CSC 211 – Advanced Programming Techniques

Calendar Project

In this project, you need to create a calendar application that allows users to add events, view daily and monthly events, update events, and delete events. You are not limited to the features included in these instructions, feel free to add any other components you find useful

Note: A normal year has 365 days. A leap year has 366 days (the extra day is February 29). In this project, you must take this fact into account. The rules that determine leap years are provided later in these instructions.

Design the **Event** class, to be used in your application, containing:

- A private data member **eventNo** of type *long integer* that holds the event number.
- A private data member **month** of type integer that holds the month of the event.
- A private data member **day** of type integer that holds the day of the event.
- A private data member **year** of type integer that holds the year of the event.
- A private data member **hour** of type integer that holds the hour of the event.
- A private data member **minute** of type integer that holds the minute of the event.
- A private data member **details** that is an array of 100 chars to store the event details.
- A default constructor that sets the date and time of the event to midnight, 01/01/1753.
- Accessors for the member variables.
- Mutators for the member variables. Make sure the values stored in the member variables are valid (example, **month** in the range [1 – 12], **hour** in [0 – 23], **minute** in [0 – 59] …
- A member function that updates the **eventNo** member variable. The function generates a long integer value for the event using the following pattern: *YYYYMMDDhhmm* (example, 202209261720 for the event occurring on 09/26/2022 at 5:20pm).
- Any other member function that can help you accomplish the project.

Write a program that thoroughly tests your **Event** class. Consider using the following functions in your program (you can use more functions). The implementations of these functions are left to you; they can be members of the **Event** class, friends of it, or just regular stand-alone functions.

- A function that tests whether the year of an event is leap.
- A function that returns the month name of an event (ex, January, February …).
- A function that returns the day name of an event (ex, Sunday, Monday …). Note that the day for January 1 of the year 1753 was a Monday.
- A function that prints monthly calendars (***optional***).
- A function that prints the holidays of any year (***optional***).

Rules for determining leap years:

✓ Leap Years are any year that can be exactly divided by 4 (such as 2016, 2020, 2024, etc)
  ✗ Except if it can be exactly divided by 100, then it isn't (such as 2100, 2200, 2300, etc)
    ✓ Except if it can be exactly divided by 400, then it is (such as 2000, 2400, 2800, etc)

Linux calendar command:

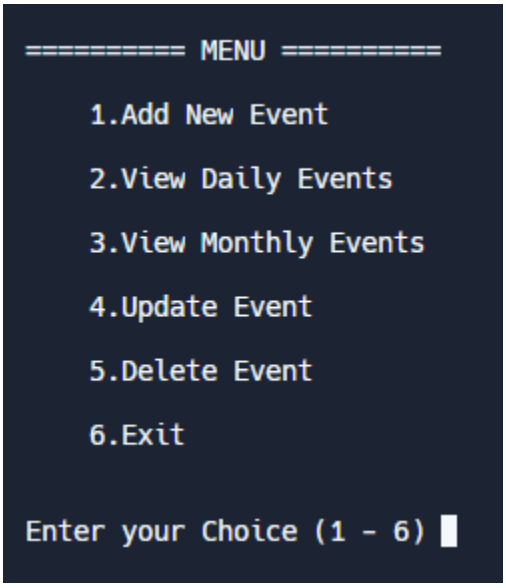
To check the results of your application, you can use the Linux **cal** command which displays the calendar of a specific month or an entire year as follows.

- **cal** without any arguments will display the calendar for the current month.
- **cal** with month and year as arguments will display the calendar for that specific mount (ex, `cal 12 2021`).
- **cal** with year as argument will display the calendar for the whole year (ex, `cal 2022`).

If you don't have access to a Linux terminal, you can use any online Linux emulator such as the following: https://bellard.org/jslinux/vm.html?url=alpine-x86.cfg&mem=192

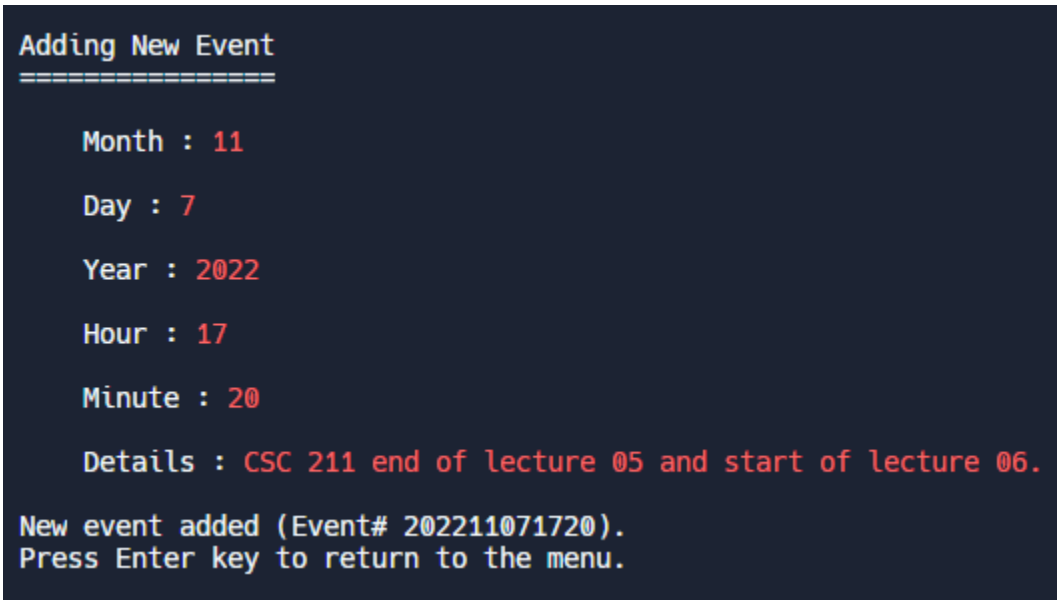
Sample application demonstration:

