

Algorithms Level 4



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حقوق النشر محفوظة، أسعار الكورسات في المنصة هي أسعار
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```
#include <iostream>
using namespace std;

struct stDate
{
    short Year;
    short Month;
    short Day;
};

bool isLeapYear(short Year)
{
    return (Year % 4 == 0 && Year % 100 != 0) || (Year % 400 == 0);
}

short NumberOfDaysInAMonth(short Month, short Year)
{
    if (Month < 1 || Month>12)
        return 0;

    int days[12] = { 31,28,31,30,31,30,31,31,30,31,30,31 };
    return (Month == 2) ? (isLeapYear(Year) ? 29 : 28) :
days[Month - 1];
}
```



```
stDate DecreaseDateByOneDay(stDate Date)
{
    if (Date.Day == 1)
    {
        if (Date.Month == 1)
        {
            Date.Month = 12;
            Date.Day = 31;
            Date.Year--;
        }
        else
        {
            Date.Month--;
            Date.Day = NumberOfDaysInAMonth(Date.Month,
Date.Year);
        }
    }
    else
    {
        Date.Day--;
    }

    return Date;
}

stDate DecreaseDateByOneWeek(stDate Date)
{
    for (int i = 1; i <= 7; i++)
    {
        Date = DecreaseDateByOneDay(Date);
    }

    return Date;
}

stDate DecreaseDateByXWeeks(short Weeks, stDate Date)
{
    for (short i = 1; i <= Weeks; i++)
    {
        Date = DecreaseDateByOneWeek(Date);
    }
    return Date;
}
```



```
stDate DecreaseDateByOneMonth(stDate Date)
{
    if (Date.Month == 1)
    {
        Date.Month = 12;
        Date.Year--;
    }
    else
        Date.Month--;

    //last check day in date should not exceed max days in the
    current month
    // example if date is 31/3/2022 decreasing one month should not
    be 31/2/2022, it should
    // be 28/2/2022
    short NumberOfDaysInCurrentMonth =
    NumberOfDaysInAMonth(Date.Month, Date.Year);
    if (Date.Day > NumberOfDaysInCurrentMonth)
    {
        Date.Day = NumberOfDaysInCurrentMonth;
    }

    return Date;
}

stDate DecreaseDateByXDays(short Days, stDate Date)
{
    for (short i = 1; i <= Days; i++)
    {
        Date = DecreaseDateByOneDay(Date);
    }
    return Date;
}

stDate DecreaseDateByXMonths(short Months, stDate Date)
{
    for (short i = 1; i <= Months; i++)
    {
        Date = DecreaseDateByOneMonth(Date);
    }
    return Date;
}
```



```
stDate DecreaseDateByOneYear(stDate Date)
{
    Date.Year--;
    return Date;
}

stDate DecreaseDateByXYears(short Years, stDate Date)
{
    for (short i = 1; i <= Years; i++)
    {
        Date = DecreaseDateByOneYear(Date);
    }
    return Date;
}

stDate DecreaseDateByXYearsFaster(short Years, stDate Date)
{
    Date.Year -= Years;
    return Date;
}

stDate DecreaseDateByOneDecade(stDate Date)
{
    //Period of 10 years
    Date.Year -= 10;
    return Date;
}

stDate DecreaseDateByXDecades(short Decade, stDate Date)
{
    for (short i = 1; i <= Decade * 10; i++)
    {
        Date = DecreaseDateByOneYear(Date);
    }
    return Date;
}

stDate DecreaseDateByXDecadesFaster(short Decade, stDate Date)
{
    Date.Year -= Decade * 10;
    return Date;
}
```



```
stDate DecreaseDateByOneCentury(stDate Date)
{
    //Period of 100 years
    Date.Year -= 100;
    return Date;
}

stDate DecreaseDateByOneMillennium(stDate Date)
{
    //Period of 1000 years
    Date.Year -= 1000;
    return Date;
}

short ReadDay()
{
    short Day;
    cout << "\nPlease enter a Day? ";
    cin >> Day;
    return Day;
}

short ReadMonth()
{
    short Month;
    cout << "Please enter a Month? ";
    cin >> Month;
    return Month;
}

short ReadYear()
{
    short Year;
    cout << "Please enter a Year? ";
    cin >> Year;
    return Year;
}

stDate ReadFullDate()
{
    stDate Date;

    Date.Day = ReadDay();
    Date.Month = ReadMonth();
    Date.Year = ReadYear();
    return Date;
}
```



Problem # 33 to 46/4 Solutions Using C++

```
int main()
{
    stDate Date1 = ReadFullDate();

    cout << "\nDate After: \n";

    Date1 = DecreaseDateByOneDay(Date1);
    cout << "\n01-Subtracting one day is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByXDays(10, Date1);
    cout << "\n02-Subtracting 10 days is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByOneWeek(Date1);
    cout << "\n03-Subtracting one week is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByXWeeks(10, Date1);
    cout << "\n04-Subtracting 10 weeks is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByOneMonth(Date1);
    cout << "\n05-Subtracting one month is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByXMonths(5, Date1);
    cout << "\n06-Subtracting 5 months is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByOneYear(Date1);
    cout << "\n07-Subtracting one year is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByXYears(10, Date1);
    cout << "\n08-Subtracting 10 Years is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByXYearsFaster(10, Date1);
    cout << "\n09-Subtracting 10 Years (faster) is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

    Date1 = DecreaseDateByOneDecade(Date1);
    cout << "\n10-Subtracting one Decade is: "
         << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;
}
```



Problem # 33 to 46/4 Solutions Using C++

```
Date1 = DecreaseDateByXDecades(10, Date1);
cout << "\n11-Subtracting 10 Decades is: "
      << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

Date1 = DecreaseDateByXDecadesFaster(10, Date1);
cout << "\n12-Subtracting 10 Decade (faster) is: "
      << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

Date1 = DecreaseDateByOneCentury(Date1);
cout << "\n13-Subtracting One Century is: "
      << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

Date1 = DecreaseDateByOneMillennium(Date1);
cout << "\n14-Subtracting One Millennium is: "
      << Date1.Day << "/" << Date1.Month << "/" << Date1.Year;

system("pause>0");
return 0;
}
```