***PROJECT TITLE:***

C program to input a year and a month and display the calendar for that specific month and year.

***INTRODUCTION:***

This C program is created for displaying the calendar, by taking the input for a specific year and month from the user. The objective of this calendar program is to help users to access and visualize a calendar for any year and month they desire.

***VARIABLE DESCRIPTION:***

|  |  |  |
| --- | --- | --- |
| ***VARIABLE NAME*** | ***DATA TYPE*** | ***USE*** |
| year | int | Stores the year entered by the user |
| month\_num | int | Stores the month number entered by the user |
| month\_name | char | Pointer character(string) to store month name |
| jan\_1st\_day | int | Stores the day Jan 1st falls |
| days\_of\_month | int | Array to store the number of days for all the months |
| month\_days | int | Stores the number of days for the month specified by the user |
| sum\_of\_days | int | Stores the day for week as 0 to 6 |
| y | int | To calculate the part of Zeller’s formula |
| y1 | int | Stores the int part of y |
| copy | int | Stores a copy of y |
| count | int | To track the number of digits in copy |
| date | int | Stores the date |
| i | int | Counter variable |
| j | int | Counter variable |

***PROGRAM WORKFLOW & EXPLANATION:***

1.) User Input:

* Asking the user to input a year and month number.

2.) Finding Jan 1st day:

* Zeller’s formula/congruence is a mathematical formula to find the day for a given date in the Gregorian calendar.
* Used Zeller’s formula to find on which day January 1st lies for the years between 2000 and 2100.This logic was obtained from online resources.
* Similarly using another form of Zeller’s formula to find on which day January 1St lies for the years below 2000.This was obtained from online resources.

3.) Month name:

* Using my knowledge, made use of switch case statement to find the month name based on the month number entered by the user.
* If a number other than 1 to 12 was entered it would display ‘invalid month number.

4.) Checking for leap year:

* This program checks if the entered year is a leap year or not.
* For this made use of if else statement.
* If the year is divisible by 4 AND not divisible by 100 OR divisible by 400 then is leap year and the number of days in February gets updated as 29 else its not a leap year and the number of days in February is 28.

5.) Determining the starting day for month’s other that January:

* Calculate the day of the week (0 for Saturday,1 for Sunday and so on) on which 1st of the month specified falls.
* This is done by summing the number of days up to the previous and adjusting January 1st based on it by and loop through the months leading up to the specified month.
* Made use of the concept of for loop.
* After looping the variable ‘sum\_of\_day’ holds the number of days from Jan 1st to the 1st of the specified month.
* To find the day of the week was 1st of specified month falls, we need to find on which day Jan 1st falls, this was obtained in the previous step using Zeller’s formula.
* Then you Jan 1st day to ‘sum\_of\_day’ to get the total count.
* The day of week varies from 0 to 6(Saturday, Sunday….)
* Check if sum\_of\_day is greater than or equal to 7. If so, subtract 7 from it until it falls in the range of 0 to 6.
* After executing the code sum\_of\_day will contain an integer value from 0 to 6 that corresponds to the day of the week for the 1st of the specified month.

6.) Printing calendar:

* The calendar is formatted by using escape sequences like ‘\n’ for new line and ‘\t’ for tab space.
* The dates are printed by using nested for loops and jump statements like break and continue.
* Display days of week as column headers and fill the dates accordingly.

***ONLINE RESOURCES AND MODIFICATIONS MADE:***

* The program’s idea and basis were obtained from the website "geekforgeeks" and initially used "Zeller's formula" to find the start day of a month of any month.
* To enhance accuracy, a new formula, featured in a YouTube video by "mindyourdecidions,"was taken. The formula mentioned here is effective for determining the day for January 1st for the years 2000-2099.
* I used this formula to find the day Jan 1st falls for a given year and using this I included my logic where I found the total number of days and added Jan 1st  using loops and module operations to ensure that there is no overflow of data I subtracted 7 so that the value ranges from 0 to 6 whereas in the website similar formula was used to find the day 1st of the month specified falls.
* Using my prior knowledge of C programming made use of switch case to display month name and if else if statement to find whether its leap year or not.
* On the website the output was just displayed but not properly formatted, but in my program, I displayed the desired output in a neatly formatted way.

***CONCEPTS APPLIED:***

The following programming concepts were used:

* Taking a user input
* Switch case statement
* If-else statements
* For loops
* Nested loops
* Arrays
* Strings
* Arithmetic operations
* Mathematical formulas
* Output formatting

***OUTPUT:***

A screenshot of a computer

Description automatically generated

***CONCLUSION:***

I would like to conclude by saying that through this program I came to know more about C programming concepts. This program provides a user-friendly solution for generating the monthly calendar for a specific month and year. This program can be a handy tool for anyone who needs to quickly view a calendar for a specific date.