The History Behind Leap Year

Mosharaf Hossain Apurbo(2105057)

October 12, 2024

1 Introduction

A leap year is a calendar year that contains an additional day compared to a commonyear[1]. This article covers the development of the leap year system and its importance in keeping our calendar aligned with Earth's revolution around the sun.

2 History

Did you know? The Earth takes about 365 days to orbit the Sun, but it's not exactly 365. In fact, it's around ~~365~~ 365.24

2.1 Julian Calendar

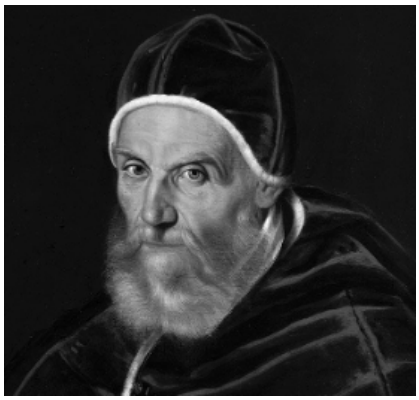
Introduced by Julius Caesar (Figure 1a) in 45 BC, the "Julian Calendar" included a leap year every four years. This was necessary because the solar year is approximately 365.25 days long.

2.2 Gregorian Calendar

The modern leap year system was developed under Gregory XIII (Figure 1b) in 1582. In the "Gregorian Calendar", leap years are introduced every four years, except years divisible by 100 but not divisible by 400.

3 Leap Year Rules

The rules for calculating a leap year can be summarized as:



(a) Julius

(b) Gregory

Figure 1: Pioneers of Modern Calendars

1. **A year is a leap year if**:
   (a) It is divisible by 4 and not divisible by 100.
   (b) Or it is divisible by 400.
2. **A year is *NOT* a leap year <u>in all other cases</u>.**

4 Leap Year Calculation Formula

The formula to determine if a year Y is a leap year (or not) is written below.

$$\text{Leap Year} = \begin{cases} \textbf{True,} & \text{if } (Y\,\%4 = 0 \&\& Y\%100 \neq 0) \| Y\%400 = 0) \\ \textbf{False,} & \text{otherwise} \end{cases}$$

Some examples of leap year calculations are shown in Table 1.

Year	Divisible By			Leap Year?
	4?	100?	400?	
1900	Yes	Yes	No	No
2000	Yes	Yes	Yes	Yes
2024	Yes	No	No	Yes

Table 1: Leap Year Calculation Examples

5 Importance

The Earth takes approximately 365.24 days to complete one orbit around the sun. This discrepancy accumulates, and leap years help correct it. Without leap years, seasons would gradually drift over time.

Disclaimer

Thearticle is designed with the sole purpose of evaluating students' LaTeXproficiency.

References

[1] J. Meeus, *Astronomical Algorithms*. Richmond, Virginia: Willmann-Bell, Inc, 1991.