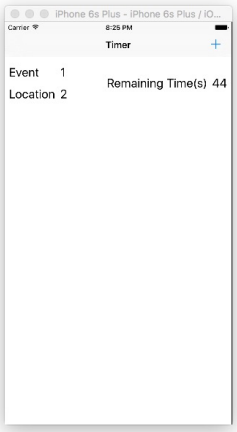
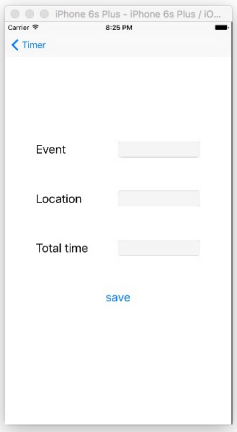
CS 329E: Bulko
Programming Assignment 7
Simple Timer

1 Problem Definition

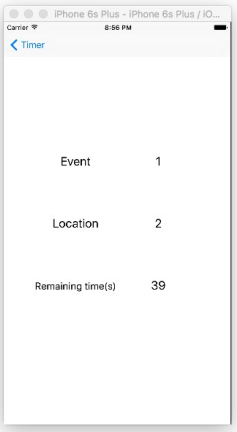
Your goal in this assignment is to create a timer application. There are three view controllers created for this application: the Main View Controller, the Add Timer View Controller, and the Countdown View Controller, as shown in Fig 1(a), Fig 1(b) and Fig 1(c).



(a) the Main View Controller



(b) the Add Timer View Controller



(c) the Countdown View Controller

Figure 1: Application demos

In the Main View Controller, a list of timers are presented. Each timer is associated with an "event", a "location", and a "remaining time". If the event has already taken place, the "remaining time" should show zero; otherwise, it should how much much time there is until the event does take place.

When the user selects a timer from the list, the Countdown View Controller will appear, and the timer is triggered as shown in Fig. 1(c). The value of the remaining time will be decreased by 1 for every second until it equals to 0.

Once you go back to the Main View Controller, the countdown will stop and the remaining time shown should be updated correspondingly.

You can also add a new timer by clicking on the "+" button of the Main View Controller. This will cause the Add Timer View Controller to appear.

The challenging part of this assignment will be using **Multithreading** to implement the countdown of the timers.

2 Detailed Instructions

- Create a Single View application project named <lastName><firstName>-HW7.
- Create a `Timer` class with 3 properties: event, location and remaining time.
- The Main View Controller (Fig. 1(a)):
  - In the storyboard, select the Main View Controller and embed it in a navigation controller with "Editor - Embed in - Navigation Controller".
  - Drag a Table View into the Main View Controller and create a custom table view cell called `TimerTable-ViewCell`. There are 3 labels in a Timer Table View Cell, containing information about the event, the location, and the remaining time on the timer.
  - Create the "+" button on the Navigation Bar of the Main View Controller.
- The Add Timer View Controller (Fig. 1(b)):
  - Ctrl+drag from the "+" button of the Main View Controller to the Add Timer View Controller.
  - Add 3 labels and 3 text fields for user input. When the "save" button is clicked, a new timer should be created with information from the text fields.
  - The timer should not automatically start from this VC. It should only run when the Countdown View Controller is displayed.
- The Countdown View Controller (Fig. 1(c):
  - Ctrl+drag from the Timer Table View Cell to the Countdown View Controller.
  - The event, location, and remaining time of the selected timer should be shown here.
  - In order to implement the countdown, we need to use **Multithreading** techniques. When the Countdown View Controller is shown, create a thread with a `while` loop running. Within the loop, call the `sleep()` function, and then decrease the remaining time on the timer. If the remaining time equals zero, jump out of the loop.
  - **The user should be able to go back to the Main View Controller anytime and the countdown should stop.** In this case, add some code in the `viewWillDisappear()` method to help stop the countdown. The remaining time of the selected timer in the Table View of the Main View Controller should be updated with the new value.
- You can use any technique you wish to implement data passing (not limited to Delegates / Protocols). For example, you can create a global array to contain all the timers that every View Controller has access to. This way of data sharing is typically not safe and is not encouraged, but you can do it for this homework.

3 Grading criteria

1. You have UI components as defined. (20%)
2. The Main View Controller is implemented as well as the Timer Table View Cell. (30%)
3. The Add View Controller is implemented such that you can add new timers, and the Main View Controller should update corresponding to the new timer. (20%)

4. In the Countdown View Controller, the value of remaining time is decreased by 1 every second. (20%)

5. When the user goes back to the Main View Controller from the Countdown View Controller, the timer should be stopped and the remaining time shown in the Main View Controller should update correspondingly. (10%)

6. **Note that if the app does not build and run, ZERO points will be given.**

7. The Coding Standard is followed. One point deducted for each violation.

4 General criteria

1. I will be looking for good documentation, descriptive variable names, clean logical structure, and adherence to all coding conventions expected of an experienced programmer, as well as those outlined in the Coding Standard document. There will be penalties for failure to meet these standards.

2. Your code must compile and run before submission.

3. Xcode will automatically generate standard headers to your .swift files. Add two lines to each Swift file so that the header includes the following:

   // Project: LastnameFirstname-HW7
   // EID: xxxxxx
   // Course: CS329E