Main Menu



Choice 1: Add New Event

Note: What is red in the screenshot below is what the user wrote and then hit the ***Enter*** key. I used a different color for you so you can distinguish between user input and application output. You don't need to use the colors in your application.



Choice 1: Add New Event (*again*)

```
Adding New Event
================

    Month : 11

    Day : 7

    Year : 2022

    Hour : 8

    Minute : 0

    Details : Early advisement and registration begin for Spring 2023.

New event added (Event# 202211070800).
Press Enter key to return to the menu.
```

Choice 2: View Daily Events

```
View Daily Events
=================

    Month : 11

    Day : 7

    Year : 2022

Event(s) of Monday, November 7, 2022 :

-> 08:00 (Event# 202211070800):
   Early advisement and registration begin for Spring 2023.

-> 17:20 (Event# 202211071720):
   CSC 211 end of lecture 05 and start of lecture 06.

Press Enter key to return to the menu.
```

Important: Events should be listed in chronological order.

Choice 3: View Monthly Events

```
View Monthly Events
===================

    Month : 11

    Year : 2022

Event(s) of November 2022 :

-> Wednesday, November 2 at 17:20 (Event# 202211021720):
   CSC 211 Lab 06.

-> Monday, November 7 at 08:00 (Event# 202211070800):
   Early advisement and registration begin for Spring 2023.

-> Monday, November 7 at 17:20 (Event# 202211071720):
   CSC 211 end of lecture 05 and start of lecture 06.

-> Wednesday, November 9 at 17:20 (Event# 202211091720):
   CSC 211 Lab 07.

-> Monday, November 14 at 17:20 (Event# 202211141720):
   CSC 211 end of lecture 06 and start of lecture 07.

-> Wednesday, November 16 at 17:20 (Event# 202211161720):
   CSC 211 Lab 07.

-> Monday, November 21 at 17:20 (Event# 202211211720):
   CSC 211 end of lecture 07 and Quiz #3.

Press Enter key to return to the menu.
```

Note: Events should also be sorted chronologically.

Choice 4: Update Event

```
Update Event
============

    Enter Event Number : 202211070800

Current Event Details:

-> Monday, November 7, 2022 at 08:00
   Early advisement and registration begin for Spring 2023.

Enter New Event Details:

    Month : 11

    Day : 7

    Year : 2022

    Hour : 8

    Minute : 30

    Details : Early advisement and registration begin for Winter and Spring 2023.

Event updated.
Press Enter key to return to the menu.
```

Choice 5: Delete Event

```
Delete Event
============

    Enter Event Number : 202210271845

Current Event Details:

-> Thursday, October 27, 2022 at 18:45
   In-person open house at BMCC main campus.

Are you sure you want to delete this event? (Y/N) Y

Event deleted.
Press Enter key to return to the menu.
```

Be sure to validate the user input as shown below.

```
Adding New Event
================

    Month : 2

    Day : 29

    Year : 2023

Error: Invalid date.
Press Enter key to return to the menu.
```

Bonus Tasks:

To get extra credits for your project (Optional), add these new features to your application.

```
========== MENU ==========

    1.Add New Event

    2.View Daily Events

    3.View Monthly Events

    4.Update Event

    5.Delete Event

    6.Display Monthly Calendar

    7.Display Holidays

    8.Exit

Enter your Choice (1 - 8)
```

Choice 6: Display Monthly Calendar

```
Display Monthly Calendar
========================

    Month : 11

    Year : 2022

     November 2022
 Su Mo Tu We Th Fr Sa
        1  2  3  4  5
  6  7  8  9 10 11 12
 13 14 15 16 17 18 19
 20 21 22 23 24 25 26
 27 28 29 30

Press Enter key to return to the menu.
```

Choice 7: Display Holidays

```
Display Holidays
================

Enter the year : 2021

Friday, January 1       - New Year's Day
Monday, January 18      - Martin Luther King, Jr. Day
Monday, February 15     - President's Day
Monday, May 31          - Memorial Day
Sunday, July 4          - Independence Day
Monday, September 6     - Labor Day
Monday, October 11      - Columbus Day
Thursday, November 11   - Veterans Day
Thursday, November 25   - Thanksgiving Day
Saturday, December 25   - Christmas Day

Press Enter key to return to the menu.
```

Note: The list of US federal holidays is provided in the next page

List of US federal holidays:

- New Year's Day - January 1st
- Martin Luther King, Jr. Day - Third Monday of January
- President's Day - Third Monday of February
- Memorial Day - Last Monday of May
- Independence Day - July 4th
- Labor Day - First Monday of September
- Columbus Day - Second Monday of October
- Veterans Day - November 11th
- Thanksgiving Day - Fourth Thursday of November
- Christmas Day - December 25th