Outline

A. Install Software and Fonts
B. Nano-Review of Unicode and Fonts/Input Utilities
C. Overview of Mac Input Utilities
D. Demo of
   1. U.S. and U.S. Extended
   2. Unicode Hex Input
   3. Russian (Phonetic vs Native)
   4. Character Palette
E. Why Build Your Own?
F. Install Logic Keyboard and Ukelele
G. Copy and Modify U.S. Keyboard
   1. Assign a Simple Option Code
   2. Undoing an Dead Key
   3. Creating a New Dead Key
   4. Beyond the Western LTR Alphabet Type
Install Software and Fonts

Already on Mac (Applications Folder)

- TextEdit
- Calculator (Optional)

Freeware

1. Drag Ukelele 1.83 folder to Applications folder.
2. Double click UnicodeFontInfor_1_5_1.dmg. Drag Unicode Font Info.app to Applications folder.

- Ukelele 1.8.3 (SIL)
- Unicode Font Info (Andrew Thomson)
  - http://pixel.recoil.org/code/unicodefontinfo/
- Img2Icons (ShinyFrog) – http://www.img2icnsapp.com/Not in Class folder

Freeware Font

1. Shut down all text editing apps (e.g. Text Edit, Dreamweaver, Word)
2. Open ArevFontFamily Folder.
3. Place four .ttf files in ~/Library/Fonts
   
   **Note:** “~” means the users folder. Click Home (white house) icon to access.

If font not recognized in an application, then try these

- Quit and restart application
- Look for font at the bottom of the font list (with Asian fonts).
- Arev Sans font Download (tavmjong)
  - http://tavmjong.free.fr/FONTS/

Free Logic Keyboard (Penn State)

1. Shut down all applications.
2. Open LogicKeyboard folder.
3. Place LogicSymbol.keylayout and LogicKeyboard.icns in ~/Library/Keyboard Layouts.
4. **You must reboot computer** any time you install a new keyboard layout.
Nano Review of Unicode & Input Utilities

An Encoding Scheme
- An encoding scheme assigns a number to each possible character or glyph within a script or set of scripts.
- Unicode aims to assign a number (aka code point) to each possible glyph in all scripts ever used in the world.

Example codes
- Note: Unicode code points are typically given in hexadecimal (base-16) values.

<table>
<thead>
<tr>
<th>CODEPOINT</th>
<th>GLYPH – GLYPH NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+0041</td>
<td>A – Latin Capital Letter A</td>
</tr>
<tr>
<td>U+0061</td>
<td>a – Latin Small Letter A</td>
</tr>
<tr>
<td>U+00C0</td>
<td>À – Latin Capital Letter A with Grave</td>
</tr>
<tr>
<td>U+00C1</td>
<td>Á – Latin Capital A Letter with Acute</td>
</tr>
<tr>
<td>U+0391</td>
<td>Α – Greek Capital Alpha</td>
</tr>
<tr>
<td>U+03B1</td>
<td>α – Greek Small Letter Alpha</td>
</tr>
<tr>
<td>U+2203</td>
<td>∃ – There exists</td>
</tr>
<tr>
<td>U+2208</td>
<td>∈ – Is an element of</td>
</tr>
<tr>
<td>U+2209</td>
<td>∉ – Is not an element of</td>
</tr>
<tr>
<td>U+0020</td>
<td>– Space (i.e. a blank space)</td>
</tr>
<tr>
<td>U+00E9</td>
<td>” – Quotation Mark</td>
</tr>
<tr>
<td>U+201C</td>
<td>“ – Left Double Quotation Mark</td>
</tr>
<tr>
<td>U+201D</td>
<td>” – Right Double Quotation Mark</td>
</tr>
</tbody>
</table>

Lookup codes
- http://www.unicode.org/charts
- http://www.unicode.org/Public/UNIDATA/UnicodeData.txt
Inputting Unicode Text

The Role of the Font
A properly encoded font matches the encoding number with the character specified in the encoding scheme.

A Unicode encoded font would always display character ∃ in position x2033 (x = hex number) and ∈ in position x2209. Conversely, a properly encoded font would never display ∃ in any other position except x2033.

Keyboards Have Numbers Also
Apple OS X

Partial schematic of Apple keyboard numbers.

