Oriental \TeX by a dummy

Abstract
This article is converted from the slides presented at the conference.

What is Oriental \TeX
\begin{itemize}
\item It is a project by Idris Samawi Hamid, Taco Hoekwater and Hans Hagen.
\item The project started shortly after we started the Lua\TeX project.
\item It boosted development of Lua\TeX thanks to a grant that paid for coding Lua\TeX.
\item It also boosted the development of Con\TeXt MkIV and was a real good torture test for OpenType font support.
\item This project also costs us a whole lot of time.
\item The main objective is to let \TeX typeset high quality (traditional) Arabic.
\item Closely related to this is to extend Con\TeXt capabilities to deal with advanced critical editions.
\item In the meantime a high quality Arabic OpenType font has become part of the package.
\end{itemize}

How we proceed
\begin{itemize}
\item Of course we were a bit too optimistic when setting the time schedule for this project.
\item This is because we need to have quite some bits and pieces in place beforehand.
\item For instance, making the font and perfecting OpenType support involves a lot of trial and error and testing.
\item This is mostly due to lack of specifications, benchmarks and limitations in tools.
\item We have identified the needs for critical editions but have postponed some of that till we have opened up more of Lua\TeX.
\item We are also getting a better picture of what is needed for advanced right-to-left typesetting, especially in mixed directionality.
\end{itemize}

Simple OpenType fonts
\begin{itemize}
\item In Latin scripts we have mostly one-to-one and many-to-one substitutions.
\item This can happen in sequence (multiple passes).
\item Sometimes surrounding characters (or shapes) play a role.
\item In some cases glyphs have to be (re)positioned relative to each other.
\item Often the substitution logic is flawed and it is assumed that features are applied selectively (DTP: select and apply).
\item Of course this is unacceptable for what we have in mind.
\end{itemize}

The Oriental \TeX approach
\begin{itemize}
\item We put as much logic in the font as possible, but also provide a dedicated paragraph builder (written in Lua).
\item The so-called First-Order Analysis puts a given character into isolated, initial, middle, or final state.
\item The Second-order Analysis looks at the characters and relates this state to what characters precede or succeed it.
\end{itemize}
Based on that state we do character substitutions. There can be multiple analysis 
and replacements in sequence.

- We can do some simple aesthetic stretching and additional related replacements.
- We need to attach identity marks and vowels in proper but nice looking places.
- In most cases we're then done. Contrary to other fonts we don’t use many ligatures 
but compose characters.

**But we go further**

- The previous steps already give reasonable results and implementing it also nicely 
went along with the development of LuaTeX and ConTeXt MkIV.
- Currently we’re working on extending and perfecting the font to support what we 
call Third-Order Contextual Analysis.
- This boils down to an interplay between the paragraph builder and additional font 
features.
- In order to get pleasing spacing we apply further substitutions, this time with 
wider or narrower shapes.
- When this is done we need to reattach identity marks and vowels.
- Optionally we can apply HZ-like stretching as a finishing touch.

**Look at luatex**

(kheetawul)

- no order (khīta w [u] l)
- first order
- second order
- second order (Jeem-stacking)
- minimal stretching
- maximal stretching (level 3)
- chopped letter khaa (for e.g. underlining)

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