

# Problem 1: Chinese Zodiac

Difficulty: Easy

Author: Tai Do, Sunnyvale, California, United States

## Problem Background

Have you ever wondered in what animal's year you were born in under the Chinese Zodiac? The Chinese Zodiac is an ancient tradition stemming from the legend of the Jade Emperor. He decreed that each calendar year would be named after animals in the order in which they finished a race. Each of the animal's personalities affected their performance in the race: the devious rat won through trickery, the noble dragon was delayed as he helped nearby villages, and the lazy pig came in last after stopping for a nap. Similar to Western astrology, traditional Chinese beliefs hold that a person's personality is linked to that of the animal associated with the year of their birth.

## Problem Description

The Chinese Zodiac consists of a 60-year rotation created by two separate cycles. The Five Elements - Wood, Fire, Earth, Metal, and Water - dictate the first cycle. The 12 animals of the Zodiac represent each of the 12 years within a lunar cycle. Additionally, each year is associated with the Yin or Yang from Taoist beliefs.

To determine the Zodiac sign for a given year, the following process can be used:

- Yin or Yang
  - Even-numbered years are Yang (positive)
  - Odd-numbered years are Yin (negative)
- Five Elements - Wood, Fire, Earth, Metal, Water
  - Subtract 4 from the year
  - Divide that value by 10 and take the remainder
  - Divide that value by 2, and round down to the nearest integer (e.g.  $7 / 2 = 3.5$ , which rounds down to 3)
  - Use that value to locate the element from the list above (Wood = 0, Fire = 1, etc.)
- 12 Animals - Rat, Ox, Tiger, Rabbit, Dragon, Snake, Horse, Goat, Monkey, Rooster, Dog, Pig
  - Subtract 4 from the year
  - Divide that value by 12 and take the remainder
  - Use the remainder to locate the animal from the list above (Rat = 0, Ox = 1, etc.)

For example, 2020's Zodiac sign is Yang Metal Rat:

- Aspect
  - 2020 is even = Yang
- Element

- $2020 - 4 = 2016$
- $2016 \% 10 = 6$
- $6 / 2 = 3$
- Element at index 3 is Metal
- Animal
  - $2020 - 4 = 2016$
  - $2016 \% 12 = 0$
  - Animal at index 0 is Rat

Write a program that can determine the Zodiac sign for any given calendar year.

## Sample Input

The first line of your program's input, received from the standard input channel, will contain a positive integer representing the number of test cases. Each test case will include a single line of text containing a four digit year no earlier than 1984.

```
4
1984
2012
2020
2043
```

## Sample Output

For each test case, your program must print a single line with the following values, separated by spaces:

- The calendar year
- The aspect of the year ("Yin" or "Yang")
- The element of the year (first letter capitalized, others lowercase)
- The animal of the year (first letter capitalized, others lowercase)

```
1984 Yang Wood Rat
2012 Yang Water Dragon
2020 Yang Metal Rat
2043 Yin Water Pig
```