Mathematics Based Problems

Problem 1 : Given a number 'n', write a program to find the numbers (less than or equal to n) which are both Fibonacci and Prime.

Input format:

Input consists of an integer 'n'.

Output format:

Output consists of an integer series separated by a space which are both fibonacci and prime.
Find the fibonacci series upto n and display the prime numbers from the fibonacci series.

Sample Input 1:

40

Sample Output 1:

2 3 5 13

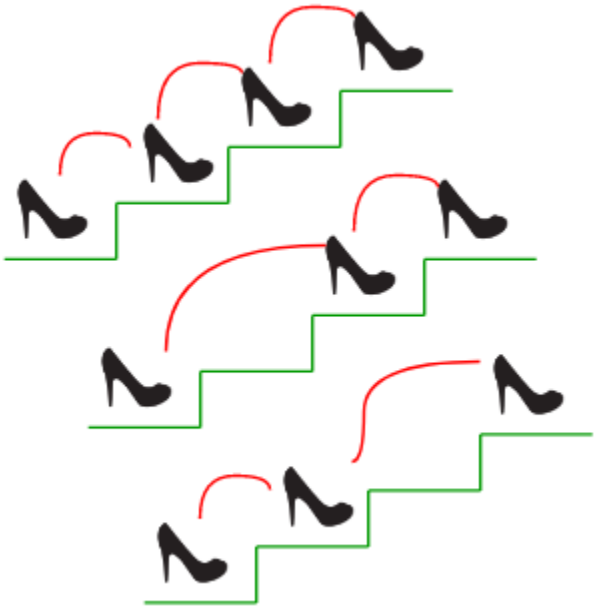
Sample Input 2:

1

Sample Output 2:

No prime numbers in the fibonacci series

Problem 2 : There are n stairs, a person standing at the bottom wants to reach the top. The person can climb either 1 stair or 2 stairs at a time. Count the number of ways, the person can reach the top.



Consider the above diagram with n value 3. From that, we can notice that there are 3 ways to reach top.

Input format:
Input contains a single integer n.

Output format:
Output consists of an integer corresponds to the number of ways to reach the top.

Sample Input 1:
1
Sample Output 1:
1 // There is only one way to climb 1 stair

Sample Input 2:
2
Sample Output 2:
2 // There are two ways: (1, 1) and (2)

Sample Input 3:
4
Sample Output 3:
5 // There are five ways: (1, 1, 1, 1), (1, 1, 2), (1, 2, 1), (2, 1, 1), (2, 2)

Problem 3 : Given an array of numbers, write a program to find GCD of the array elements

Input format:
First line of input consists of an integer n, corresponds to the size of array.
The next n lines of input corresponds to the elements in an array.

Output format:
Output consists of an integer which corresponds to the GCD of the array elements.

Sample Input:
3
2
4
6
Sample Output:
2

Problem 4 : Given an array of n numbers, write a program to find LCM of array elements.

Input format:
First line of input consists of an integer n, corresponds to the size of array.
The next n lines of input corresponds to the elements in an array.
Output format:
Output consists of an integer which corresponds to the LCM of the array elements.

Sample Input:
4
2
1
8
3
Sample Output:
24

Problem 5 : Given a positive integer n, write a program to find the largest prime factor of a number.

Input format:
Input consists of an integer number n. Assume that the n value ranges ($1 <= n <= 10^{15}$).

Output format:

Output contains an integer, which corresponds to the largest prime factor of a given number n.

Sample Input:
6

Sample Output:
3

Problem 6: Given two numbers a and b, write a program to find all x such that a % x = b .

Input format:
Input consists of two integers which corresponds to a and b.

Output format:
Output consists of an integer , which corresponds to the count of x such that a % x = b.

Sample Input 1:
21
5

Sample Output 1:
2

Sample Input 2:
5
12

Sample Output 2:
No solution possible

Sample Input 3:
12
12

Sample Output 3:
Infinite solution possible

Problem 7 : Given an positive even integer ‘n’, write a program to count total number of ways to express ‘n’ as sum of even positive integers.

Input format:
Input consists of an integer n.

Output format:
Output consists of a number ways to express 'n' as sum of even positive integers.

Sample Input:
6

Sample Output:
4

Explanation
There are only four ways to write 6 as sum of even integers:
1) 2 + 2 + 2
2) 2 + 4
3) 4 + 2
4) 6

Problem 8 : Given a number n, the task is to calculate its primorial. Primorial (denoted as P_n#) is the product of first n prime numbers. It is denoted with P#.

Input format:
Input consists of an integer n. Assume that the value of n ranges from 1 <n<15.

Output format:
Output corresponds to the product of first n prime numbers.

Sample Input:
3

Sample Output:
30 // 2 * 3 * 5

Problem 9 : Given a number n, write a program to print all primes smaller than n. It is also given that n is a small number.

Input format:
Input consists of an integer n.

Output format:
Output is a series of prime numbers which are smaller than n.

Sample Input:
10

Sample Output:
2 3 5 7

<u>Problem 10:</u> Given two integer numbers n and d. The task is to find the number between 0 to n which contain the specific digit d.

Input format:
Input consists of two integers corresponds to n and d. Assume that the value of d ranges from 0 < = d < = 9.

Output format:
Output corresponds to the numbers between 0 to n, which contains the specific digit d. Each number is separated by a single whitespace.

Sample Input:
20 // n
5 // d

Sample Output:
5 15