U.S. Keyboard
Key 1 = U+0073 = Latin Small Letter S
Shift+Key 1 = U+0053 = Latin Capital Letter S

Greek
Key 1 = U+03C3 = Greek Small Letter Sigma (σ)
Shift+Key 1 = U+03A3 = Greek Capital Letter Sigma (Σ)
Overview of Different Input Methods for Mac

There are several utilities available to help you insert or type accented letters and other special characters. To pick one that could work for you, check the grid below to see what software and hardware you need.

<table>
<thead>
<tr>
<th>METHOD</th>
<th>SOFTWARE/HARDWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Default + Accent Codes</td>
<td>These are enabled by default on all U.S. Macs.</td>
</tr>
<tr>
<td>U.S. Extended Keyboard</td>
<td>This utility significantly expands the accents available to long marks, Central European characters and more.</td>
</tr>
<tr>
<td>Unicode Hex Input</td>
<td>A utility which allows you to generate any Unicode character by pressing the Option Key plus the Language Keyboards key.</td>
</tr>
<tr>
<td>Language Keyboards</td>
<td>Change key settings to characters needed for a language. Apple includes many but others are available as freeware.</td>
</tr>
<tr>
<td>Character Palette</td>
<td>A utility which allows you to insert Unicode characters including a large number of symbols</td>
</tr>
</tbody>
</table>

Open Text Edit (Applications Folder)

Text Edit is an ideal application to test a keyboard because

- It recognizes all of Apple’s font specifications (esp Middle Eastern/South Asian)
- It switches fonts if you type a glyph not found in the current font.

U.S. Standard + Accent Codes

These accent and character codes are accessed with the Option key.

Basic Codes

To insert these characters, press the Option key (bottom of keyboard) then other "code" key to make the symbol appear.

Example 1: To input French ç (Option+C), hold down the Option, then the C key. The ç will appear.
Example 2: To input French Ç (Shift+Option+C), hold down the Shift key, then the Option key, then the C key. The ç will appear.

Other Foreign Characters

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>Option+1</td>
</tr>
<tr>
<td>¿</td>
<td>Shift+Option+?</td>
</tr>
<tr>
<td>ç,Ç</td>
<td>Option+C Shift+Option+C</td>
</tr>
<tr>
<td>œ,Œ</td>
<td>Option+Q Shift+Option+Q</td>
</tr>
<tr>
<td>ß</td>
<td>Option+S</td>
</tr>
<tr>
<td>ø,Ø</td>
<td>Option+O Shift+Option+O</td>
</tr>
<tr>
<td>å,Å</td>
<td>Option+A Shift+Option+A</td>
</tr>
<tr>
<td>æ,Æ</td>
<td>Option’ Shift+Option’ (apostrophe key)</td>
</tr>
<tr>
<td>«»</td>
<td>Option+\ Shift+Option+\</td>
</tr>
</tbody>
</table>

Currency Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Code</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>¢</td>
<td>Option+4</td>
<td>Cent Sign</td>
</tr>
<tr>
<td>£</td>
<td>Option+3</td>
<td>British Pound</td>
</tr>
<tr>
<td>¥</td>
<td>Option+Y</td>
<td>Japanese Yen</td>
</tr>
<tr>
<td>€</td>
<td>Shift+Option+2</td>
<td>Euro</td>
</tr>
<tr>
<td>f</td>
<td>Option+F</td>
<td>Dutch Florin</td>
</tr>
</tbody>
</table>
Letters with Accents (Actions)

Accented Vowels

This list is organized by Accent type. The sample shows a letter with that accent, and the Notes present any special comments about using that accent.

For the Template, the symbol "V" means any vowel. The format is to hold the first two keys down simultaneously, release, then type the vowel you wish to be accented.

