Calendar concept

A **Calendar** is a chart or series of pages showing the days, weeks and months of a particular year, or giving particular seasonal information. It Improves time-management and analytical skills for solving calendar-based problems. Commonly asked in IBM, Cognizant, HCL, Amazon, Cisco, VISA, etc.

Types of calendars problem

There are two types of problems in calendar one based on **real calendar** that we follow and other is the **reference calendar**. To solve both calendars you need to learn some basic concepts mentioned below.

Types of years

1. Ordinary year = 365 days
2. Leap year = 366 days

Leap year: Leap year can be further classified into two types:

- **Century leap year:** any century year which is completely divisible by 400. Ex – 2000, 2400, 1600 etc.
- **Non-century leap year:** Any non-century year which is completely divisible by 4. Ex – 2016, 1992, 1876 etc.

Finding number of leap years in given years: Suppose you are given with 75 years, and you want to count the number of leap years in it. Just divide the number by 4 and find the **quotient,**

Method = $\frac{Number\ of\ yeaars}{4}$ = Find the quotient

So, 75/4 quotient = 18

Odd days or extra days

The number of days obtained after eliminating the perfect number of weeks from given number of days. Ex – in the month of January there are 31 days, if we eliminate 4 weeks from it, the remaining 3 days will be odd days or extra days. In general, odd days can be obtained by dividing the number of days by 7 and then find the **remainder**

Method: = $\frac{Number\ of\ days}{7}$ = Find the remainder

For leap year – 366/7 = remainder = 2

For ordinary year – 365/7 = remainder = 1

Odd days in months

Months	Odd days	Months	Odd days
January	3	July	3
February ordinary/leap	0/1	August	3
March	3	September	2
April	2	October	3
May	3	November	2
June	2	December	3

Finding number of days in 100 years

First divide 100 years into number of ordinary and leap years.

So, 100/4, Quotient = 25, but there will be only 24 leap years because 100^{th} year is a multiple of 4 but not divisible by 400, and not a leap year.

Number of odd days in ordinary year = 1

Number of odd days in leap year = 2

So, in 100 years 24 are leap years and 100-24 = 76 are ordinary years

Hene 24x2 for odd days in leap years and 76x1 for odd days in ordinary years

48+76 = 124

But odd days can never be more than 6, because the divisor itself is 7. So, we should divide 124 by 7 and find the remainder.

124/7, remainder = 5 odd days

Therefore: Number of odd days in 100 years = 5 odd days

Number of odd days in 200 years = 10/7 = 3 odd days

Number of odd days in 300 years = 15/7 = 1

Number of odd days in 400 years = 20+1/7 = 0 odd days, because here 400 is a leap year, one odd day will increase. These odd days are cyclic and after every 400 years the odd days become 0.

Code for finding days of the week

Number of odd days	1	2	3	4	5	6	0
Days fall	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

1. Real calendar problem

Question: Find the day of the week falls on 2nd April 2024?

Solution: 2nd April 2024 = (2023 years + Period from 1.1.2024 to 02.04.2024)

Odd days in 2000 years = 0

In 23 years 18 ordinary years + 5 leap year = (18×1+5×2) = 0 odd days

Jan, Feb, Mar, Apr, (31 + 29 + 31 + 02) = 93 days

∴ 93 days = 93/7 = (13 weeks +2 days) ≡ 2 odd days .

Total number of odd days = (0+0+2) = 2 odd days.

So, 2nd April 2024 is Tuesday, because Tuesday is the second day of the week as per the table.

Reference calendar-based problem

In reference calendar, we don't follow days of the week as per the code given in table above, rather whatever day is given, we consider that day is 0, and from there we increase or decrease the number of days depending on the number of days we obtained from the calculation in the question.

Question: If 2nd Feb 2025 is Wednesday, which day of the week will fall on 2nd Feb 2028.

Solution: to solve this question, find the gap between two given dates.

Here from 2nd Feb 2025 to 2nd Feb 2028, there are 3 years, and all are ordinary years. However, 2028 is a leap year but until 29th Feb is not being counted, we can't consider 2028 a leap year.

So, in 3 years there are 3 odd days.

Therefore, consider Wednesday as 0 and increase it by 3 days, and the answer will be Saturday.

Note: reference calendar does not follow actual calendar table, answer is totally dependent on the question, it may not match the actual calendar.

Trick for same calendar

Question: The calendar for the year 2005 can be same again in which year?

Solution: Calendar of a leap can be same again after 28 years

Calendar for leap+1 year can be same again in 6 years

Calendar for leap+2 years can be same again in 11 years

Calendar for leap+3 years can be same again in 11 years

Here 2005 is = 2004 + 1 = leap + 1 year

So, 2005 + 6 years = 2011

Some important questions of calendar

Q1. The leap day of a leap year falls again after how many years?

Q2. The calendar for the years 2009 can be same again in which year?

Q3. The maximum gap between two successive leap years can be?

Q4. Which two months of the year have the same calendar?