**Siena College’s 35th Annual High School Programming Contest**

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##### March 31, 2023

###### Green Problem #7: Triple Plays!

Background Information:

You are undoubtedly familiar with factor pairs. Every positive integer N has a set of factor pairs. This set includes all the pairs of integer factors that produce N when multiplied. For example 36 has 5 factor pairs. They are (1, 36), (2, 18), (3, 12), (4, 9), and (6, 6).

Every positive integer also has a set of factor triples. For example, 36 has 8 factor triples. The factor triples for 36 are: (1, 1, 36), (1, 2, 18), (1, 3, 12), (1, 4, 9), (1, 6, 6), (2, 2, 9), (2, 3, 6), and (3, 3, 4).

Write a program that inputs a positive integer and outputs the number of factor triples followed by a list of the factor triples. For this problem, some of the most straightforward approaches will result in your program taking more than a minute of Central Processing Unit (CPU) time. For the contest, your programs must finish in less than 1 minute of CPU time. To do this your program will need to be more efficient in terms of CPU time than a program that takes a “brute force” approach.

###### Programming Problem:

Input:  A positive integer N between 1 and 1,000,000 inclusive.

Output: The number N followed by the number of factor triples of N and then a list of the factor triples of N, each triple on its own line and in ascending order separated by single spaces. The triples must be listed in ascending numerical order.

###### Example 1: Input: 12

Output: 12 has 4 factor triples:

1 1 12

1 2 6

1 3 4

2 2 3

###### Example 2: Input: 31

Output: 31 has 1 factor triples:

1 1 31

###### Example 3: Input: 36

Output: 36 has 8 factor triples:

1 1 36

1 2 18

1 3 12

1 4 9

1 6 6

2 2 9

2 3 6

3 3 4