<table>
<thead>
<tr>
<th>Accent</th>
<th>Sample</th>
<th>Code</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>ó,Ó</td>
<td>Option+E,V</td>
<td></td>
</tr>
<tr>
<td>Circumflex</td>
<td>ô,Ô</td>
<td>Option+I,V</td>
<td></td>
</tr>
<tr>
<td>Grave</td>
<td>ò,Ò</td>
<td>Option+`,V</td>
<td></td>
</tr>
<tr>
<td>Tilde</td>
<td>õ,Õ</td>
<td>Option+N,V</td>
<td>Only works with n,N,o,O,A</td>
</tr>
<tr>
<td>Umlaut</td>
<td>ö,Ö</td>
<td>Option+U,V</td>
<td></td>
</tr>
</tbody>
</table>

Example 1: To input the letter ó, hold down the **Option** key, then the **E** key. Release both keys then type lowercase o.

Example 2: To input the letter Ó, hold down the **Option** key, then the **E** key. Release both keys then type capital O.

Actions and Dead Keys

A specification which matches combinations of keystrokes with the right glyph. The Accented Vowel keystrokes are specified by a set of actions.

The **Option+E** key does not generate a single character but “holds” until a vowel is selected, then inserts the character for a vowel plus acute accent. The Option+E is a **dead key** which takes the user to another state where typing a = á.

Typing Practice

América  São Paulo  Übermann
déjà vu  hôtel     Ñandutí
Activate Apple Keyboards

Apple includes a number of keyboard utilities which change the mapping between the keys and the characters generated.

Activate the Keyboard (Leopard)

1. Go to the Apple menu and open Systems Preferences.
2. Click the International icon on the first row of the Systems Preferences panel.

![System Preferences Window.](image)

3. Click the Input Menu tab and check the keyboards you want activated.

![List of available keyboards on this system](image)

**Note:** If you do not see the keyboard you need to activate, you may need to install them from an OS X CD or download the most recent version of OS X from Apple. Make sure the appropriate
Localized Files are checked during the installation set-up wizard.

**Minimal Keyboards to Activate**

You will need to activate the following keyboards to complete the rest of the exercises in this handout.

- Unicode Hex Input
- U.S. Extended
- Russian and Russian Phonetic
- Logic Keyboard
- Character Palette
- Keyboard Viewer
- Any other keyboards of your choice.

**Switch Between Keyboards**

If you want to switch between the International keyboard and other keyboards, do the following:

1. Make sure you have activated your target keyboards following the instructions above. You should see an American flag icon in the upper right of your computer screen. This icon indicates that more than one keyboard is active on your system.

   ![U.S. flag for the U.S. keyboard](image)

2. Open an application such as a word-processor, HTML editor, spreadsheet or any other application in which you need to input text.

3. On the upper right portion of the screen, click on the American flag icon (🇺🇸). Use the dropdown menu to select the U.S. Extended Keyboard (🇺🇸) which symbolized as the U.S. flag with a U.
   
   **Note:** If the keyboard is grayed out, then the application is too old to support the Extended keyboard.

   The keyboard will be selected and the appropriate font selected (except for some Adobe applications).

**Change Default Keyboard**

To change the default keyboard, go to the Finder (i.e. where you navigate to folders and open applications and switch the keyboard.)
U.S. Extended Keyboard Codes

- These codes only work within the U.S. Extended Keyboard
- They work with many letters, but not all letters
- Math option codes are not available in the U.S. Extended Keyboard

