

international collegiate programming contest INDONESIA NATIONAL CONTEST INC 2020



Practice Problem PD Sum of Three Cubes

Recently, a mathematician has just found three cube numbers that sum up to 42 using over a million hours of computing time. With this breakthrough, we have found three cube numbers that sum up to all non-negative integers less than 100 if it is possible to do so. In other words, for every $0 \le N < 100$, we have found the triples (X,Y,Z) such that $X^3 + Y^3 + Z^3 = N$, or we have proved that no such triplet exists.

The following is a table of (X, Y, Z) that satisfies $X^3 + Y^3 + Z^3 = N$ for $0 \le N < 50$.

| N | N | X | Y | | | |
|---|----|------------------|-------------------|-------------------|--|--|
| 1 0 0 1 | | | | | | |
| 2 0 1 1 1 3 1 1 1 1 4 Image: contract of the contra | | | | | | |
| 3 1 1 No solution 5 No solution 5 6 -1 -1 2 7 0 -1 2 8 0 0 2 9 0 1 2 10 1 1 2 111 -2 -2 3 12 7 10 -11 13 No solution -11 14 No solution -1 14 No solution -1 14 1 1 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 20 1 -2 3 20 1 -2 3 20 1 -2 3 21 -11 -14 16 22 3 -2 3 21 -11 -1 3 24 -2901096694 -1550655555 | | - | _ | | | |
| No solution No solution | | | | | | |
| 5 No solution 6 -1 -1 2 7 0 -1 2 8 0 0 2 9 0 1 2 10 1 1 2 11 -2 -2 3 12 7 10 -11 13 No solution -11 14 No solution -11 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 3 -11 16 22 3 -14 16 22 3 -1 16 22 3 -2 3 21 < | | 1 | | 1 | | |
| 6 -1 -1 2 7 0 -1 2 8 0 0 2 9 0 1 2 10 1 1 2 11 -2 -2 3 12 7 10 -11 13 No solution 14 No solution 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 3 3 21 -11 -14 16 22 3 3 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 | | | | | | |
| 7 0 -1 2 8 0 0 2 9 0 1 2 10 1 1 2 111 -2 -2 3 12 7 10 -11 13 No solution 14 No solution 14 No solution 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 3 3 21 -11 -14 16 22 3 3 23 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 | | | | | | |
| 8 0 0 1 2 10 1 1 2 111 -2 -2 3 12 7 10 -11 13 No solution 14 No solution 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 No solution 23 No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -221888817 | | | | | | |
| 9 0 1 2 10 1 1 2 11 -2 -2 3 12 7 10 -11 13 No solution 14 No solution 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 3 3 3 21 -11 -14 16 22 3 No solution 23 No solution 16584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 | | - | | | | |
| 10 1 1 2 11 -2 -2 3 12 7 10 -11 13 No solution 14 No solution 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 20 1 -2 3 21 -11 -14 16 22 No solution 23 No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 22204229 | | | | | | |
| 11 | | 0 | | | | |
| 12 7 10 -11 13 No solution 14 No solution 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 10 | | | | | |
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| 15 -1 2 2 16 -511 -1609 1626 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 No solution 166 22 No solution 166 23 No solution 166 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 | | | | | | |
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| 17 1 2 2 18 -1 -2 3 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 15 | | | | | |
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| 19 0 -2 3 20 1 -2 3 21 -11 -14 16 22 No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 36 1 2 3 37 0 -3 4 | 17 | 1 | 2 | | | |
| 20 1 -2 3 21 -11 -14 16 22 No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | | -1 | | | | |
| 21 -11 -14 16 22 No solution 23 No solution 24 -2901096694 -155505555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 19 | 0 | | | | |
| No solution 23 No solution 24 -2901096694 -15550555555 15584139827 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | | | | | | |
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| 25 -1 -1 3 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 23 | No solution | | | | |
| 26 0 -1 3 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | | -2901096694 | -1555055555 | 15584139827 | | |
| 27 0 0 3 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 25 | -1 | -1 | 3 | | |
| 28 0 1 3 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 26 | 0 | -1 | | | |
| 29 1 1 3 30 -283059965 -2218888517 2220422932 31 No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 27 | 0 | 0 | | | |
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| No solution 32 No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | | | | | | |
| No solution 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 30 | -283059965 | -2218888517 | 2220422932 | | |
| 33 8866128975287528 -8778405442862239 -2736111468807040 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | 31 | No solution | | | | |
| 34 -1 2 3 35 0 2 3 36 1 2 3 37 0 -3 4 | | | | | | |
| 35 0 2 3 36 1 2 3 37 0 -3 4 | 33 | 8866128975287528 | -8778405442862239 | -2736111468807040 | | |
| 36 1 2 3 37 0 -3 4 | 34 | -1 | | | | |
| 37 0 -3 4 | 35 | 0 | | | | |
| | | 1 | 2 | | | |
| 38 1 -3 4 | 37 | 0 | | | | |
| | 38 | 1 | -3 | 4 | | |



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| 39 | 117367 | 134476 | -159380 |
|----|--------------------|-------------------|-------------------|
| 40 | No solution | | |
| 41 | No solution | | |
| 42 | -80538738812075974 | 80435758145817515 | 12602123297335631 |
| 43 | 2 | 2 | 3 |
| 44 | -5 | -7 | 8 |
| 45 | 2 | -3 | 4 |
| 46 | -2 | 3 | 3 |
| 47 | 6 | 7 | -8 |
| 48 | -23 | -26 | 31 |
| 49 | No solution | | |

Reading a long table is a tedious job, so you would like to create a program that takes N as an input, and produce X, Y, Z as the output. The value of X, Y, and Z must be an integer not less than -10^{18} and not more than 10^{18} .

Input

Input begins with a line containing an integer: N ($0 \le N < 50$).

Output

Output in a line three integers (separated by a single space): X Y Z that satisfies the condition given in the problem statement. If there is more than one solution, you can output any of them. If there is no solution, output 0 instead.

Sample Input #1

2

Sample Output #1

3737830626090 1490220318001 -3815176160999

Explanation for the sample input/output #1

Other answers such as $X=1214928,\,Y=3480205,\,{\rm and}\,Z=-3528875$ are also accepted.

Sample Input #2

5

Sample Output #2

0