The Date Class

Lecture 27

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Outline

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The `isLeapYear()` Function

- The `isLeapYear()` function receives a year (integer) as its parameter.
- It returns **`true`** if the year is a leap year and **`false`** if it is not a leap year.
- Which years are leap years?

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- Examples:
  - 2019 is not a leap year.
  - 2020 is a leap year.
  - 2100 is not a leap year.
  - 2000 was a leap year.

The `isLeapYear()` Function

- The relevant questions for each year are
    - Is it a multiple of 4?
    - If so, is it a multiple of 100?
    - If so, is it a multiple of 400?

Outline

Converting Dates to Integers

- To facilitate calculations with dates, we will write functions that will convert dates to integers and integers to dates.
- Our scheme is to assign 0 to Jan 1, 1601; 1 to Jan 2, 1601; and so on.
- If we create the appropriate functions, then we can “cast” a `Date` object as an `int` and cast an `int` as a `Date` object.

The Date class add() Function

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```
Date Date::add(int n) const
{
    return Date(int(*this) + n);
}
```

- To add n days to a date, we will
  - Convert the date to an integer.
  - Add n to the integer.
  - Convert the integer to a date.

Pre- and Post-Increment

- For the `Date` class, how would we implement
  - The pre-increment operator `++`?
  - The post-increment operator `++`?

Outline

The `weekday()` Function

- The `weekday()` function will return the name of the weekday as a string: `"Sunday"`, `"Monday"`, etc.
- One way to determine the day of the week is to
  - Figure out what day of the week day `0` was (Jan 1, 1601).
  - Get the "day number" (number of days since Jan 1, 1601) of the desired date.
  - Divide by 7 and keep the remainder.
  - Use that remainder and Jan 1, 1601 to get the desired day of the week.

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- It also so happens that Dec 25, 2050 is 164,352 days later.
- Compute 164352 % 7 = 6.
- Therefore, Christmas, 2050 will be on a Monday + 6 = Sunday.
- But that is not how we will do it.
- We will use "Zellner's Algorithm" (given).