<table>
<thead>
<tr>
<th>Accent</th>
<th>Sample</th>
<th>Code</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>ñ, Ý</td>
<td>Option+E,X</td>
<td></td>
</tr>
<tr>
<td>Circumflex</td>
<td>Ṽ, ö</td>
<td>Option+I,X</td>
<td>Different from U.S. Keyboard</td>
</tr>
<tr>
<td>Macron</td>
<td>ò, Ō</td>
<td>Option+A,X</td>
<td></td>
</tr>
<tr>
<td>Brave</td>
<td>Ṽ, Ō</td>
<td>Option+B,X</td>
<td></td>
</tr>
<tr>
<td>Cedille</td>
<td>Ŝ, Š</td>
<td>Option+C,X</td>
<td></td>
</tr>
<tr>
<td>Polish Ogonek</td>
<td>ơ, Ō</td>
<td>Option+M,X</td>
<td></td>
</tr>
<tr>
<td>Hachek</td>
<td>ˇ, Č</td>
<td>Option+V,X</td>
<td></td>
</tr>
<tr>
<td>Double Acute</td>
<td>ő, Ō</td>
<td>Option+J</td>
<td></td>
</tr>
<tr>
<td>Double Grave</td>
<td>ő, Ō</td>
<td>Shift+Option+Y,X</td>
<td></td>
</tr>
<tr>
<td>Dot Above</td>
<td>ȯ, Ō</td>
<td>Option+W,X</td>
<td></td>
</tr>
<tr>
<td>Dot Below</td>
<td>ȯ, Ō</td>
<td>Option+W,X,X</td>
<td></td>
</tr>
<tr>
<td>Strikethrough</td>
<td>ı, Ł</td>
<td>Option+L,X</td>
<td>Only, O,L, lowercase I</td>
</tr>
<tr>
<td>Thorn</td>
<td>ǔ, Û</td>
<td>Option+T</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift+Option+T</td>
<td></td>
</tr>
<tr>
<td>Eth</td>
<td>œ, Ŏ</td>
<td>Option+D</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shift+Option+D</td>
<td></td>
</tr>
<tr>
<td>Circle</td>
<td>ū, Ŕ</td>
<td>Option+K</td>
<td>Only u,a</td>
</tr>
<tr>
<td>Arch</td>
<td>ŏ, Ő</td>
<td>Shift+Option+S,X</td>
<td></td>
</tr>
<tr>
<td>Grave</td>
<td>ñ, Ŷ</td>
<td>Option+`V</td>
<td></td>
</tr>
<tr>
<td>Tilde</td>
<td>ẽ, Ŗ</td>
<td>Option+N,V</td>
<td>Only works with n,N,o,O,A</td>
</tr>
<tr>
<td>Umlaut</td>
<td>ŵ, Ŵ</td>
<td>Option+U,V</td>
<td></td>
</tr>
</tbody>
</table>
Unicode Hex Option Keyboard
This utility allows you to input characters based on their Unicode hexadecimal value.

Activate Keyboard
1. The Unicode Hex Input keyboard can be activated as a “keyboard” in International options within the System Preferences. See the instructions for activating a keyboard in the “U.S. International Section.”
2. Open any application such as which supports Unicode input.
3. Choose Unicode Hex Input from the International (flag icon) menu on the upper right.
4. Type Option+<the hexadecimal code value> for the character (see details below).
   Note: The code must be at least 4 digits long

Typing Exercise
<table>
<thead>
<tr>
<th>What is this sequence?</th>
<th>And this Sequence?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option+03BA</td>
<td>Option+0043</td>
</tr>
<tr>
<td>Option+03BF</td>
<td>Option+006F</td>
</tr>
<tr>
<td>Option+03B4</td>
<td>Option+0064</td>
</tr>
<tr>
<td>Option+03B5</td>
<td>Option+0065</td>
</tr>
</tbody>
</table>

Decimal Versus Hexadecimal Codes
Unicode character codes can be listed as hexadecimal (e.g. U+03BA) or decimal (954). Depending on your application, you may need one or the other.
For example: Windows ALT Codes always use the decimal value.

If Above U+FFFF
If the code is above U+FFFF (i.e. five or more hex digits), then code must be entered as two 4-digit (16-byte) sequences (or the UTF-16 Surrogate Pair).

e.g. ₪ (Phonecian Letter Mem) = U+1090C =
     Option+(D802+DDOC) release
Character Palette

The **Character Palette** is a Mac utility which allows you to insert individual accented characters, symbols and characters from other scripts.

**Activate Character Palette**

The **Character Palette** can be activated as a “keyboard” in **International** options within the **System Preferences**. See the instructions for activating a keyboard in the “U.S. International Section.”

**Open Character Map**

1. Open any application such as which supports Unicode input.
2. Choose **Show Character Palette** from the **International** (flag icon) menu on the upper right.

**Basic Symbols**

3. In the new window, switch the **View** drop-down menu to **Roman**.
4. Select the type of symbol in the left column.
5. Highlight the symbol needed, then drag the symbol into the document or click **Insert**.

