

**Q6. Combination of Multiplication (40 marks)**

Given a target number and a list of distinct positive integers, your program is required to find all possible combinations of multiplication using only the provided integers, which result in a product equal to the target number.

For example, given that the target number is **24**, and the **list** of positive integers is,

**2 8 12 4 6 3**

Then all the possible combinations of multiplication using only the provided integers, which result in a product equal to the targeted number (i.e., 24 in this case) are:

2 2 2 3 → combination 1

2 2 6 → combination 2

2 12 → combination 3

2 4 3 → combination 4

8 3 → combination 5

4 6 → combination 6

**Note:**

- (1) The same integer may be chosen from the list an unlimited number of times.
- (2) Two combinations may consist of the same set of integers, but the two combinations are considered as different if the frequency of at least one of the integers is different. For example,  $2 \times 2 \times 3 \times 3 \times 6$  and  $2 \times 3 \times 6 \times 6$  are considered two different combinations.

Your program will then be required to compute the sum of all the numbers in each of the combinations. For the above example, the sums computed are as follows:

Combination 1 → The sum is 9

Combination 2 → The sum is 10

Combination 3 → The sum is 14

Combination 4 → The sum is 9

Combination 5 → The sum is 11

Combination 6 → The sum is 10

Finally, your program needs to sort all the sums in ascending order as given below and output the result:

**9 9 10 10 11 14**

**Write a programme to**

**Input, in sequence:**

- (1)  $N$ , the number of integers in the list, where  $2 \leq N \leq 15$ .
- (2)  $N$  distinct integers in the list, where all of them are in the range of  $[2, 100]$ .
- (3) The target number  $T$ , where  $6 \leq T \leq 300$ , and it is greater than all the integers in the list.

**Output:**

The sums in ascending order, where each of them is the sum of all the integers used in a combination of multiplication(s) that result(s) in a product equal to  $T$ .

Your program needs to output “0” if there is no combination available.

**试题 6. 乘法的组合 (40 分)**

给定一个目标数字和一组不同的正整数，您的程式需要使用提供的整数，找到所有可能的乘法组合使得其乘积等于该目标数字。

例如，假设目标数字是 **24**，同时所提供的正整数为，

**2 8 12 4 6 3**

那么，仅使用所提供的整数并使得乘积等于目标数字（在此例中即 24）的所有可能的乘法组合如下：

2 2 2 3 → 组合 1

2 2 6 → 组合 2

2 12 → 组合 3

2 4 3 → 组合 4

8 3 → 组合 5

4 6 → 组合 6

**注意：**

- (1) 同一个整数可被选取的次数没有限制。
- (2) 如果两个组合使用相同的整数，但只要至少一个整数的频率不同，那么这两个组合被视为不同的组合。例如： $2 \times 2 \times 3 \times 3 \times 6$  和  $2 \times 3 \times 6 \times 6$  是不同的组合。

然后，您的程式将需要计算每个组合中所有整数的和。对于上面的例子，计算得到的和如下所示：

组合 1 → 其和为 9

组合 2 → 其和为 10

组合 3 → 其和为 14

组合 4 → 其和为 9

组合 5 → 其和为 11

组合 6 → 其和为 10

最后，您的程式需要由小到大的将所有的和排序，并输出结果：

**9 9 10 10 11 14**

### 试写一程式以

#### 依序输入：

- (1)  $N$ , 给定整数组中的整数数量, 其中  $2 \leq N \leq 15$ 。
- (2)  $N$  个在此整数组中不同的整数, 其取值范围为  $[2, 100]$ 。
- (3) 目标数字  $T$ , 其中  $6 \leq T \leq 300$ , 并且它大于所有整数组中的整数。

#### 输出：

找出所有整数组中可以乘积出目标数字的组合, 然后找出每个组合中的整数之和, 再按升序 (由小到大) 排列并输出这些和。

如果整数组中没有相关的乘法组合, 您的程式需要输出“0”。

**Examples (例子)**

Input (输入)	Output (输出)
6 2 8 12 4 6 3 24	9 9 10 10 11 14
5 2 3 4 6 8 24	9 9 10 10 11
4 2 3 4 5 16	8 8 8
3 2 4 5 18	0
3 2 4 5 20	9 9

**Test Cases:**

Input (输入)	Output (输出)
6 2 8 12 4 6 3 24	9 9 10 10 11 14
5 2 3 4 6 8 24	9 9 10 10 11
4 2 3 4 5 16	8 8 8
3 2 4 5 18	0
3 2 4 5 20	9 9
4 2 3 4 6 24	9 9 10 10
7 23 14 5 8 2 3 4 25	10
9 37 23 34 5 8 2 3 98 4 148	41 41
9 37 23 34 5 8 2 3 98 4 149	0
12 3 7 2 4 5 8 9 18 14 15 25 32 48	11 11 11 13