SIENA COLLEGE
30^{th} Annual High School Programming Contest
March 24, 2017

Gold Problem #3: In the year 2025!

Background Information:

It is well known that the year 2025 will be a **Perfect Scubey Year.** This is because 2025 is the sum of the first nine perfect cubes. In other words, $2025 = 1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3$.
We designate a Perfect Scubey Year which is the sum of the first n cubes as effect Scubey [1, n].
So 2025 is Perfect Scubey Year [1, 9.]

Not as well known is that years that are the sum of consecutive cubes, a^3 to b^3, where $a \neq 1$ are **Normal Scubey Years**. For example, 2016 was a Normal Scubey Year because $2016 = 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3$. We designate a Normal Scubey Year which is the sum of the consecutive cubes m^3 to n^3 as Normal Scubey [m, n]. So 2016 is Normal Scubey Year [3, 9].

Even less known is that the year 2017 is a **Near Scubey Year** because 2017 is the sum of consecutive cubes with one cube missing. $2017 = 1^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3$, (only missing 2^3).
We designate a Near Scubey Year which is the sum of the consecutive cubes m^3 to n^3 with exactly one "inside" cube, k^3, missing as Scubey [m, n, k]. Note that $m < k < n$.
So 2017 is Near Scubey Year [1, 9, 2].

Interestingly, $216 = 3^3 + 4^3 + 5^3$ and $216 = 6^3$, so 216 is the lowest multiple Normal Scubey year.
Also, 559 is the first year that is Normal Scubey and Near Scubey since $559 = 6^3 + 7^3$ and $559 = 3^3 + 4^3 + 5^3 + 7^3$.
The year 1288 is a Near Scubey Year in two different ways: $1288 = 1^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3$ (only missing 2^3) and $1288 = 6^3 + 7^3 + 9^3$ (only missing 8^3).
And $5832 = 18^3$, is the smallest perfect cube that is Near Scubey $4^3 + 5^3 + 7^3 + 8^3 + 9^3 + 10^3 + 11^3 + 12^3$.

Programming Problem:

Input: Positive integers A and B on one line with $A \leq B$ and $B \leq 1{,}000{,}000$ and $(B - A) \leq 1000$.

Output: In ascending order, all values between A and B inclusive that are Perfect Scubeys, Normal Scubeys, or Near Scubeys. Values in the range should be repeated if they have multiple representations. Each output value must be designated as in the following example. Output must be readable but does not need to be perfect.

Example: Input:

```
1 99
```

Output:

```
 1 Perfect 1 1
 8 Normal  2 2
 9 Perfect 1 2
27 Normal  3 3
28 Near    1 3 2
35 Normal  2 3
36 Perfect 1 3
64 Normal  4 4
72 Near    2 4 3
73 Near    1 4 3
91 Normal  3 4
92 Near    1 4 2
99 Normal  2 4
```