# STUDENT REPORT

## DETAILS

**Name**

N ASHFAQ DESAI

**Roll Number**

TEMPBTech-EEE016

## 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:

```
from collections import defaultdict

def prime_factors(num):
    factors = defaultdict(int)

    while num % 2 == 0:
        factors[2] += 1
        num //= 2
    for i in range(3, int(num**0.5) + 1, 2):
        while num % i == 0:
            factors[i] += 1
            num //= i
    if num > 2:
        factors[num] += 1

    return factors

def calculate_prime_index_sum(arr, num):
    if not arr:
        return -1

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

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

    return total_sum if valid_prime_found else 0


if __name__ == "__main__":
    n = int(input())
    arr = list(map(int, input().split()))
    num = int(input())

    result = calculate_prime_index_sum(arr, num)
    print(result)
```

## RESULT

4 / 5 Test Cases Passed | 80 %