Objectives:

- Implement a simple class with public and private members and multiple constructors.
- Gain a better understanding of the building and using of classes and objects.
- Practice problem solving using Object Oriented Programming.

Overview:

In this assignment, you are expected to implement a *date and day of week calculator for the calendar years in the inclusive range from 2018 to 2518*. Reading in a three tuple *(a b c)* of non-negative numbers from the input, the calculator interprets the first and second numbers as month and day respectively, and calculates the day after c days from Month a, Day b, of the year 2018. We fix the starting year to be 2018 to simplify the code.

Sample Input-Output Pair : For example, input *1 1 31* results in an output of *31 days after Monday, January 1, 2018 is Thursday, February 1, 2018*. The first input number must be from 1 to 12 representing the 12 months in 2018, the second input number must be a day in the month. The input month and day always correspond to the year 2018. The program should report an error (and exit) if the input is incorrect. If the answer is not in the inclusive range from 2018 to 2518, the program should output "is a date not in the range". Here is a simple sequence of inputs and outputs from the program.

Input	Output
1 1 20	20 days after Monday, January 1, 2018 is Sunday, January 21, 2018.
1 1 31	31 days after Monday, January 1, 2018 is Thursday, February 1, 2018.
2 1 0	0 days after Thursday, February 1, 2018 is Thursday, February 1, 2018.
1 1 32	32 days after Monday, January 1, 2018 is Friday, February 2, 2018.
4 5 0	0 days after Thursday, April 5, 2018 is Thursday, April 5, 2018.
6 10 100	100 days after Sunday, June 10, 2018 is Tuesday, September 18, 2018.
7 20 300	300 days after Friday, July 20, 2018 is Thursday, May 16, 2019.
7 20 365	365 days after Friday, July 20, 2018 is Saturday, July 20, 2019.
12 31 200000	200000 days after Monday, December 31, 2018 is a date not in the range.

Detailed Structure of Assignment Task:

This assignment has two components. The first component is to implement a `DateCalculator` class specified in the following. The second component is a driver program that uses the `DateCalculator` class to realize the calculator.

[1]This assignment has been reproduced from http://www.cs.fsu.edu/ xyuan/cop3330/

Part I : Designing the Class `DateCalculator` : We first discuss the design of the structure:

- The `DateCalculator` class should have three private data members of the `int` type, d, m and y with m encoding the month (1 - January, 2-February, ...) , d being the day in the month and y being the year. For example to represent April 5, 2020 we keep $d = 5$, $m = 4$, $y = 2020$. To represent a date not in the inclusive range from 2018 to 2518, $m = -1$, $d = -1, y = -1$.
- The `DateCalculator` class should have the following public functions:
  - `DateCalculator();` : This default constructor should set the default date of the object to be January 1, 2018.
  - `DateCalculator(int dd);` The parameter for this constructor with 1 parameter, ranges from 1 to 365 (the code should report error and exit if the parameter is not in the range) and is day of year for the date in 2018. The constructor converts day of year to month and day of month. For example the 70th day of the year is March 11: the constructor should make $m = 3$ and $d = 11$ when DateCalculator(70) is invoked.
  - `DateCalculator(int dd, int mm);` For this two parameter constructor, you just need to make sure that month (mm) and day (dd) are legitimate and set $d = dd$, and $m = dd$. If either the day or the month is not legitimate, the code should report error and exit.
  - `void setdate(int dd, int mm);` setdate is similar to the two parameter constructor.
  - `void print();` calculates the day of week for the DateCalculator object and output to the standard output the date in the form of 'dayofweek, month day, year'. For example, when the object have $d = 1, m = 1, y = 2018$, the print should output "Monday, January 1, 2018". For a date not in the inclusive range from 2018 to 2518 ($m = -1$, $d = -1$ and $y = -1$), this routine should output "is a date not in the range".
  - `void plusday(int days);` modifies the m, d and y for the new date, which is days after the current date.

Part II : Driver Program: After defining the class, you should write a driver program that reads in a line of three numbers as specified earlier and generates the corresponding output as specified using the DateCalculator class. The driver is very small performing the basic IO in C++.

Input-Output Format:

The input consists of 3 tuple (a b c)

- a is of type int and is a positive encoding for month.
- b is of type int and is a non negative value for day in a month.
- c is of type int and is the number of days to be added.

The output is a single line of the form 'dayofweek, month day, year'.

Refer Sample Input-Output pairs for examples

Grading Policy

- Handling leap years and corner cases, 15 marks
- Basic testcases without leap years and corner cases, 25 marks
- Maximum marks 40

Leap Year: A leap year has 366 days in total with February having 29 days instead of 28 days. A leap year is either of the following:

- Divisible by 400
- Divisible by 4 and not divisible by 100