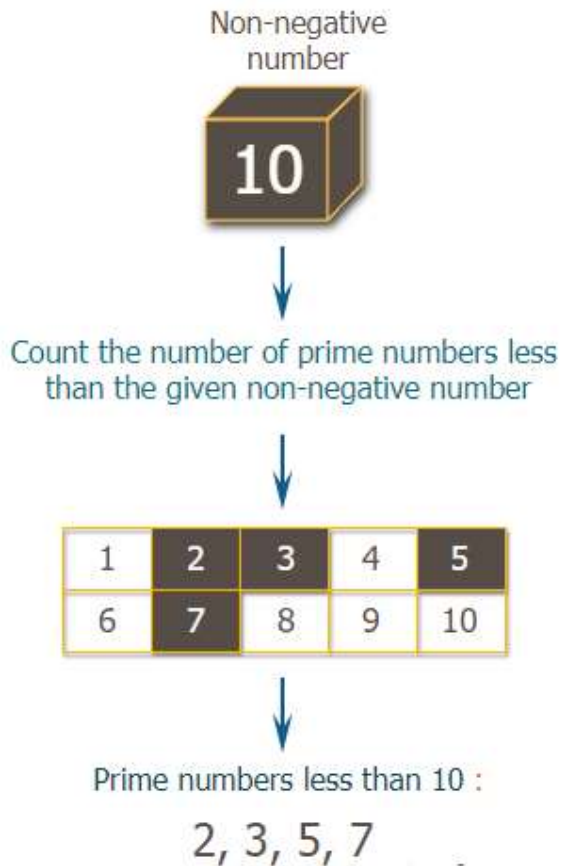
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Number of regions:

16

20. Write a Python program to count the number of prime numbers less than a given non-negative number.

Pictorial Presentation:



21. There are 12 intermediate stations between two places A and B. Write a Python program to find the number of ways in which a train can be made to stop at 4 of these intermediate stations so that no two stopping stations are consecutive?

Formula to find is :

$${}^nC_r = \frac{n!}{r!(n-r)!}$$

Where n=total number of non stop stations (Here n=12-4+1=9 non stop solutions) and r= no. of stops (Here r=4)



Examples –

Input : n = 12, s = 4

Output : 126

Input : $n = 16, s = 5$

Output : 792

22. Python Program for Number of solutions to Modular Equations

Given A and B, the task is to find the number of possible values that X can take such that the given modular equation $(A \bmod X) = B$ holds good. Here, X is also called a solution of the modular equation.

Examples:

Input : $A = 26, B = 2$

Output : 6

Explanation

X can be equal to any of {3, 4, 6, 8, 12, 24} as A modulus any of these values equals 2 i. e., $(26 \bmod 3) = (26 \bmod 4) = (26 \bmod 6) = (26 \bmod 8) = \text{Output:} 2$

Input : 21 5

Output : 2

Explanation

X can be equal to any of {8, 16} as A modulus any of these values equals 5 i.e. $(21 \bmod 8) = (21 \bmod 16) = 5$

23. Python program to check if the given number is a Disarium Number

A number is said to be the Disarium number when the sum of its digit raised to the power of their respective positions becomes equal to the number itself.

For example, 175 is a Disarium number as follows:

$$1^1 + 7^2 + 5^3 = 1 + 49 + 125 = 175$$

24. Python program to determine whether the given number is a Harshad Number.

If a number is divisible by the sum of its digits, then it will be known as a Harshad Number.

For example:

The number 156 is divisible by the sum (12) of its digits (1, 5, 6).

Some Harshad numbers are 8, 54, 120, etc.

In this program, integer value is predefined, we don't need to put integer value to determine whether the given number is a Harshad number or not

25. Python program to print all pronic numbers between 1 and 100

The pronic number is a product of two consecutive integers of the form: $n(n+1)$.

For example:

$$6 = 2(2+1) = n(n+1),$$

$$72 = 8(8+1) = n(n+1)$$

Some pronic numbers are: 0, 2, 6, 12, 20, 30, 42, 56 etc.

In this program, we need to print all pronic numbers between 1 and 100

26. Write a Python program to find an integer exponent x such that $a^x = n$.

```
Input:
a = 2 : n = 1024
Output:
10
Input:
a = 3 : n = 81
Output:
4
Input:
a = 3 : n =
12900700781701026662481960358450703949334417416449930858101164
41344597492642263849
Output:
170
```