

Leap Year Calculator Project Report

Author: Habib Hammam Kurniawan
Teacher: Muhammad Qomaruz Zaman, S.T., M.T., Ph.D.
Class name: Algoritma dan Komputasi

Project Title

Leap Year Calculator with MATLAB Graphical User Interface (GUI)

Project Description

This project implements a Leap Year Calculator using MATLAB with a modern Graphical User Interface (GUI). The program allows users to input single years, multiple years (comma or space separated), and year ranges (e.g., 2010–2015). The application then determines whether each year is a leap year according to the Gregorian calendar rules: a year is a leap year if it is divisible by 400, or divisible by 4 but not divisible by 100.

The GUI is designed with `uifigure` and `uigridlayout`, including labeled panels, buttons, and a results table. The system provides alerts for invalid inputs and displays a summary of leap and non-leap years.

Challenge

One of the main challenges was designing the GUI to handle different input formats (single, multiple, and range) while maintaining user-friendliness. Handling invalid or mixed input required creating a robust parser to validate numbers and ranges. Another challenge was ensuring compatibility with MATLAB versions, as certain UI features are only supported in MATLAB R2018a or later.

New Skill Earned

Through this project, I learned:

- How to design interactive applications in MATLAB using `uifigure`, `uigridlayout`, and `uitable`.
- How to implement robust input parsing with string processing and error handling.
- How to create responsive user feedback through status labels and alerts.

User Manual

1. Launch the application by running `leapYearApp` in MATLAB.
2. Enter the year(s) in the input field:
 - Single year: 2024
 - Multiple years: 2020, 2021 2024
 - Range: 2010–2015
3. Click the **Check** button to evaluate the input.
4. The results will appear in a table, showing each year and whether it is a leap year.
5. The status label summarizes the number of leap and non-leap years.
6. To reset the application, press the **Clear** button.

Flowchart

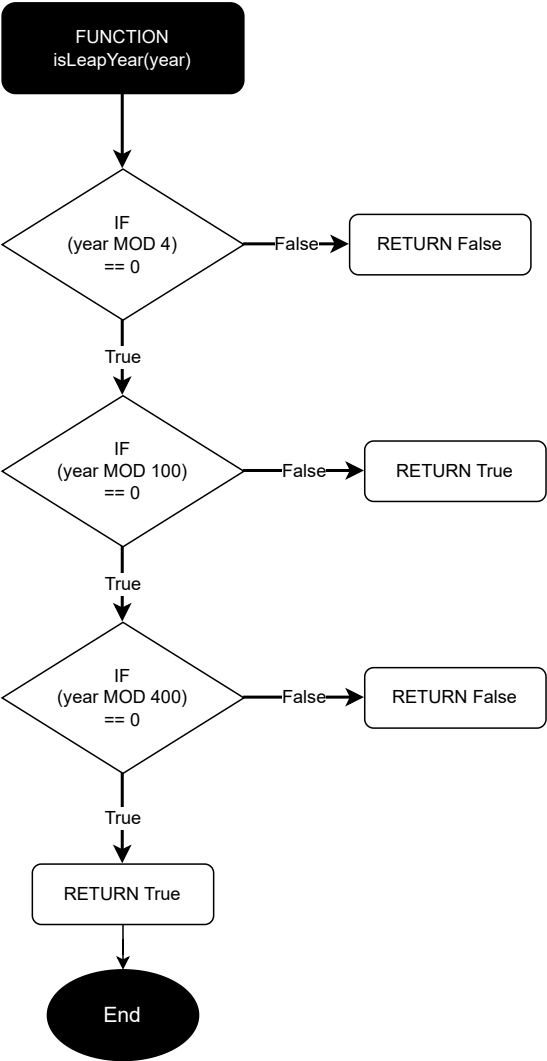


Figure 1: Flowchart of Leap Year Calculator process.