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## iPad Web App Development for Music Theory

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### Abstract

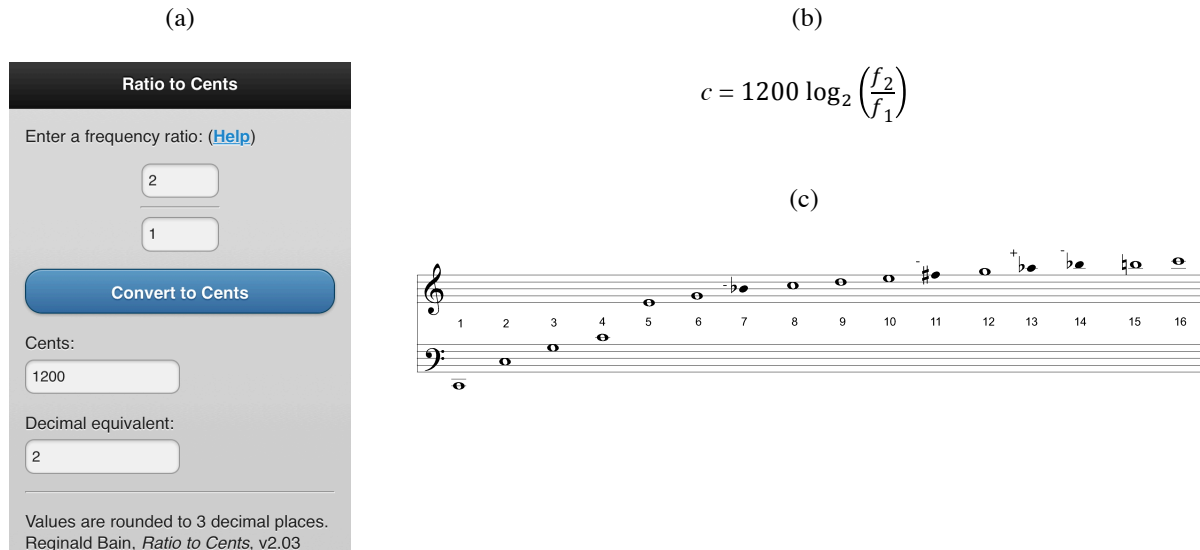
Multi-Touch technology has transformed the way we want to interact with applications. This paper will discuss techniques and strategies for taking existing Web-based applications for undergraduate music theory and adapting them to take advantage of the iPad's built-in hardware features. The iPad's multi-touch interface, multimedia capabilities, and larger screen are just some of the features that make it an ideal platform for such applications. Rather than building iPad (iPhone) apps using application programming interfaces (APIs) like Objective-C or Cocoa Touch, which have rather steep learning curves, educators may develop compelling instructional content using the Web standards HTML5, CSS3, and JavaScript which are comparatively easier to learn, maintain, and enhance over time. A web site for this presentation is available at:

<http://in.music.sc.edu/fs/bain/atmi12/>

**Figure 1.** The *Contextual Analysis of Chorale Phrase Harmonizations* by J.S. Bach Web app for iPad, Built with HTML5, CSS3, JavaScript and jQuery, this iPad app allows MUSC 116 *Music Theory II* students to interactively explore the signs/sounds of Roman numeral, contextual analysis, and two-voice counterpoint symbols in the context of 7 chorale phrase harmonizations by J.S. Bach.

The screenshot shows an iPad displaying a web application. At the top, the status bar shows 'Carrier', '7:47 AM', and '100%' battery. The browser address bar contains 'in.music.sc.edu/fs/bain/atmi12/ca/ex1/index.html'. Below the browser, the page title is 'BAIN MUSC 116 Music Theory II'. The main heading is 'Contextual Analysis of Chorale Phrase Harmonizations by J.S. Bach'. Underneath, it says 'Example 1: J.S. Bach, "Wie schön leuchtet der Morgenstern" (How beauteous beams the morning star)'. There is a sequence of buttons labeled 'Ex. 1 | 2 | 3 | 4 | 5 | 6 | 7 | >'. Below this, a red instruction reads: 'Select a button, or click on the musical example, to cycle through the different views.' There are five radio buttons: 'SATB' (selected), 'RNA', 'CA', 'SB', and 'SB Cpt.'. Below the buttons is a musical score for SATB voices. At the bottom, there are two sliders for 'SATB' and 'SB'. Below the sliders is an 'Analytical Commentary' section with text: 'Note the perfect authentic cadence (PAC) and the sense of finality it achieves. Note too the ornamental pitch D4 in the alto voice. Listen carefully for the arrival of the Dominant (D) in m. 2 and study how the 7th is added to V at cadence in the tenor voice. This tonic expansion begins and ends on a root position tonic triad and features parallel 10ths between the outer voices, a voice-leading paradigm often found in tonic expansions. (Chorale 195, mm. 5-6)'. At the very bottom, it says 'Copyright © 2012 Reginald Bain All rights reserved'.

**Figure 2.** (a) The *Ratio to Cents* Web app for iPhone. Built with jQuery Mobile, it allows students to calculate the number of cents ( $c$ ) in a pitch interval expressed as a frequency ratio; (b) The formula used by the app to convert a user entered frequency ratio ( $f_2/f_1$ ) to cents ( $c$ ); (c) The first 16 partials of a harmonic series on C2 using staff notation and partial numbers.



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## Selected Links

- jQuery - <http://jquery.com>
- jQuery Mobile - <http://jquerymobile.com>
- Matt Bryson, TouchSwipe - <https://github.com/mattbryson/TouchSwipe-Jquery-Plugin>