Arcadio 嘉略宋体 أركاديــو

Reflection on practice

Mark Zhu | EsadType 2021-23
École supérieure d'art et de design d'Amiens

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Introduction

This dissertation documents and discusses the development of the project. It first examines the typographic issues and challenges related to the context; chapter two describes the proposed design space for the typeface family and how it would address these issues; the next chapter discusses the design development of the typeface family, presenting references and states of design at various stages; and at last, the dissertation will show the testing process for the typeface, including a mock-up application built for the project.

Prior to EsadType, I had previously attended the MA Typeface Design course at the University of Reading in the UK, where I developed a focus on multi-script typeface design. Arriving in Amiens, I was hoping to take the opportunity of EsadType to develop another multi-script project, and to continue my explorations and experimentations in this area at a more advanced level.

Early on in the course, I established that the brief for my project would be "a Latin-Chinese-Arabic typeface family for digital dictionaries".

The idea originated from my personal experience with language learning. I have been studying the Arabic language for some time, and in many Arabic textbooks and dictionaries that I have used (Latin-Arabic or Chinese-Arabic), I keep noticing typographic issues that hinder the readability or even effectiveness of the books. Then I realised some of the issues actually come from the typeface design level: for example, unmatched weights or styles between scripts, or the general lack of good typefaces that support these scripts at the same time. Therefore, I decided to develop a typeface family specifically for this context.

The specific use environment of digital dictionaries is chosen because they provide a natural and complex multi-script typesetting environment, and the digital ones are also more relevant today as language learners now tend to look up words online or in an application. In addition, this context would allow me to explore some particular themes in type design, such as optical sizes and typeface design for screen.

1.Context and initial research

1.1 Issues in current digital multi-script dictionaries

I started off the project by collecting a series of dictionaries for observations and analysis. These include both multi- and mono-script dictionaries, in both digital and print format. This process helps me identify a series of type and typographic issues that need to be addressed, as well as set up a few goals that I would like my typeface project to achieve.

By examining some of the available and/or popular multi-script dictionary websites and mobile applications, I pinpointed a few specific type and typographic issues present in these dictionaries.

1.1.1 Limited choice in typefaces

One obvious observation across these dictionaries is that the diversity of typefaces are very limited: the majority of them simply use one of the few neutral sans-serif typefaces throughout; or in the case of Chinese and Arabic, many dictionaries opt for the system fonts. This results in the overall rather bland and uninteresting typographic landscape across many dictionary websites and applications, as seen in the few examples given in *Fig. 1*.

One reason for this limited diversity could be the general lack of available typeface families that support these scripts. For example, in the mainland China market, FounderType, the largest type foundry in the country, only has three Arabic typefaces in their catalogue through their partnership with TypeTogether, and none of them are designed to work with Chinese; Hanyi, the other major type foundry, has no Arabic typefaces in their collection. In the international market, there are more Arabic-Latin typefaces available, but still not many options for typefaces that cover all

(a)
1. Avaler pour se nourrir (un aliment solide ou consistant) après avoir mâché. ➜ absorber, consommer, ingérer, ingurgiter, prendre ; familier bouffer. *Manger du pain. Bon à manger.* ➜ comestible, mangeable. *Ne rien manger.* ➜ jeûner.
 – pronominal *Ce plat se mange froid.*

2. sans complément S'alimenter, se nourrir. *Elle refuse de manger.*
 – (avec un adverbe) *Manger peu, comme un oiseau. Manger beaucoup, comme quatre, comme un ogre.*
 – *Donner à manger à qqn, à un animal.*
 ◆ Prendre un repas. ➜ déjeuner, dîner, souper. *Manger chez des amis, au restaurant. locution Salle à manger.*

(b)

(c)
wǒ
1. I (代) (称自己) je; me; moi
à mon humble avis
以我之见
2. (指称我们) nous
nous deux
我等二人
notre université
我校
Les troupes de Qi nous a attaqué.
齐师伐我。
3. ("我、你"对举，表示泛指) moi; toi
Se battre pour le football au terrain de football.
足球场上你争我夺。

Fig. 1 Screenshots of a few online dictionaries. Typefaces used in these websites include Roboto, Helvetica, Tahoma, which represent the majority of the typefaces seen among the dictionaries observed for the project. Some multi-lingual dictionary websites do not define a typeface for Chinese or Arabic at all, leaving it to the fall-back system font.
Sources: (a) Le Robert dico en ligne [online], original size 12.4 x 5.6 cm.
(b) Lisaan Masry Egyptian Arabic dictionary [online], original size 11.2 x 5.3 cm.
(c) 法语助手 ("French helper"), [online], original size 6.3 x 9.2 cm.

简体 你采你的花我酿我的蜜

繁体 你採你的花我釀我的蜜

你采你的花，我酿我的蜜

nǐ cǎi nǐ de huā wǒ niàng wǒ de mì; at aylixan'gha, yol sarixan'gha

‍ئات ئايلىخانغا، يول‍ ;nǐ cǎi nǐ de huā wǒ niàng wǒ de mì
‍ سارىخانغا

Fig. 2 Screenshot of Uyghurche Xenzuche Lughet, a Uyghur-Chinese online dictionary (the Uyghur language uses the Arabic script). A typeface is defined for the Uyghur part of the entry , but unfortunately it does not have an extensive character set for Latin, and some accented letters used in pinyin falls back to the system font.
Source: Uyghurche Xenzuche Lughet [online], original size 13.3 x 4.5 cm.

