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STUDENT REPORT

DETAILS

Name

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Roll Number

KUB23ECE004

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:

```
def prime_factors(num):
    factors = {}
    d = 2
    while d * d <= num:
        while (num % d) == 0:
            if d in factors:
                factors[d] += 1
            else:
                factors[d] = 1
            num //= d
        d += 1
    if num > 1:
        factors[num] = 1
    return factors

def calculate_weighted_sum(arr, num):
    if len(arr) == 0:
        return -1

    factors = prime_factors(num)
    total_sum = 0
    valid_indices_found = False

    for prime, exponent in factors.items():
        if prime < len(arr):
            total_sum += exponent * arr[prime]
            valid_indices_found = True

    return total_sum if valid_indices_found else 0

# Reading input
import sys

input = sys.stdin.read
data = input().splitlines()

n = int(data[0])
arr = list(map(int, data[1].split()))
num = int(data[2])

# Calculating the result
result = calculate_weighted_sum(arr, num)
print(result)
```

RESULT

4 / 5 Test Cases Passed | 80 %