Logo

STUDENT REPORT

DETAILS

Name

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Roll Number

22BI24CS407-T

EXPERIMENT

Title

SUM OF NUMBERS AT PRIME FACTORS

Description

Prime factors of a positive integer are the prime numbers that divide that integer exactly.

Given an array arr of n integers and a positive integer num.

Let's suppose prime factorization of num is: $p^a \times q^b \times r^c \times .... \times z^f$,where p,q,r...z are prime numbers.

Sum of numbers in array arr at indices of prime factors of number num is: a x arr[p] + b x arr[q] + c x arr[r] +..... + f x arr[z].

You are given an array arr of size n and a positive integer num. You are required to calculate the sum of numbers in arr as mentioned above, and print the same.

Note:

- If arr is empty, print -1.
- If prime factor of num not found as indices, print 0.

Input Format:

The input consists of three lines:

- The first line contains an integer, i.e. n.
- The second line contains an array arr of length of n.
- The third line contains an integer num

The input will be read from the STDIN by the candidates.

Output Format:

Print the sum that was mentioned in the problem statement.

Example:

Input:

6

11 21 32 45 1 23

6

Output:

77

Explanation:

$6=2^1 \times 3^1$

sum=1*arr[2]+1*arr[3]=1*32+1*45=77

Source Code:

```
import math

# Function to find prime factors of a given number
def prime_factors(num):
    factors = []

    # Check for number of 2s
    while num % 2 == 0:
        factors.append(2)
        num = num // 2

    # Check for odd factors from 3 to sqrt(num)
    for i in range(3, int(math.sqrt(num)) + 1, 2):
        while num % i == 0:
            factors.append(i)
            num = num // i

    # If num is a prime number greater than 2
    if num > 2:
        factors.append(num)

    return factors

# Main function
def sum_at_prime_indices(n, arr, num):
    # Check if the array is empty
    if n == 0:
        return -1

    # Find prime factors of num
    factors = prime_factors(num)

    # Initialize sum
    total_sum = 0
    found_valid_index = False

    # Sum up arr at prime factor indices
    for factor in factors:
        if factor < n:
            total_sum += arr[factor]
            found_valid_index = True

    # If no valid index was found
    if not found_valid_index:
        return 0

    return total_sum

# Input reading
n = int(input())  # Size of the array
arr = list(map(int, input().split()))  # Array elements
num = int(input())  # The number whose prime factors are used

# Output the result
print(sum_at_prime_indices(n, arr, num))
```

RESULT

4 / 5 Test Cases Passed | 80 %