

模型部分：

1：年份

公元前 1 年后一年是公元 1 年

闰年：公元后闰年是 4 年一闰，百年不闰，400 年一闰，如 2016,2000 年为闰年，2018,1900 不为闰年

公元前闰年和其年份的绝对值-1 对应的公元后年份相同，如公元前 1 年，前 2001 年为闰年，前 1901，前 32 年不为闰年

公元前闰年规则

1，非整百年：年数除以 4 余数为 1 是闰年，即公元前 1、5、9.....

年；

2，整百年：年数除以 400 余数为 1 是闰年，年数除以 3200 余数为 1，不是闰年，年数除以 172800 余 1 又为闰年，即公元前 401、801.....年。

---摘自必应网典

2：架构：

日期类的年，月，日都为 private，只能通过特定的接口调用，修改。而其显示，设置，计算函数为 public，便于调用。

应用了读入整数的模块。

计算函数原理：先将一个月，日转换成其对应年份的第几天。

```
int switch_to_day(int month, int day, int day_per_month[])
{
    int i,num=0;
    for (i = 1; i < month; i++) num += day_per_month[i];
    num += day;
    return num;
}
```

之后加上所要计算的 n，然后对年份进行递推（如果要计算的 n 为正数，则年份每+1，减去当年的天数；如果 n 为负数，则年份每-1，加上去年的天数）

```
if (n >= 0)
{
    num += long long(n);
    while (num > day_per_year_new)
    {
        num -= day_per_year_new;
        if (year_new != -1) year_new++;
        else year_new = 1;
        judge_leap_year_new(year_new, &day_per_month_new[2], &day_per_year_new);
    }
}
```

```

while (num <= 0)
{
    if (year_new != 1)
    {
        judge_leap_year_new(year_new - 1, &day_per_month_new[2], &day_per_year_new);
    }
    else
    {
        judge_leap_year_new(year_new - 2, &day_per_month_new[2], &day_per_year_new);
    }
    num += day_per_year_new;
    if (year_new != 1) year_new--;
    else year_new = -1;
}

```

之后得到哪一年的第几天，再将天数转换成月-日形式

```

void switch_to_month(int num, int* month, int* day, int day_per_month[])
{
    *month = 1; *day = 0;
    int i = 1;
    while (num > day_per_month[i])
    {
        num -= day_per_month[i];
        i++;
    }
    *month = i;
    *day = num;
}

```

测试部分

1：对年份读入输出的测试

等价类：一般年月日，公元前年月日，闰年（公元前后，三种闰年），非法输入（0，非 int 形式）

非法输入测试

```
Please input the year
Please input an integer.
0
Invalid input, please try again.
Please input the year
Please input an integer.
pwijhfbheh
Invalid input, please try again.
Please input an integer.
20.18
Invalid input, please try again.
Please input an integer.
2018
Please input the month
Please input an integer.
13
Invalid input, please try again.
Please input the month
Please input an integer.
-1
Invalid input, please try again.
Please input the month
Please input an integer.
0
Invalid input, please try again.
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
29
Invalid input, please try again.
Please input the day
Please input an integer.
-1
Invalid input, please try again.
Please input the day
Please input an integer.
28
The date is 2/28/2018 AD.
```

一般日期输入

```
Please input the year
Please input an integer.
2018
Please input the month
Please input an integer.
3
Please input the day
Please input an integer.
20
The date is 3/20/2018 AD.
```

公元前输入

```
Please input the year
Please input an integer.
-1
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
29
The date is 2/29/1 BC.
```

闰年

```
Please input the year
Please input an integer.
2016
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
30
Invalid input, please try again.
Please input the day
Please input an integer.
29
The date is 2/29/2016 AD.
```

```
Please input the year
Please input an integer.
1900
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
29
Invalid input, please try again.
Please input the day
Please input an integer.
28
The date is 2/28/1900 AD.
```

```
Please input the year
Please input an integer.
2000
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
29
The date is 2/29/2000 AD.
```

公元前闰年

```

Please input the year
Please input an integer.
-101
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
29
Invalid input, please try again.
Please input the day
Please input an integer.
28
The date is 2/28/101 BC.

```

```

Please input the year
Please input an integer.
-2001
Please input the month
Please input an integer.
2
Please input the day
Please input an integer.
29
The date is 2/29/2001 BC.

```

2：计算模块的测试

等价类划分：n>0 一般数据（不跨年），n<0 一般数据（不跨年），n>0 一般数据（跨年），n<0 一般数据（跨年），公元前，闰年，大数据等  
一般数据（来源：高考倒计时日历）

```

The date is 3/20/2018 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
79
The date you want is 6/7/2018 AD.

```

一般数据（公元前）

```

The date is 2/16/3 BC.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
365
Invalid input, please try again.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
365
The date you want is 2/16/2 BC.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.

```

跨年

```
The date is 3/20/2018 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
444
The date you want is 6/7/2019 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
```

```
The date is 3/20/2018 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
-286
The date you want is 6/7/2017 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
```

闰年

```
The date is 1/1/2017 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
-1
Invalid input, please try again.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
-307
Invalid input, please try again.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
-307
The date you want is 2/29/2016 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
```

```

The date is 1/1/1 AD.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
-307
Invalid input, please try again.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
-307
The date you want is 2/29/1 BC.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.

```

### 3：单元测试

这次测试方法是对拍（仅测试计算日期的核心模块）  
与夏天航同学的对拍结果

Set1：

```

Please input the year
Please input an integer.
-9999
Please input the month
Please input an integer.
3
Please input the day
Please input an integer.
23
The date is 3/23/9999 BC.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.
1
Now please input an integer n, as the days before or after the date
Positive n or 0 means n days after, while negative n means n days before.
Please input an integer.
100000
The date you want is 1/6/9725 BC.
Do you want to get the date after some days?
Input 1 to continue, input 0 to quit the program.
Please input an integer.

```

（这组数据是面面对拍的，他没

有截图）

Set2：

```

1492
3
23
20
AD:1492年4月12日 103

```

```

Please input an integer.
20
The date you want is 4/12/1492 AD.

```

（左图为室友结果，右图为我的结果，

以下数据规则相同）

Set3：

```

1492
3
23
-38284
AD:1387年5月29日 149

```

```

Please input an integer.
-38284

```

```

The date you want is 5/29/1387 AD

```

Set4：

```
1492
3
23
-39
AD:1492年2月13日 44
Please input an integer.
-39
The date you want is 2/13/1492 AD.
```

Set5 :

```
1492
3
23
140226
AD:1876年2月25日 56
Please input an integer.
140226
The date you want is 2/25/1876 AD.
```

Set6 :

```
1492
3
23
38246234
AD:106206年11月10日 314
Please input an integer.
38246234
The date you want is 11/10/106206 AD.
```

以上各组数据皆匹配，再加上之前的特殊数据测试。  
可以初步说明结论正确