I. v.tr.
1a. volgere, posare intenzionalmente lo sguardo su qcs. o su qcn.: *guardare una vetrina, guardare la gente che passa*; anche ass.: *guardare dalla finestra, guardare fuori, guardare avanti*; *guardare col binocolo, col telescopio*; *guardare di sottecchi, con la coda dell'occhio*; *guardare con insistenza, con odio, con amore*
1b. seguire una trasmissione, un programma, uno spettacolo e sim.: *guardare la televisione, guardare il telegiornale, un quiz, guardare una rivista, un balletto*
1c. sfogliare distrattamente: *guardare una rivista, un giornale*
2a. osservare con attenzione, contemplare: *guardare un quadro, una statua*; *guardare il panorama*
2b. verificare, controllare: *guardare i conti*

Fig. 3 Screenshot of the Italian dictionary of Internazionale. The typeface is Lyon, one of the few examples collected where a serif typeface is used.
Source: Dizionario italiano de Mauro [online], original size 12.6 x 6.2 cm.

three scripts. This means that when a designer takes on a Arabic-Chinese project, they would either need to spend extra effort to source and combine typefaces, or take the easy solution of using open source (such as Noto) or system fonts.

Another reason could be due to the use environment of website and digital media. For many years in graphic and typographic design, it is a general belief that sans-serif typefaces are better-suited for texts on screen, because they contain fewer details and fit better with the pixel grid of the digital screen. However, as the quality of screen and digital devices improving, these limitations have become less relevant, and designers may utilise more diverse typefaces on web and digital environments. Among the dictionaries observed for this project, there are a few examples that use typefaces other than a neutral sans-serif (such as the Italian dictionary shown in *Fig. 3*) , which already produce more refreshing typographic textures, as well as open new possibilities in design.

Therefore, the existence of a typeface family that supports Latin, Chinese, and Arabic at the same time would already have significant value for designers who work with these scripts. Within such a multi-script environment, I would also like to explore the balance between functionality and aesthetics among these scripts, in order to design a typeface family that functions well in the given typesetting environment (web and digital dictionaries in this case), and also introduces refreshing design elements to the context.

1.1.2 Un-coordinated styles between scripts

As mentioned in the previous section, many of these multi-script dictionaries have to employ different typefaces for each script, and the design of them are usually not coordinated. This results in various typographic issues, such as unmatched weights and sizes and uneven textures, which hinder the readability of the text and thus the readers' experience.

In certain scenarios, the un-coordinated styles could also cause confusion in the organization of information and hierarchy of the content. For example, in *Fig. 4*, which is a Chinese-English dictionary, the Latin has three weights while the Chinese only has two. This makes the Chinese and English content do not fully correspond to each other, even though it seems to be the intention of the designer. In addition, the boldest Latin text is heavier than the boldest Chinese, which makes the Chinese phonetics, known as *pinyin*[†], much more prominent than the other content, while in reality they should be secondary information.

As a result, having well-coordinated styles between the scripts would be a major goal for the project, so that they could be used as a effective tool to build typographic hierarchy in the context of dictionaries.

[†] The *Pinyin* (拼音) is a romanization system for the Mandarin Chinese language developped by a group of Chinese linguists in the 1950s, and is often used to denote Chinese phonetics. It is currently the official romanization system in China, and also used in some other countries and regions where Mandarin Chinese is spoken.

吧/罢〔-/罷〕

PY **ba**

DICT STROKE CHARS WORDS SENTS

▼ PLC

HZ 吧/罢〔-/罷〕

AUXILIARY

1 [indicating a suggestion, request or mild command]

咱们走**吧**。

Zánmen zǒu ba.

Let's go.

你好好儿想想**吧**！

Nǐ hǎohāor xiǎngxiang ba!

Just think it over.

2 [indicating consent or approval]

明天就明天**吧**。

Míngtiān jiù míngtiān ba.

All right, let's make it tomorrow.

好**吧**, 就这么办**吧**！

Hǎo ba, jiù zhème bàn ba!

O.K., that's what we'll do.

3 [in a leading question which asks for confirmation of a supposition]

他会来**吧**？

Tā huì lái ba?

He'll come, won't he?

Fig. 4 Screenshot from Pleco iOS application, a Chinese-English dictionary.
Source: Pleco iOS application, original size 7.1 x 9.2 cm.

跑快, 行疾 (٢) — أَثْوًا الحيوانُ / أسرعَ فى السير واستقامَ فيه

大长, 长成 (口牲) (٣) — ـت الماشيةُ / نمتْ

买收, 贿行, 赂贿 (٤) — أَثْوًا وإتْأَوةً فلانًا / رشاه

谣造, 伤中, 谤诽 (٥) — به أو عليه / وشى به

物礼, 品礼 (١) — / عطاء أَثْو

径途, 法方 (٢) — / طريقة

物获收、品产、物产的地土 إتَاء (١) ــُ الأرضِ / رَبْعُها وحاصِلُها

乳的油黄有漂 (٢) لَبَنٌ ذُو ـــِ / ذُو زُبد

Fig. 5 Entries from an Arabic-Chinese dictionary. The normal reading directions for Chinese texts are either horizontally left-to-right or vertically right-to-left, but here he Chinese texts follow the Arabic writing direction, which makes the Chinese very difficult to read. Source: 阿拉伯语汉语大词典 ("*Arabic-Chinese dictionary*", edited by Wang Peiwen, Commercial Press, 2003), original size 14.6 x 10.2 cm.

Fig. 6 Screenshot from an Arabic-English dictionary application. The designer decides to align certain elements to the left and others to the right, which results in weird white space and unnatural text flow, especially in the first section. Source: DictBox iOS application, original size 7.1 x 9.4 cm.

1.1.3 Challenges in multi-script typesetting for screen

Beyond the issues with typefaces themselves, these dictionaries also have many problems at the typography level, mostly related to the complexity of multi-script typesetting.

