

Lab: Timecode Calculator

CPATH: Introduction to Computational Thinking

October 5, 2010

1 Introduction

While you edit media in the field of film and digital media you are using a time-based clock. This is called time code. It begins with “00:00:00.00” and ends with “23:59:59.29.” Another way to think about this is every frame in the clips has a unique number associated with it. This is written as hh:mm:ss.ff or hour:minutes:seconds.frames. The United States television standard is to broadcast television with 30fps.

You happen to have just found a job on a small budget movie entitled, “Summer Break Apocalypse.” This movie needed an assistant editor and you have the skills for the job. Part of the role of an assistant editor is to log tapes and deliver those numbers to either an editor or someone who can capture the media into the computer. You have decided that using some computational thinking might help you because trying to do this by hand is an extremely long process and is extremely error prone. Can you create a time-based calculator to accomplish the task?

2 Problem Statement

Your task is to design, implement, test and deliver a time-based calculator using the following technologies:

1. **Excel:** You will sometimes be given long lists of timecodes you will need to calculate the time differences for. Using Excel, you will code a user defined formula that allows you to add and subtract the timecode values in two cells.
2. **Javascript:** Your friend George decided that since a graphic user interface calculator could come in handy for adding several timecodes together successively, he would go ahead and code the graphical portion of this calculator. What he needs from you are two small javascript functions that he can plug into his interface to carry out the actual calculation logic.

After creating your calculator functions, answer the questions in the “Questions” section.

3 Tools

You will be using Microsoft Excel to learn how to create custom spreadsheet functions.

For the second part of the task, you will need Firefox or Google Chrome web browser, the timecode.html file and the timecode.js stub file. The stub file has place holders for where you will create your two javascript calculator functions.

4 Setup and Programming

4.1 Excel

1. To begin, open Excel and create a new spreadsheet.
2. On the menu, go to “Tools > Macro > Visual Basic Editor” (or hit ALT + F11.) This will open up the editor window, where you will be defining your functions.
3. From the menu, select “Insert > Module” This module will hold your code.
4. In the code window, type the following stub functions:

```
Public Function timecodeAdd(t1 As String, t2 As String) As String
    Dim result As String

    'Place your code to calculate timecode here, replacing this comment

    timecodeAdd = result
End Function

Public Function timecodeSubtract(t1 As String, t2 As String) As String
    Dim result As String

    'Place your code to calculate timecode here, replacing this comment

    timecodeSubtract = result
End Function
```

5. Replace the comments with actual code that parses two strings and returns a calculated time code. Google for “Excel VBA tutorial” or visit www.excel-vba.com to learn the syntax for Excel’s VBA code. **(Alternately, whoever is leading the lab can explain how to do the bits they’d need to complete this assignment.)**
6. After you have created your functions, you can use them in any cell as a formula by typing the following, for example into a cell: =timecodeAdd(A1, B1). Notice the equal sign, which tells the spreadsheet that an equation expression is going to be calculated and the contents stored in the cell.

4.2 Javascript

1. Open the timecode.js file with Vim or Notepad (or any other text editor.)
2. Replace the comments in the function stubs with actual code that calculates timecode differences and sums.
3. Open timecode.html in a web browser (Mozilla Firefox or Google Chrome) and see if your functions correctly add and subtract timecodes using the calculator buttons. (Your code is automatically loaded, assuming you saved your file and have it in the same folder as the html file.)

5 Questions

1. How long is the video clip if it began at 13:45:21.15 and ended at 13:48:25.04?
2. If you had 2 clips that were 4:31.27 and 5:30.05, how much time would you need if you combined the clip?
3. If you have 2 clips where the first clip begins at 00:03:31.00 and ends at 00:04:32.15, the second clip begins at 00:10:45.10 and ends at 00:11:30.05, how much time would you need if you combined the clips together?
4. Fill out the following table:

t1	t2	Difference	Sum
21:49:48.15	58:59:42.10	37:09:53.25	80:49:30.25
00:53:26.23	44:57:25.10		
26:19:12.19	56:45:35.22		
16:43:06.10	46:29:47.08		
05:37:10.05	58:00:06.29		
23:49:38.01	53:42:22.29		
33:50:47.20	49:53:44.16		
18:01:36.19	33:53:28.12		
34:03:37.12	55:02:51.13		
02:43:12.28	12:39:25.02		