How to Compute Character Day Of week?

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It happened in April 1990!

Bibliographic information

Title	War of Wits: A Complete Law Guide Covering Case-law Up to April, 1987
Author	N. M. Mulchandani
Publisher	Daulat Publications, 1987
Length	1064 pages

How to Compute Leap Year?

```
long isleap(long year ) {

  return ( (year % 400 == 0 ) ||
        ( (year%4 == 0 ) &&
        (year%400 != 0 )));
}
```

The Concept of Odd days

- How many days in a Year? (365 , in leap years, it is 366)
- How many weeks in a Year? (52 and 52 x 7 = 364)
- In regular year, one day is occurring 53 times (let us call it, Odd day!)
- In leap years, you require 2 Odd days (2 days come 53 times)
- So, Number of Odd days in ‘N’ years
  - (N + (N >> 2))% 7
  - If N is 100,200,300 … one needs to subtract 1

How many odd days ?

SlNo	Year	Odd day
1	400 and it's multiple (400 + 96 +1)%7	0
2	300 and it's multiple (300 + 72)%7	1
3	200 and it's multiple (200 + 48)%7	3
4	100 and it's multiple (100 + 24) %7	5

How to Encode CDOW in Programming?

```
const char * days[] = { "Sunday", //0
                        "Monday", //1
                        "Tuesday", //2
                        "Wednesday", //3
                        "Thursday", //4
                         "Friday",  //5
                         "Saturday", //6
                         0
};
```

How Many Odd days in each month?

SlNo	Year	Cumulative Sum of Odd days
0	January not completed	0
1	January (31%7)	3
2	February (28%7 , if Leap Year 29%7)	3 (for non leap year)
3	March	6
4	April	1 (8%7)
5	May	4
6	June	6
7	July	2
8	August	5
9	September	0
10	October	3
11	November	5
12	December	-

Which day India got it’s Independence?

- The date is 1947 , August 15
- The Computation should start from 1946 (1600 + 300 + 46)
- No of Odd days – (0 + 1 + (46 + 46 /4))%7 (== 2)
- No of Odd days including July , 2 , so 2 + 2 = 4
- 1947 is not a Leap year , so odd day is still 4
- August month (15%7) == 1 = 1 + 4 = 5
- The day is Friday!

When was Mahatma Gandhi born?

- The date is 1869 , October 2
- The Computation should start from 1868 (1600 + 200 + 68)
- No of Odd days – (0 + 3 + (68 + 68 /4))%7 (== 4)
- No of Odd days including September , 0 , so 0 + 4 = 4
- 1869 is not a Leap year , so odd day is still 4
- October month (2%7) == 2 = 2+ 4 = 6
- The day is Saturday!

When my Elder Son was born?

- The date is 2002 , February 23
- The Computation should start from 2001 (2000 + 1)
- No of Odd days – (0 + 1)%7 (== 1)
- No of Odd days including January 3 , so 1+ 3 = 4
- 2002 is not a Leap year , so odd day is still 4
- Febraury month (23%7) == 2 = 2+ 4 = 6
- The day is Saturday!

When was Indira Gandhi Assassinated?

- The date is 1984 , October 31
- The Computation should start from 1983 (1600 + 300 + 83)
- No of Odd days – (0 + 1 + (83 + 83/4))%7 (== 6)
- No of Odd days including Septemeber 0 , so 0+ 6 = 6
- 1984 is a Leap year , so odd day is still 7 (6 + 1)
- October month (31%7) == 3 = 3+ 7 = 10 (== 3)
- The day is Wednesday!

A C Program to Compute CDOW!

```
#include <stdio.h>
#include <math.h>


long isleap(long year ) {

   return ( (year % 400 == 0 ) ||
            ( (year%4 == 0 ) &&
            (year%400 != 0 )));
}



int main()
{

          long month , day , year;
          long tempcomp;
          long oddday = 0;

          long accum[12] = { 0,3,3,6,8,11,13,16,19,21,24,26};

          const char * days[] = { "Sunday",
                                  "Monday",
                                                "Tuesday",
                                                "Wednesday",
                                                "Thursday",
                                                "Friday",
                                                "Saturday",0 };
```

CDOW program contunued

```
printf("Enter day month and year\n\n");
scanf("%d%d%d",&day , &month , &year );
if ( month < 1 && month >12 ){
          printf("You  have entered an illegal month\n");
          return -1;
}
if ( day < 1 && day > 31 ) {
          printf("u have entered an illeagal day \n" );
          return -1;
}
if ( year < 0 ) {
         printf("Year should not be a negative number");
         return -1;
}
if ( ( day == 29 ) && ( month == 2 ) && !isleap(year) ){
          printf("u have entered an illeagal date : not a leap year\n");
          return -1          ;
}
if ( ( day > 29 ) && ( month == 2 ) ){
           printf("u have entered an illeagal date \n");
           return -1;
}
```

CDOW program contunued

```
        //--- Take the Previous Year , Take Modulo 400
        tempcomp = year-1;
        tempcomp = tempcomp%400;
        //--- Depending upon reminder, odd days has to be assigned
        if (tempcomp >= 300 ) { tempcomp = tempcomp%300; oddday = 1;}
        else if ( tempcomp >= 200 ) { tempcomp = tempcomp%200; oddday = 3; }
        else if ( tempcomp >= 100 ) { tempcomp = tempcomp%100; oddday = 3;}
        else  { oddday = 0; }

        //---- Adjust the Number of Year and Number of Leap Years
        oddday = ( oddday + ( tempcomp + (long)(tempcomp/4) ));
        //------- Adjust for the month
        oddday = ( oddday + accum[ month- 1 ]);
        //---- Adjust for the Leap Year
        if ( month > 2 && isleap(year) ) { oddday +=1; }
        //----------- Adjust the Odd days for DAYs and take modulo 7
        oddday = ( oddday + day ) % 7;
        //------------- Look up in the days array to find CDOW
        printf("The day is %s\n" , days[oddday]);
        return 0;
}
```

Any Questions?

- The Program can be retrieved from https://github.com/praseedpai/ElementaryMathForProgrammingSeries/blob/master/AlgebraNArith/Calendar/Calendarmain.cpp
- Thank you!