In mono-script typesetting, there tends to be established typographic principles which designers could follow; but for multi-script, such rules are still largely being explored and not well-defined. Among the three scripts of the project, there are some standards or conventions when typesetting Arabic-Latin or Chinese-Latin texts, due the prevalence of the Latin script; but when it comes to Arabic-Chinese or the three scripts, no such rules have been established, and many designers and typographers are still experimenting with various possibilities.

One particular element that adds to this complexity is the mixture of different writing directions. Among the three scripts, Latin writes horizontally left-to-right, Chinese either horizontally left-to-right or vertically right-to-left, and Arabic horizontally right-to-left. When typesetting these scripts together, a lot of issues arise in terms of text flow and paragraph alignment. So far, designers are still experimenting with various options, such as conforming one script to the other script's convention or a mixture of both. For example, in *Fig. 5* the designer chooses to have Chinese follow the Arabic right-to-left direction, producing unreadable Chinese texts; in *Fig. 6*, the designer mixes the Latin and Arabic alignment by aligning certain elements to the right and others to the left, which creates a disconnected text flow and strange white space.

Another challenge is the typesetting environment of web and digital media, which is quite different from the traditional medium of paper. Compared to print, the screen and other digital environments present the possibility of scrolling, which creates vastly more space for designer to work with than on a paper with defined size; digital devices also include more elements of inter-action and flexibility, which leads to a new sets of challenges in typesetting. Among the digital dictionaries collected for the pro-ject, one can notice that some designers attempt to transfer the structures and typesetting principles of the printed version to the screen (the one in *Fig. 7* for example), while others are proposing new methods specifically adapted for screen.

Therefore, within the scope of this project, besides resolving issues in type design, I would also like to take on the challenges in typography. By taking advantage of the type system created for the project, I could experiment with typesetting for multi-script digital dictionaries, and attempt to propose some potential solutions.

新华字典。

Fig. 7 Screenshot from the mobile version of Xinhua Dictionary. The application features many typographic structures and symbols similart to those in its printed version (*Fig. 8*). Source: 新华字典 (*Xinhua Dictionary*) iOS application, original size 7.1 x 11.8 cm.

Fig. 8 The same entry in a printed version of the Xinhua Dicitonary. Source: 新华字典 (*Xinhua Dictionary*) 11th edition, Commercial Press, 2013, original size 5 x 5.5 cm

1.2 Observations of type and typography in monolingual print dictionaries

In conjunction to identifying typographic issues found in current multi-script dictionaries, I also collected and observed some monolingual print dictionaries. These dictionaries usually follow more established typographic rules and traditions, and therefore may provide insights to the planning of the typeface as well as potential layout solutions for multi-script typesetting on screen.

1.2.1 Latin-only dictionary

Dictionaries of the Latin script tend to employ a variety of typographic styles to differentiate information or to create hierarchy.

For example, in *Dictionnaire Le Petit Robert de la langue française 2022* (*Fig. 9* on p. 20), a French-French dictionary, there are at least over 15 different typographic styles employed within a single dictionary entry to show various levels of information. Some major ones include:

1.2.2 Chinese dictionary

In Mainland China and some other countries and regions, the *pinyin* romanization system is the common method for native speakers and learners of Mandarin Chinese to denote the pronunciation of Chinese characters. Therefore the majority of Chinese dictionaries already include Latin letters and are naturally multi-script.

Traditionally, Chinese dictionaries tend to only employ limited typographic styles, and rely on punctuations, symbols, or other typographic elements for different information. It is possible that this is due to the limited options for Chinese text typefaces. Due to the complexity of Chinese characters and the large character set, most Chinese text typefaces offer limited numbers of styles. In addition, typesetting a dictionary would require the most extensive character set possible, which probably leave the designers of dictionaries with few choices.

In the *Xinhua Dictionary* (新华字典, *Fig. 10* on p. 22), which the most authoritative dictionary in Mainland China, the majority of the text is set in the same style of typeface, but a variety of symbols and other typographic elements are used.

1.2.3 Arabic-only dictionary

Arabic dictionaries also tend to use only one typeface or typographic style in its text, and rely on the help of punctuations, symbols, or colours. Arabic dictionaries are arranged by roots, and all words derived from the same root are grouped together.

In the dictionary *Al-Mu'jam Al-Wasīt* (*Fig. 11* on p. 24), published by the The Academy of the Arabic Language in Cairo, the main text of the dictionary essentially uses only one typographic style. Some other features are used to signify specific information.

Fig. 9 Page from the French dictionary *Le Petit Robert*.

The highlighted typographic features:

(a) The headword is set in small caps (or in capital letters if the word is a acronym), in a slightly-condensed, bold sans-serif typeface, in a size that is slightly larger than the rest of the paragraph. This treatment makes the headword the most prominent elements on a given page.

(b) Some complementary information, such as pronunciation, parts of the speech, etymology, follow directly the headword but in a smaller type size. Each piece of information is given a different treatment so that they are distinct to each other.

(c) The definition is set in a serif typeface in a regular weight, followed by an example in italic.

(d) Special notes regarding the definition, such as denoting figurative meaning (FIG.) or terms used in a specific field of studies, are in small caps, in a condensed sans serif.

(e) An arrow signifies a related word, set in lower case letters, in a bold sans serif.

(f) A quote is set between quotation marks, in italic, followed by the name of the person set in small caps, in a bold serif typeface.

(g) Antonyms are marked with a square dot and the abbreviation CONTR. set in a wide serif typeface in bold, and the antonyms themselves are set in a light condensed sans seri

Source: *Dictionnaire Le Petit Robert de la langue française 2022*, Le Robert, 2021, original size 17 x 24 cm.