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![Character Palette - Roman View Options](image)

---

**Character Palette – Roman View Options**
Roman View Options
1. Math – Math symbols
2. Arrows – Arrow variations
3. Parentheses – Bracket variations
4. Currency Symbols
5. Punctuation – Includes foreign language punctuation
6. Miscellaneous, Crosses, Stars/Asterisks – multiple symbols
7. Latin – basic English alphabet
8. Accented Latin – Accented letters and non-English symbols
9. Digits – Fractions, circled numbers, superscripts/subscripts
10. Greek – Basic Greek symbols with access to accented Greek
11. Ornamental Punctuation and Braille – more symbols

Additional Symbols
To view symbols from multiple scripts, switch the View menu in the upper left to All Characters.
About Other Language Keyboards

What Apple Provides
See list on http://tlt.its.psu.edu/suggestions/international/keyboards/mackey.html

Note: This list is reconstructed over time. Minor inaccuracies may occur.

QWERTY/Phonetic/Transliterated vs. Native Layout
Keyboards can be split into two types:

QWERTY/Phonetic/Transliterated
Keys are mapped to match English (Latin) letters and characters in other script. For instance Latin "S" would be Cyrillic "С", Latin "R" would be Cyrillic "Р" Latin "P" would be Cyrillic "Ҏ", and so forth.
Recommended for U.S. foreign language students.

Native Layout
Matches native typewriter layout
Preferred by many native (but not all) native speakers.

Third Party Keyboards
Covers scripts not supported by Apple. Many are freeware.
• http://www.redlers.com/downloadkeyboard.html
• Do a Google Search

Make Your Own!
• Ukelele – http://www.sil.org/computIng/catalog/show_software.asp?id=94
Creating Your Own Keyboard

Why On Earth....

- **Efficiency:** Palettes are good for the occasional exotic character, but becomes cumbersome when entering multiple characters over the course of a long document.
- **Accessibility:** Typing causes less strain to hand muscles than repeated mouse movements.
- **Mental processing:** Mnemonic keystrokes easier to process and again, quicker is more efficient.

Possible Scenarios (Not Already Built)

- Include most frequently used technical symbols
  - Logic Symbols
  - Currency Symbols (Global pricing?)
  - Astronomy/Meteorology (Planets, weather symbols)
  - Thermodynamics (calculus, dotted letters)
  - Chess/Poker/Mahjong publications
  - Publications on religion/spirituality
  - Most technical fields use only a fraction of the Math and other symbol blocks
- Missed PC version of a layout
  - U.S. International (PC) on the Mac
  - [http://www.brockerhoff.net/usi/index.html](http://www.brockerhoff.net/usi/index.html)
- No keyboard for your language’s orthography/region yet
- Special characters for archiving historical documents (e.g. Insular Celtic “D” = ꞏ)
Planning The Keyboard

Partial set used for this class. Installed Logic Course may have different layouts.

<table>
<thead>
<tr>
<th>Character</th>
<th>Key Stroke (Including Dead Keys)</th>
<th>Unicode Code Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>∀</td>
<td>Option+A</td>
<td>U+2200</td>
</tr>
<tr>
<td>∃</td>
<td>Option+E</td>
<td>U+2203</td>
</tr>
<tr>
<td>א</td>
<td>Option+,E (Action)</td>
<td>U+2204</td>
</tr>
<tr>
<td>∨</td>
<td>Option+V</td>
<td>U+2228</td>
</tr>
<tr>
<td>u</td>
<td>Shift+Option+V</td>
<td>U+222A</td>
</tr>
<tr>
<td>∧</td>
<td>Option+7</td>
<td>U+2227</td>
</tr>
<tr>
<td>∩</td>
<td>Shift+Option+7</td>
<td>U+2229</td>
</tr>
<tr>
<td>≡</td>
<td>Option+-</td>
<td>U+2261</td>
</tr>
<tr>
<td>≠</td>
<td>Option+,,-</td>
<td>U+2262</td>
</tr>
<tr>
<td>∈</td>
<td>Option+3</td>
<td>U+2208</td>
</tr>
<tr>
<td>∉</td>
<td>Option+,3</td>
<td>U+2209</td>
</tr>
<tr>
<td>⊃</td>
<td>Shift+Option+&gt;</td>
<td>U+2283</td>
</tr>
<tr>
<td>∅</td>
<td>Option+,&gt;,</td>
<td>U+2285</td>
</tr>
<tr>
<td>⊆</td>
<td>Shift+Option+&lt;</td>
<td>U+2282</td>
</tr>
<tr>
<td>∉</td>
<td>Option+,&lt;</td>
<td>U+2284</td>
</tr>
<tr>
<td>↔</td>
<td>Shift+Option+-</td>
<td>U+2194</td>
</tr>
<tr>
<td>→</td>
<td>Option+;</td>
<td>U+2192</td>
</tr>
<tr>
<td>←</td>
<td>Option+K</td>
<td>U+2190</td>
</tr>
<tr>
<td>¬</td>
<td>Option+L</td>
<td>U+00AC</td>
</tr>
<tr>
<td>~</td>
<td>Shift+` (Tilde Key)</td>
<td>U+007E</td>
</tr>
<tr>
<td>P</td>
<td>Option+P</td>
<td>U+2119</td>
</tr>
<tr>
<td>Q</td>
<td>Option+Q</td>
<td>U+211A</td>
</tr>
<tr>
<td>R</td>
<td>Option+R</td>
<td>U+211D</td>
</tr>
</tbody>
</table>
# Planning The Keyboard (Blank)

