Challenge 6.3 - Stop Watch: Refactoring Elapsed Time

It is common to rewrite and update existing code when you make apps. There are many ways to get the same thing to work in code. We call the process of modifying existing code *refactoring*. By refactoring we can simplify code or make code easier to understand.

We're going to refactor the code we wrote to display the elapsed time using several methods from *NSDate* and *NSDateFormatter*. Modern computers calculate time, UNIX time, in seconds from 1970 January 1st 00:00:00.0 UTC. We can leverage this starting date as a way to use the *NSDateFormatter* to create *NSDate* strings that we can use in our apps.

Refactor the method *updateDisplayTime* in your ViewController.m code file. We'll use a new *algorithm* to calculate the time. Algorithms are as simple or complicated as you make them. When you hear the word algorithm you should think about it like a series of steps.

Date Format Algorithm

1. Calculate the *NSTimeInterval* between the *_startDate* and [NSDate date].
2. Create a *NSDate* using the the *NSTimeInterval* to the *NSDate* since 1970.
3. Create a *NSDateFormatter* object to display @"HH:mm:ss.SSS".
4. Set the *NSDateFormatter* object to the UTC timezone.
5. Use the *NSDateFormatter* to format the *NSDate* into a *NSString*.
6. Update the time *UILabel* with the string.

Use the *NSDate* methods:

```
- (NSTimeInterval)timeIntervalSinceDate:(NSDate *)anotherDate;
+ (instancetype)dateWithTimeIntervalSince1970:
(NSTimeInterval)secs;
```

Using the *NSDateFormatter* method with a *NSTimeZone* object to set the timezone to UTC. *Note*: If you miss this step, you'll see a time that looks like 19:00:01.234 instead of 00:00:01.234.

```
[dateFormatter setTimeZone:[NSTimeZone
timeZoneWithAbbreviation:@"UTC"]];
```

Bonus 1: Make a method to convert a NSTimeInterval to return a formatted time string.
*- (NSString *)formatTimeInterval:(NSTimeInterval)timeInterval;*

Resources

“Working with Date and Time in Cocoa (Part 1)” http://oleb.net/blog/2011/11/working-with-date-and-time-in-cocoa-part-1/