2 a—ǎi

A

啊 a·丫 同"啊"(a)。另见1页ā;1页á;1页ǎ;1页à;184页hē。

(a) 啊 a·丫 助词。1.用在句末,表示赞叹、催促、嘱咐等语气(常因前面字音不同而发生变音,可用不同的字来表示):快些来～(呀)!|您好～(哇)!|同志们加油干～(哪)!2.用在列举的事项之后:纸～,笔～,摆满了一桌子。另见1页ā;1页á;1页ǎ;1页à。

AI 艻

(b) 哎 āi 艻 叹词,表示不满或提醒:～,你怎么能这么说呢!|～,你们看,谁来了![哎呀]叹词,表示惊讶。[哎哟](—yō)叹词,表示惊讶、痛苦。

(c) 哀 āi 艻 ❶悲痛(⊕悲—):喜怒～乐。❷悼念:默～。❸怜悯,同情:～怜|～怜其不幸。

锿(鎄) āi 艻 人造的放射性金属元素,符号Es。

(d) 埃 āi 艻 灰尘(⊕尘—)。

埃 āi 艻 ❶靠近:居民区～着一条河。❷顺着(一定次序):～家查问|～着号叫。另见2页ái。

唉 āi 艻 叹词。1.表示答应:～,听见了。2.表示叹息:～,一天的工夫又白费了。3.表示招呼:～,你来一下。另见3页ài。

嗳(嗳) āi 艻 同"哎"。另见2页ǎi;3页ài。

挨(**捱) ái 艻 ❶遭受,亲身受到:～饿|～打|～骂。❷困难地度过(岁月):～日子。❸拖延:他～到晚饭后才开始写作业。另见2页ái。 (e)

骏(駿) ái 艻 傻:痴～。

皑(皚) ái 艻 白(叠):～白雪。

癌 ái 艻 (旧读 yán) 生物体细胞变成恶性增生细胞所形成的肿瘤:胃～|肝～|肺～|乳腺～。

毐 ǎi 艻 用于人名。嫪毐(lào—),战国时秦国人。

欸 ǎi 艻 [欸乃]形容摇橹声:～一声山水绿。另见120页ē;120页é;120页ě;121页è。 (f)

嗳(嗳) ǎi 艻 叹词,表示否定或不同意:

22

Fig. 10 Spread form *Xinhua Dictionary*.

The highlighted typographic features:
- (a) The head-character is set in bold, in a much larger size that occupies two lines of the regular text. The character is slightly outdented to the left. The traditional version of the character, if there is one, follows the head-character, in a regular weight and a smaller size.
- (b) The entry text begin with *pinyin*, set in a light sans serif typeface, and the bopomofo (a different system to denote Chinese phonetics) set in a calligraphic kaiti style typeface.
- (c) The definitions are numbered with numerals in black circles, and set in a regular Songti typeface in regular weight, followed by examples in the same style, where the head-character is replaced by a tilde.
- (d) Certain types of definitions, such as derivative or figurative meanings, are marked with symbols where a Chinese character is positioned within a circle.
- (e) If the character is a heteronym, an additional line is added after the entry pointing to another page. This line is indented but is set in the same style as the main entry.
- (f) Specific word or phrase examples are set in square brackets.

Source: 新华字典 (*Xinhua Dictionary*) 11th edition, Commercial Press, 2013, original size 10.5 x 14.4 cm.

[Right-hand annotation column:]

Fig. 11 A page from *Al-Mu'jam Al-Wasī*.

The highlighted typographic features:
- (a) Each headword is enclosed in parentheses, and starts a new paragraph with indent.
- (b) However, if the word is the basic form of a root, or a word that does not belong to a root (pronouns, or foreign words, for example), it is preceded by a dot. All the derivative words from this root follows after and are not preceded by a dot.
- (c) Some letters enclosed in parentheses are used to signify special forms or meanings of the word: for example, (ج) precedes the plural form of the word; (مج) indicates forms that are approved by the Arabic Language Academy.
- (d) Decorated parentheses are used to show a quote from the Qu'ran.

[Highlighted dictionary entries:]

(a) (أَزَمَ) عليه ـِ أزْمًا: أزم. (تأزّم): أصابته أزمة. (الآزم): النابُ (ج) أُزُم. (الأزمة): الشِّدّة والقحط (ج) أوازم. (الأزمة ـ الأَزمة): الضِّيق، الشِّدّة.

(b) (أزا) الظلُّ ـُ أزوًا: تقلّص. و ـ اليوم: اشتدّ حرّه.
(أزى) ـِ أزيًا، وأزوًا: تقبّض.

(c) أو الصيانة أو الزينة (مج) (ج) أُزُر، وآزِرة.

(d) وفي التنزيل العزيز ﴿أَلَمْ تَرَ أَنَّا أَرْسَلْنَا الشَّيَاطِينَ عَلَى الْكَافِرِينَ تَؤُزُّهُمْ أَزًّا﴾.

24
25

2.Design space

2.1 Planning the design space

With initial ideas and research in mind, I began to define what I would like to achieve with this project, which include:

- Design a harmonised multi-script family: ensure that weights, sizing, and styles are coordinated between the scripts, so that they can be used easily and effectively in multi-script typesetting.
- Introduce novelty to the typography of online dictionaries: explore styles that are not commonly used in web typography and digital dictionaries, and offer options other than sans-serif for designers.
- Investigate new themes in type design: this includes areas that I personally have not explored, as well as those that are still new to the type design of certain scripts.

At the same time, I started to draft a design space that would fulfil the these goals, and also provide me with plenty of learning opportunities. An initial version of the design space is presented in *Fig. 12*.