<table>
<thead>
<tr>
<th>Character</th>
<th>Key Stroke</th>
<th>Unicode Code Point</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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Create Keyboard in Ukelele

Create Template Based on U.S. Standard

Note: The U.S. default chosen because many math symbols already built in.

1. Open Ukelele from the Applications folder. You will see a small ukelele icon in a popup.
2. In the new layout window, select Copy of other keyboard layout. Click OK. Note: If you don’t see pop-up to create new layout, go to File » New.

3. In the file browsing window, go to Applications/Ukelele 1.83/System Keyboards/Roman/ and select U.S..keylayout.
4. A U.S. keyboard display opens. Save the keyboard as LogicClass.keylayout.
Change Basic Option Key Assignments

1. Switch to the Unicode Hex keyboard.

2. Press Option+A. You will see that å is currently assigned to this sequence. The keys with a white outline are “dead keys” associated with actions.

3. Press Option+A again, then double click on that key in the virtual layout. A pop-up window opens showing the current assignment of that key.

4. Place your cursor in the pop-up text area and highlight å. Type Option+2200 (in Unicode Hex keyboard) or &amp;#x2204;. The display changes to ∀. Click OK to close the Window.

   **Note:** Other input options include drag and drop from the Character Palette, inserting from the Character Palette or copy and paste from another (Unicode) document including Web sites.

5. Click Option+A to verify change of å to ∀.
Override a Dead Key

1. Press Option+E in Ukelele. The white outline indicates that this is currently a dead key which is associated with an action to assign an acute accent over a vowel.

2. Press Option+E again, then double click on that key in the virtual layout. A pop-up window indicating it’s a dead key appears.

3. Click the Delete option. The window to change the key assignment appears. Enter Option+2203 (Unicode Hex) for ∃.

Adding A Dead Key Action

In this section we will add the Option+\ dead key such that

• Option+\,E = Ñ
• Option+\,3 = É
• Option+\,– = ≠

In this case the Option+\ key is a dead key.

1. From the Keyboard menu select Edit Dead Key.

2. A window of predefined dead keys appears (if they exist). Click New to create a new dead key.
3. A window stating none opens. Type **Option+\**. A new state (State 1) appears in the list of states and a blank keyboard opens.

4. Click the E key location. Input ∄ or &x2204;.

5. Input the other “not” or strikethrough characters at the appropriate key locations.

6. To complete the dead key specification, from the **Keyboard** menu select **Finish Dead Key**. The basic key assignments should reappear and only the **none** state should be visible.

7. Press **Option+\**. You should see only a white rectangular outline, indicating that it is now a dead key.

**Change Name of Dead Key State**
1. From the **Keyboard** menu select **Edit Dead Key**.
2. Select State 1 from the menu. Click **OK**.
3. Type in new name (e.g. “Not Slash”) in the next window’s text field. Click **OK** to exit.

**Add A Terminator**
A terminator is what Option+\ displays until the sequence is complete. Currently Option+\ displays nothing, but it could display a “placeholder” /.

