Problem Solving and Programming

Day No - 14

Date - 12 May 2019

Day Objectives

1. Objective 1
2. Objective 2
3. Objective 3

Problem 1 :

Problem Statement

Define a function to check if a given year is a leap year. Returns a boolean value

Constraints

Test Cases

- 2000 -> True
- 1900 -> False
- 2012 -> True
- 2020 -> True
- 0200 -> False

Explanation

A given year is leap year if it is divisible by 4 and not by 100 or by 400

2100 -> 2100%400 != 0 2100 % 100 == 0 //Not a leap year

2016 -> 2016 % 400 != 0 2016 % 100 != 0 2016 % 4 == 0

Logical Operators - and or Bitwise Operators - | &

In [10]:
```
def checkLeapYear(year):
    if (year % 400 == 0) or (year % 100 != 0 and year % 4 == 0):
        return True
    return False

checkLeapYear(1200)
```

Out[10]: True

In [ ]:
```

```

Problem 1 :

Problem Statement

Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules. Return the total number of days existing between the two dates.

Constraints

Test Cases

- dateDifference('2019:05:10', '2019:05:01') -> 9
- dateDifference('0003:03:03', '0003:06:06') -> 95
- dateDifference('0001:03:27', '0001:06:03') -> 68

Explanation

Calculate the month difference and subtract difference

In [68]:
```
def dateDifference(date1, date2):
    if yearFromDate(date1) == yearFromDate(date2):
        return abs(totalDaysDate(date1) - totalDaysDate(date2))
    elif yearFromDate(date2) - yearFromDate(date1) == 1:
```

```
        return totalDaysDateEndYear(date1) + totalDaysDate(date2)
    else:
        sum = totalDaysDateEndYear(date1) + totalDaysDate(date2)
        year1 = yearFromDate(date1)
        year2 = yearFromDate(date2)
        for i in range(year1+1, year2):
            sum += numDaysInYear(i)
        return sum


 # This function returns the total number of days in February for a given year
def daysInFeb(year):
    '''
    import calendar
    return calendar.isleap(year)
    '''

    if (year % 400 == 0) or (year % 100 != 0 and year % 4 == 0):
        return 29
    return 28

# This function returns the total number of days in a given month
def numDaysInMonth(month, year):
    #monthDays = {'01':31, '03':31, '04':30, '05':31, '06':30, '07':31, '08':31, '09':30, '10':31, '11':3
0, '12':31}
    if(month == 2):
        return daysInFeb(year)
    elif (month <= 7 and month != 2 and month % 2 == 0) or (month > 7 and month % 2 != 0) :
        return 30
    else:
        return 31

#This functions returns the total numberof days in a given year
def numDaysInYear(year):
    if daysInFeb(year) == 29:
        return 366
    return 365

# This function returns the total number of days completed till the given date
def totalDaysDate(date):
    year = yearFromDate(date) # extract the year as an integer
    month =  monthFromDate(date) # extract the month as an integer
    day =  daysFromDate(date) # extract the day as an integer
    sum = 0
    for i in range(1, month):
        sum +=  numDaysInMonth(i, year)
    sum += day
    return sum

def totalDaysDateEndYear(date):
    year = yearFromDate(date) # extract the year as an integer
    month =  monthFromDate(date) # extract the month as an integer
    day =  daysFromDate(date) # extract the day as an integer
    sum = 0
    for i in range(month+1, 13):
        sum +=  numDaysInMonth(i, year)
    sum += (numDaysInMonth(month, year) - day + 1)
    return sum

def yearFromDate(date):
     return int(date[:4])

def monthFromDate(date):
    return int(date[5:7])

def daysFromDate(date):
    return int(date[len(date)-2:])

#dateDifference('0001:03:27', '0001:06:03')

dateDifference('0001:01:31', '0003:02:28')
```

Out[68]: 759

In [ ]:

In [67]:
```
from datetime import date, datetime
def dateDifference2(date1, date2):
    year1 = yearFromDate(date1) # extract the year as an integer
    month1 =  monthFromDate(date1) # extract the month as an integer
    day1 =  daysFromDate(date1)
    year2 = yearFromDate(date2) # extract the year as an integer
    month2 =  monthFromDate(date2) # extract the month as an integer
    day2 =  daysFromDate(date2)
    d1 = date(year = year1, month = month1, day = day1)
    d2 = date(year = year2, month = month2, day = day2)
```

```
    print(d2-d1)
    return
dateDifference2('0001:01:31', '0003:02:28')
```

```
758 days, 0:00:00
```

In [ ]:

```

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In [ ]:

```

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