Scripts

| Latin Roman + Italic |
| Chinese |
| Arabic |

Weights (variable axis)

Regular ↕ Bold

Contrasts (variable axis)

High Contrast ↕ Low Contrast
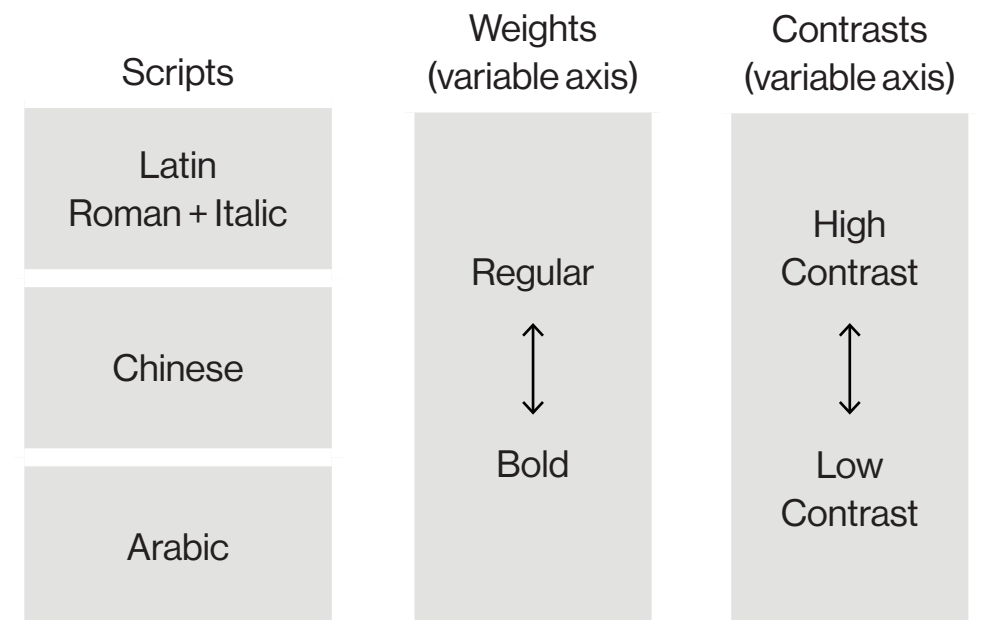
Fig. 12 Initial version of the design space for the project, February 2022.

2.2 Particular features

中文汉字

中文汉字

Fig. 13 The two main categories of Chinese typefaces are Songti (top) and Heiti (bottom). They are usually considered to be the equivalents of Serif and Sans-serif in Latin, respectively.
Typefaces: Source Han Serif (top), Founder Lanting Hei (bottom).

2.2.1 Overall styles
The main style for each of the script would be:

- Serif for Latin
- Songti for Chinese
- Naskh for Arabic

These styles are chosen because they are the primary ones used for long texts for each script. The typical typefaces in these styles would usually feature some contrast as well as stroke decorations. For these reasons, they are usually considered to be equivalents when designing multi-script typeface families involving these scripts (see *Fig. 13 and Fig. 14*).

كتابة عربية

كتابة عربية

Fig. 14 The Arabic Naskh style is based on the traditional Naskh calligraphy. While Arabic doesn't have serifs, in modern typefaces there are categories of high-contrast Naskh (top) and low-contrast Naskh (bottom), which generally correspond to Serif and Sans-serif in Latin.
Typefaces: Adobe Arabic (top), 29LT Zarid Sans (bottom).

2.2.2 Italic for Latin only

This typeface would include a secondary style for Latin only, which is the italic. This decision is made for two main reasons.

First of all, secondary styles are not common in traditional Chinese and Arabic typesetting. In Latin, it is standard to use italic together with upright roman within the same text for a variety of purposes, such as highlighting words or introducing a quote; in Chinese and Arabic, such secondary styles and usages of them are not traditional nor common, and other typographic devices are used to achieve similar functions as what italic would do in Latin. As shown in chapter 1, traditional Chinese and Arabic dictionaries do not require secondary style to be functional. Therefore secondary styles for Chinese and Arabic are not necessary for the project.

	Latin	Arabic	Chinese	Mongolian
Text	Latin	العربية	汉字	
	Latin	العربية	汉字	
	Latin	العربية	汉字	
Sans	Latin	العربية	汉字	
	Latin	العربية	汉字	
	Latin	العربية	汉字	
Informal	Latin	العربية	汉字	
	Latin	العربية	汉字	
	Latin	العربية	汉字	

Fig. 15 Design space for my final project at the University of Reading, where each script has three independent styles that can be combined and used in different ways according their typographic traditions. For example, the Informal style of Chinese, Arabic, and Mongolian is intended for setting long text, since in these script there is a tradition of setting long text with a more calligraphic style of typeface; for Latin, the informal, which is an upright italic, can be used either as a regular italic or independently like other scripts.

Secondly, I would like to explore the theme of "secondary styles in multi-script typefaces" through a different perspective. During my previous studies at the University of Reading, I developed a multi-script project consisting of Latin, Chinese, Arabic, and Mongolian (*Fig. 15*), where I proposed that each script should have an equal variety of styles, so that designers are able to typeset complex texts in any combination of the scripts. Within that project, instead of having primary or secondary styles, each script has three independent styles which can be combined and used according to their respective typographic conventions. However, this time I would like to approach it from the opposite direction: instead of providing many options for each script, I would only include a minimum selections of essential styles.

2.2.3 A contrast variable axis

The typeface family would include a variable axis of high/low contrast.