1. From the **Keyboard** menu select **Edit Dead Key**.
2. Select the state you just created in the menu. Click **Existing**. **Note:** If this option is grayed out, then make sure you have performed steps #1-2.
3. From the **Keyboard** menu select **Change Terminator**. A window with the blank dead key appears.
4. Open the **Character Palette**. Select the Punctuation option on the left.
5. Drag the “/” (solidus) character onto the dead key in the pop up. Click OK to exit.

6. To exit the dead key edit mode, select Keyboard » Finish Dead Key.

Load and Test

1. Shut down all applications.
2. Place .keylayout folder in either ~/Library/Keyboard Layouts/ (just one user account) or /Library/Keyboard Layouts/ (all accounts). See details below.
   a. On your desktop (i.e. Finder) go to the File window then New Finder Window.
   b. Open your Users folder clicking the house icon on the left (or click the Macintosh HD icon if you want to install the font for all users).
   c. Open the Library folder then Keyboard Layouts folder.
   d. Drag LogicSymbols.keylayout file into this folder.
3. Reboot the Mac, then activate keyboard from the International options in System Preferences.
4. Open TextEdit, switch to this keyboard and test option keys.
Other Options

View Keyboard Numbers in Ukelele

To view keyboard number codes,

1. Go to **Keyboard » Show Key Code**.
2. Press key to reveal the number of that key.
3. To hide the window, go to **Keyboard » Hide Key Code**.

Create the Keyboard Icon

The image associated with your keyboard is an .icns image file.

1. Find or create an image file of an appropriate shape (size not important yet) which can be legible at small sizes. File should be about 300 x 300 pixels.
   **Note:** Format can be GIF, PNG, JPG or other common image format.
2. Open **img2icns.app** (if available). A popup window opens.
3. Drag PNG image file from desktop into dotted box. The box closes and a .icns file will be created.

Drag PNG image into dotted box above to create a .icns file.

4. Check preview for size and legibility, then click the File (folder icon) to select location for output.
5. Click the **Icns** icon to select location for output. Click **Choose** to trigger conversion.

6. Give the .icns file the same name as your keyboard. For instance if your keyboard is **foo.keylayout**, then the image must be **foo.icns**.
Apple Keyboard XML

Open XML File
To view the XML, open a .keylayout file in TextEdit, BBEdit or other text edit editor.

Apple’s Official Specification

Some Notes & Example Code

<keyboard> - root and name of keyboard
<keyboard group="0" id="0" name="Logic33" maxout="1">

  <layout> (See Apple Docs)
  <modifierMap> (Controls dead keys such as Shift, Option, Caps Lock)
    <keyMapSelect> (Assigns dead keys a number)

    <keyMapSelect mapIndex="3"> <!-- Option = State 3 -->
      <modifier keys="anyOption"/>
    </keyMapSelect>

  </modifierMap>
  <keyMapSet> (Where keys/output specified)
    <key> (the assignment)
      <keyMap index="3">
        <key code="0" output="∀"/>
        <key code="1" output="&#x00df;"/>
        ...
        <key code="14" action="14"/> <!-- E key interaction w/ dead key -->
      ...
    </keyMap>

</keyboard>
<action> (Where interactions with dead keys specified)

<action id="14">
  <when state="none" output="e"/>
  <when state="Not Slash" output="Å"/>
  <when state="s1" output="&#x00e9;"/>
  <when state="s2" output="&#x00e8;"/>
  <when state="s3" output="&#x00ea;"/>
  <when state="s4" output="&#x00eb;"/>
</action>

<terminators>

<terminators>
  <when state="Not Slash" output="/"/>
  <when state="s1" output="&#x00b4;"/> <!-- x00b4 = ´ -->
  <when state="s2" output="``"/>
  <when state="s3" output="&#x02c6;"/>
  <when state="s4" output="&#x00a8;"/>
  <when state="s5" output="&#x02dc;"/>
</terminators>
Non-Western Scripts

Syllabary & South Asian
- Consonants typically are “dead keys”
- Check out the XML

Linear B Keyboard in Ukelele
http://www.geocities.com/ale_vatri/ (Allesandro Vatri)

Non-Latin Scripts (e.g. Greek, Cyrillic)
Keyboard XML differs in some ways from Latin keyboards. Use a non-Latin keyboard as a basis in Ukelele or inspect XML.

