Doomsday Rule

Problem ID: doomsdayrule

In 1973, mathmetician John Conway, invented an algorithm for quickly computing the day of the week (e.g. Monday, Tuesday) from any date in history. The algorithm, which he called the Doomsday algorithm, was designed to be simple enough to be computed by hand.

Conway's algorithm hinges on the cyclic nature of the Gregorian calendar and consists of three steps.

1. Calculate the anchor day for a given century
2. Calculate doomsday for the specific year. Certain dates (e.g. April 4th) in every month always occur on doomdays.
3. Lastly, count (modulo 7) from the nearest doomsday to your desired day

Days of the week are numbered from Sunday (with a value of 0) through Saturday (with a value of 6). The anchor day can be found using the formula:

$$a = (5 \times (\lfloor \frac{\text{yyyy}}{100} \rfloor \bmod 4) + 2) \bmod 7.$$

The doomsday can then be calculated using the formula:

$$d = ((y + \lfloor \frac{y}{4} \rfloor + a) \bmod 7$$

Where $y = \text{yyyy} \bmod 100$

In every year, the following dates will occur on the doomsday:

- January 3rd (which becomes January 4th in leap years)
- February 28th (which becomes February 29th in leap years)
- April 4th
- May 9th
- June 6th
- July 11th
- August 8th
- September 5th
- October 10th
- November 7th
- December 12th

Leap years occur if the year is evenly divisible by 4 but not 100. They also occur in years divisible by 400. 2000 was a leap year, but 2200 will be a common year.

Input

The first line contains the number of test cases $1 \leq n \leq 10,000$ followed by n test cases, one per line. Each test case is in the format **dd month yyyy** where month $\in$ {January, February, March, April, May, June, July, August, September, October, November, December}, $1 \leq$ dd ≤ 31, and $0 \leq$ yyyy $\leq 3,000$. All years are CE (AD) in the Gregorian Calendar and leading zeroes won't be present.

For dates before the implementation of the Gregorian Calender, use the proleptic Gregorian Calendar instead of the Julian Calendar. This way, Conway's Doomsday algorithm applies consistently over all input dates.

Output

Output the day of the week for each line of the input in the same order one day per line. Day names are case-insensitive but abbreviations will not be accepted.

Sample Input 1	Sample Output 1
5 26 December 1937 4 July 1776 16 July 1969 28 June 1919 21 September 1978	Sunday Thursday Wednesday Saturday Thursday