Initially, this axis is conceived to provide me with the opportunities to explore variable font technology as well as optical sizes. The low contrast variant who be more sober and simplified, and functions well for small and longer text; the high contrast variant would include some more calligraphic details and mainly for display or large text, such as the headwords. In additional, optical size is still a relatively new concept to modern Chinese and Arabic type design and typography, and this would give me some room for experimentation.

However, this idea later evolved into something else, so that it is no longer strictly an axis for optical sizes. This will be further discussed in the following chapter.

3.Design development

3.1 Initial ideation

Among the various styles proposed in the design space, I started with the regular weight of the low contrast variation. This style is intended for text purposes, so I imagined it would be the most used one within the design space, and thus require more attention.

I also made the decision to start designing the three scripts at the same time. For many multi-script typeface families currently in the market, it is quite common that one script is designed first, and later other scripts are added as demands arise. This often results in situations where the later-added scripts have to make comprises in terms of design or metrics. A more ideal situation would be that all scripts are designed at the same time, so that design decisions could be made taking all the scripts into consideration. Since this is a student project and I have the opportunity to do so, I thought this would be a more ideal workflow.

3.1.1 Legibility studies

Since the project involves the medium of screen, a complex typesetting scenario with dense information, as well as the subject of optical sizes, I immediately started with researches in legibility studies, hoping to understand what design considerations are crucial to those typesetting environments.

» **Latin**

For Latin, I looked into typefaces that are designed for screen, such as the Microsoft ClearType collection, as well as those with a micro/caption optical size, in order to understand what considerations were taken into account during their design process when it comes to designing legible type for screen.

One Latin typeface I referenced primarily is Sitka (*Fig. 16*), designed by Matthew Carter for Microsoft. It is a more recent serif typeface family designed specifically for screen, with a variety of optical sizes. A series of legibility tests were conducted along the process, to help inform design decisions at various stages (Larson and Carter, 2016, pp. 37), which makes the design decisions more convincing. Some of the main findings from their research and testing, which I considered incorporating into my project, include:

- A large x-height helps the legibility of neutral letters, but actually hurts those with ascenders and descenders;
- Narrow letters need to be made wider to improve their recognition;
- Flared terminals on c, f, and j perform better than teardrop shapes (*Fig. 17*).

Sitka Text
Sitka Display

Fig. 16 Sitka Text and Display, two optical sizes from the typeface family.

a a c c ff jj

67% 66%   44% 50%   43% 51%   22% 26%

Fig. 17 One of the letter recognition accuracy tests performed during the design process of Sitka, where teardrop terminals and flared terminals are compared. Source: Larson and Carter, 2016, pp. 50

» Chinese

Legibility studies in Chinese typeface design have been scarce, and the available ones are not conclusive. Some commercial typefaces claim certain features of their designs help improve legibility, but do not provide actual proofs to support their claims. In some cases, the claims from different designers also contradict each other. While more systematic and scientific researches are definitely needed in this area, there are still a number of recurring design elements that are generally considered to help improve the legibility of Chinese characters.

A slightly wider proportion and reduced inter-character spacing are believed to emphasize the horizontality of the text, thus improving legibility. Meiryo (*Fig. 18,* middle), a Japanese typeface designed for screen and included in the Microsoft ClearType Font Collection, and Founder Boya Song (*Fig. 18*, right), a Chinese typeface intended for newspaper publishing, both adopted this feature in their design. The designers claimed that they produced "extremely convincing results" (Microsoft ClearType and Advanced Reading Technologies Group, 2004), and "has been used by many newspaper with positive feedback" (Zhu, 2006), respectively.

Some other studies, such as the one by Chinese designer Chen Rong (2016, pp. 142; shown in *Fig. 19*), show that the information at the edges of each Chinese character is the most crucial to their recognition, and therefore more distinct character silhouettes would improve legibility. Chen applied this theory to his typeface Hanyi New Humanist Song, and argues that slightly looser inter-character spacing would assure that the elements at the edges of each character would be properly observed. This is somewhat contracting to the first point above.

Fig. 18 Comparison between Source Han Sans (left), Meiryo (middle) and Founder Boya Song (right). The latter two have a sightly wider proportion.
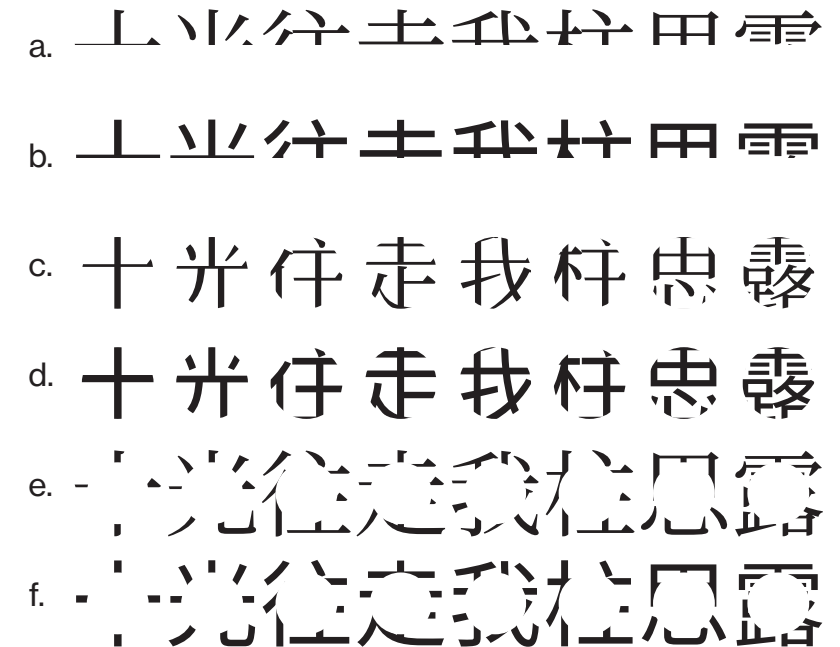
Fig. 19 Chen Rong's research on recognisability of Chinese characters involves covering different parts of the character and determine whether it is still recognisable. Chen suggests that e. and f. are the most recognisable, and therefore the most important elements of a Chinese character are those close to the four edges.
Typefaces used: Source Han Serif and Sans
Source: Recreated by the author based on an image by Chen Rong (2016, p. 142)