RTL Scripts
RTL direction built into the characters, but directionality of punctuation (e.g. ( )) a concern
Check out the XML as well

CJK Scripts
Often built with alternate palettes similar to the Character Palette (but with options to type character by Western pronunciation or stroke). That is another seminar…
Appendix 1: Does This Font Have My Glyph?

In many cases (e.g. phonetics, math symbols, non-Latin script), a software application will continue to output text but actually switch fonts behind the scenes.

Background Font Switch – Quick Demo

1. Open Word and switch to Unicode Hex Input or the Logic Keyboard.
2. Set the font to Palatino.
3. Type some English text, then type or insert a logic symbol, then type some English text again. **Note:** The English text after the logic symbol is likely not Palatino.

Unicode Font Info Application

This application allows you to inspect fonts by name and also Unicode blocks in each font.

Download: http://pixel.recoil.org/code/unicodelfontinfo/index.html

Character Palette

Highlight a character and click arrow besides **Font Variation** to display variants in multiple fonts. Some processing time may be involved.
Appendix 2: Fonts for Phonetics and Other Obscure Scripts

Good News

Apple and Windows both supply fonts which cover a large number of scripts (e.g. Greek, Russian Cyrillic, Hebrew, Arabic, Armenian, Chinese, Japanese, Korean, Devanagari)

Bad News

• There’s not a large selection in font variety for undersupported scripts.
• Not everything is covered

Key Fonts for Phonetics/Extended Latin/Grk/Cyr

• Lucida Grande – Free from Apple with lots of glyphs. Default system and menu font. αβγ дол āşɤʃɮ
• Monaco – Free from all with lots of glyph. Suited for plain text. αβγ дол āşɤʃɮ
• Arial Unicode MS – Free from Windows with lots of glyphs. Now available on Apple as of OS X 10.5 αβγ дол āşɤʃɮ
• Times New Roman – Actually contains Latin/Greek/Cyrillic, but not all IPA αβγ дол āş

Apple & Windows also ship with language specific fonts.
See http://tilt.its.psu.edu/suggestions/international/bylanguage/index.html

Insert Text in Phonetics (Manual Font Control)

1. Insert text using methods listed above
2. If box appears, switch to Lucida Grande or other phonetics fonts (see below)
   Note: You may need to switch

Other Phonetic Fonts

These also support Latin, Greek, Cyrillic other characters as indicated by developers.

• SIL Fonts – http://scripts.sil.org/cms/scripts/page.php?site_id=nrsi&id=FontDownloads&_sc=1
• Junicode (Medieval) – http://junicode.sourceforge.net/
• Aboriginal (Native American) – http://www.languagegeek.com/font/fontdownload.html
• Quivira (Mega Font) – http://www.grinningbit.com/quivira.php
• Arev (Sans Serif Mega) – http://tavmjong.free.fr/FONTS/

See also http://tilt.its.psu.edu/suggestions/international/bylanguage/ipa.html
Phonetic Keyboards & Palettes

- SIL (Mac) – http://scripts.sil.org/cms/scripts/page.php?site_id=nrsi&id=UniIPAKeyboard&_sc=1
- IPA Palette (Mac) – http://www.blugs.com/IPA/
- UCL Phonetic Keyboard (Win) – http://www.phon.ucl.ac.uk/resource/phonetics/
- Windows IPA Palette (Win) – http://www.davidmontero.net/Linguistics.php

Installation Instructions

See http://tlt.its.psu.edu/suggestions/international/keyboards/macfont.html

Third Party Fonts for Other Scripts

Installation Instructions:

- Free and for pay. Many academic consortia are developing fonts for undesupported scripts (as well as talented amateurs)
- TTF and OTF fonts fine (except for Arabic/South Asia)
- Try to get a matching keyboard!
- SIL Fonts
  http://www.sil.org/computing/catalog/show_software_catalog.asp?by=cat&name=font
- Alan Wood
  http://www.alanwood.net/unicode/fonts.html (Win/3rd Party)
  http://www.alanwood.net/unicode/fonts_macosx.html
- Gallery of Unicode Fonts
  http://www.wazu.jp/