CS 15900 – Homework 4
Due Monday 04 March 2024 at 11:00 PM (time local to West Lafayette, IN).
10 Points

Problem: Given a year, indicate what day-of-week 01 January of that year falls on (Sunday through Saturday) and what months Friday the 13th falls in (January through December).

Dominical letters (DLs) are used to refer to the day-of-week pattern a given year follows. In this system, 01 January is assigned the letter A, 02 January is assigned the letter B, …, 06 January is F, 07 January is G, and then the cycle repeats with 08 January as A. The **year**'s dominical letter (YDL) indicates which of these is a Sunday. From this relationship, the YDL will also indicate what day-of-week the first day of the year is:

YDL	G	F	E	D	C	B	A
01 January is a...	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

If the year is a leap year, then there are two dominical letters. The first (YDL) indicates when Sundays fall for days prior to 29 February (leap day). It also indicates the day-of-week for the first day of the year according to the table above. The year's second dominical letter (2YDL) indicates when Sundays fall for all days after the leap day.

The year's dominical letter(s) also correspond to which months will have a Friday that falls on the 13th day.

Common years			Leap years		
YDL		Friday the 13th in...	YDL	2YDL	Friday the 13th in...
A		**January**, October	B	A	October
B		May	C	B	May
C		August	D	C	**February**, August
D		**February**, March, November	E	D	March, November
E		June	F	E	June
F		September, December	G	F	September, December
G		April, July	A	G	**January**, April, July

Hint: Use the expressions from problem 60 on page 300 of the *Forouzan and Gilberg* text to determine the day of the week for 31 December of the previous year and whether the current year is a leap year or not.

Example Execution #1:

```
Enter year -> 2024

01 January 2024 falls on a: Monday
Dominical letters:          GF
Friday the 13th falls in:   September, December
```

Explanation: the first day of this year was a Monday. The year's dominical letter (YDL) is therefore G according to the first table above. This year also happens to be a leap year, so there is a second dominical letter (2YDL) of F according to the second table above. A year with letters GF has Friday the 13th in the months of September and December.

Example Execution #2:

```
Enter year -> 2023

01 January 2023 falls on a: Sunday
Dominical letters:          A
Friday the 13th falls in:   January, October
```

Example Execution #3:

```
Enter year -> 1788

01 January 1788 falls on a: Tuesday
Dominical letters:          FE
Friday the 13th falls in:   June
```

Example Execution #4:

```
Enter year -> 2000

01 January 2000 falls on a: Saturday
Dominical letters:          BA
Friday the 13th falls in:   October
```

Example Execution #5:

```
Enter year -> 2100

01 January 2100 falls on a: Friday
Dominical letters:          C
Friday the 13th falls in:   August
```

Example Execution #6:

```
Enter year -> 1970

01 January 1970 falls on a: Thursday
Dominical letters:          D
Friday the 13th falls in:   February, March, November
```

Example Execution #7:

```
Enter year -> 1984

01 January 1984 falls on a: Sunday
Dominical letters:          AG
Friday the 13th falls in:   January, April, July
```

Example Execution #8:

```
Enter year -> 1900

01 January 1900 falls on a: Monday
Dominical letters:          G
Friday the 13th falls in:   April, July
```

Example Execution #9:

```
Enter year -> 2022

01 January 2022 falls on a: Saturday
Dominical letters:          B
Friday the 13th falls in:   May
```

Example Execution #10:

```
Enter year -> 2032

01 January 2032 falls on a: Thursday
Dominical letters:          DC
Friday the 13th falls in:   February, August
```

Example Execution #11:

```
Enter year -> 2020

01 January 2020 falls on a: Wednesday
Dominical letters:          ED
Friday the 13th falls in:   March, November
```

All course programming and documentation standards are in effect for this and each assignment this semester. Please review this document!

Academic Integrity Reminder: Please review the policies of the course as they relate to academic integrity. The assignment you submit should be your own original work. You are to seek assistance from course staff members ONLY. Collaboration is not permitted on individual homework assignments.

Additional Requirements:

1. Add the homework assignment header file to the top of your program. A description of your program will need to be included in the assignment header. This particular header can be added to your file by entering `:hhw` while in command mode in `vi`.

2. **Each of the example executions provided for your reference represents a single execution of the program.** Your program must accept input and produce output **exactly** as demonstrated in the example executions. Do not add any "bonus" features not demonstrated in the example executions. Your program will be tested with the data seen in the example executions and an unknown number of additional tests making use of meaningful data.
   - The user will enter years between 1753 and 4000 inclusive.

3. For this assignment you will be **required** to implement user-defined functions (from chapter 4). Failing to follow course standards as they relate to good user-defined function use will result in a **zero for this assignment.**

4. Revisit **course standards as it relates what makes for good use of user-defined functions, what is acceptable to retain in the** `main` **function, and when passing parameters by address is appropriate.** In many cases user-defined function use should result in a `main` function that only declares variables and makes function calls.

5. Course standards **prohibit** the use of programming concepts beyond the material found in the first **FIVE** chapters of the book, notes, and lectures.
   - The use of any technique of repetition or arrays would violate the requirements of this assignment and would result in no credit being awarded for your effort.

6. A program **MUST** compile, be submitted through Vocareum as demonstrated during the Lab #0 exercise, and submitted prior to the posted due date to be considered for credit. The source code file you submit must be named exactly `hw04.c`; no variation is permitted.

Course Programming and Documentation Standards Reminders:

- Code found inside the body of relevant selection constructs must be indented two additional spaces.
- Make use of `{` and `}` with all relevant selection constructs.
- See page 258 of your C programming text regarding the proper indentation for a `switch` construct.

- Use the course function header (`vi` shortcut `:hfx` while in command mode) for every user-defined function.
  - List and comment **all parameters** to a function, one per line, in the course function header.
  - **All function declarations** will appear in the global declaration section of your program.
  - **The user-defined function definitions will appear in your program after the** `main` **function.**

- Indent all code found within the `main` function **exactly** two spaces.
- Place a **single space** between all operators and operands.
- Comment **all** variables to the right of each declaration. Declare only one variable per line.
- Maximize your use of symbolic/defined constants and minimize your use of literal constants.

- Notice that several programs (see program 2-9 on pages 74-75) in the programming text use a single line comment to indicate the start of the local declaration and executable statement sections of the `main` function.
  - At no point during the semester should these two sections ever overlap.

When you submit... only the final successful submission is kept for grading. All other submissions are overwritten and cannot be recovered. You may make multiple submissions, but only the last attempt is retained and graded.

- Verify in the confirmation email sent to you by the course that you have submitted the correct file to the correct assignment.
- Leave time prior to the due date to seek assistance should you experience difficulties completing or submitting this assignment. All attempts to submit via a method other than through the appropriate assignment on Vocareum will be denied consideration.

Assignment deadlines... are firm and the electronic submission will disable promptly as advertised. We can only grade what you are able submit via Vocareum prior to the assignment deadline.