Another common theory is that a larger central area (*Fig. 20*) for the characters would help increase the legibility of the typeface. The central area in Chinese is comparable to the x-height in Latin, where a large central area creates more inner white space, thus improving character legibility. However, a larger central area also leads to a more mechanical and clumsy look for the design. Microsoft YaHei, a Chinese typeface designed for screen in 1997, features a rather large central area. It may have performed well on screen in the early 2000s, but today on a high-resolution screen, the characters appear abnormally large (as shown in *Fig. 21*) and thus deemed by many to be not very elegant.

Based on these initial researches, I considered experimenting with a sightly wider proportion in my design. On the other side, since a large central area would create a mechanical look, which is the opposite of what I was envisioning in terms of style, I decided to not take this into account.
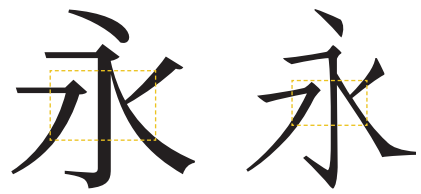
Fig. 20 Central area (中宫) refers to a optical zone where the central part of the character resides. A "large central area" describes that the strokes are more spread out towards the edges, while "small central area" means strokes are pulled towards the centre. It is comparable to x-height in Latin, as it affects the apparent size of the character; but unlike x-height, there are no clear guidelines to which the strokes align to.
Typefaces: Source Han Serif & Founder Fangsong

Fig. 21 Comparison between Microsoft YaHei (top) and Source Han Sans (bottom) Microsoft YaHei has a visibly larger apparent size.

» **Arabic**

Researches on Arabic legibility are not abundant either, and one main reference I was able to find is the doctoral research done by Dr. Nadine Chahine in 2012 for her Doctoral research at the University of Leiden in the Netherlands. One of the main conclusions from her research is that increased complexity of word formation would hinder the legibility of Arabic typefaces (Chahine, 2012, p. 229). In fact, based on testing results from her studies, when other factors remain constant, the Simplified Arabic style turned out to be the most legible, more than the traditional Naskh (Chahine, 2012, p. 216).
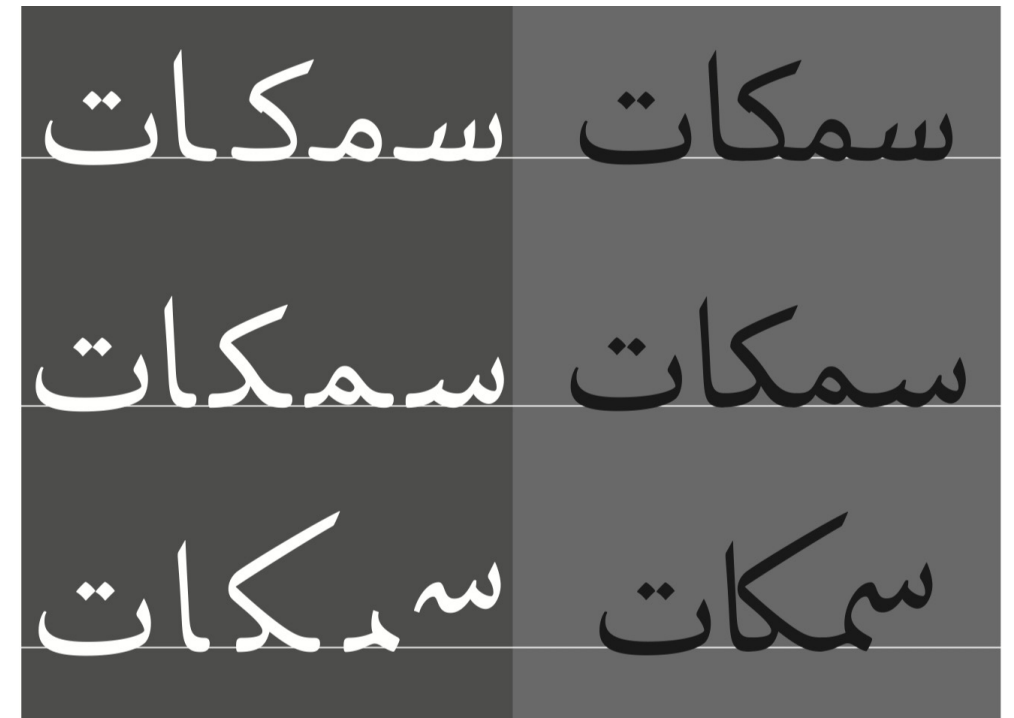
Fig. 22 A part of Dr. Nadine Chahine's research involves designing an Arabic typeface in three variants, in order to test how visual complexity and style could influence the legibility of Arabic typeface.
Source: Chahine, 2012, p. 102

However, in terms of style, Simplified Arabic might not be suitable for my project, as it is usually considered old and outdated in contemporary Arabic design scene. The Simplified Arabic style (an example of which is Yakout, shown in *Fig. 23*) was developed by Linotype in the 20th century, as a response to the technological limitations and a rising demand for faster printing at the time, and it has been largely used in newspaper printing in the Middle East (Chahine, 2012, pp. 46-47). But today, with the help of modern digital tools, Arabic designers tend to design and use typefaces that are more closer to traditional Naskh. A Simplified Arabic design would appear intentionally creating an impression of the old newspaper.

In addition, within contemporary Arabic type design, there are certain methods that are believed to help improve legibility, such as opening up the counters. As I'm still going after a modern look for my typeface, I thought the contemporary approach would fit my project much better.

3.1.2 Exploration of styles

As for the style of the typeface, the overall initial art direction was to create a modern design that performs well in the intended use environment, but also has some humanist characteristics to add some warmth. Therefore, finding the right balance between the geometric and the humanist elements became a main challenge throughout the design process.

» **Latin**

For Latin, I quickly decided on the category of "humanist slab serif". Among the typefaces I had observed, a low contrast, serif typeface intended for small sizes usually lead to a more slab serif design (*Fig. 24*). Combined with the humanist elements, humanist slab serif seemed to be a natural combination.

Fig. 24 For many Latin typefaces with multiple optical sizes, the smaller sizes usually feature a lower contrast and more robust serifs, closer to a slab serif design.
Typefaces: (from left to right) Freight Display & Micro, Source Serif Display & Caption

Fig. 23 Linotype Yakout is a very popular typeface in the Simplified Arabic style, commonly used in Newspapers in the Arab world. It features a very flat baseline, and letters that usually have four positional forms in traditional calligraphy are simplified to have only two forms.
Source: Linotype

Fig. 25 Adelle and Fedra are examples of humanist slab typefaces that are closer to what I was imagining in terms of overall impression.

方正悠宋

Fig. 26 Founder You Song, one of the few low-contrast Songti text typeface available in the Chinese market. It is also designed specifically for screen, and include simplified design details.

冬青黑体
筑紫黑体

Fig. 27 Examples of Chinese/Japanese humanist sans serif typefaces, which usually features gentle swellings in strokes and humanist decorative elements that mimic brush writing. Typefaces: Hiragino Sans (top), Founder/FontWorks Zhuzi Old Heiti (bottom)

به قطاری که ایستاده
کسی سنگ نمیزنه

Fig. 28 Modern low contrast Naskh Arabic typefaces were referenced, in order to observe how the designers interpret in traditional Naskh calligraphic model in a contemporary way.
Typeface: Aria (آریا)

» Chinese

A "low-contrast Songti" is not a common type style category for Chinese and not many references are available. I initially started with simply decreasing the contast in a regular Songti style design, but due to the complexity of Chinese characters, it was difficult to arrive at a very low contrast or a very dark weight as the Latin. I then switched to an opposite approach by starting from a Heiti design, which is an equivalent to Sans Serif in Latin, and then reintroducing contrast and decorative details. For this, I referenced some Chinese and Japanese humanist Sans Serif typefaces as a starting point (*Fig. 27*), and then some more calligraphic typefaces for inspirations of decorative details that could be exaggerated.

Besides adding calligraphic stroke decorations, another way to make Chinese typefaces appear humanist is to have a smaller central area, which brings the design closer to the calligraphic structure. However, as mentioned in the previous section, a smaller central area may lead to less inner white space and thus affecting legibility, and therefore I decided to start with a more neutral central area.

» Arabic

The Arabic would be in the Naskh style, and modern Naskh typefaces have the categories of high and low contrast (which usually correspond to serif and sans-serif in Latin). These categories fit my design space quite well.

At the same time, I was also imagining the Arabic would be more calm and static. Arabic is a connecting script, and the traditional Naskh calligraphy is also very dynamic and cursive, which makes it naturally very humanist. For this reason, I considered experimenting with introducing more static structures or geometric elements to a Naskh design, in order to balance out the cursiveness.

fslnopt

十永鷹

انبوص

3.1.3 Early sketches and testing

With all the above information gathered, I started to sketch a few letters/characters for all three scripts for the low contrast variation, which results in the sketch show in *Fig. 29*.

This version aimed for a rather sober and clean impression, while retaining certain hints of humanist influences. It features a visible wide proportion, large x-height/counters/central areas, and simplified stroked details.

However, after digitizing the sketch and testing it on screen, it turned out that this version did not work well at a normal text size. The contrast is quite low, and combined with the wide proportion, the design appears rather crude and intended for micro sizes (*Fig. 30*). Based on these testing results, I added some contrast to the design and adopted a more regular proportion, in order to create a more refined texture at normal text size.

From the low contrast variation, I was able to reduce the weights on the thins and arrive at a high contrast variation (*Fig. 32* on p. 49). At this point, my plan for the two contrast variations was still that the low contrast would be for text, and the high for display. Therefore I tried to add some adjustment to make the high contrast version more display, such as a slightly smaller central area for the Chines, and more curvature in the Arabic. The impression I was looking for was a more elegant display typeface, almost in the area of Didot.

aefghi
lmno
pstv

inrestas saloons stop inan gitan got
sameiginlega angela steven paholaista
megavitamin malate angeles saiga
template gesleept aftan setae vahvistaa
stalagmas tightening afhangt shivahs
posteens taipei voitolla lina elsie
tegmen avesse pooling mise anges sem
fellt volanie pienso hithe semen
pensionnats soen shoat avine tissot
agonia napoleons massima eant
feminises hegemonism pels passages
maise oto stolti peni vesentlig tal ling
eli planeetalle lapsilla pallissa mantoes
valval hevosten lepping insomnis mills
intensa plantsman shmoes melissa
magann seinem heitti laginn popes esel

gentpas
folhvim
今十国天
白目永鷹
البدوصاع
كخمنلعج

Fig. 31 State of design, low contrast regular, late April 2022.

gentpas
folhvim
今十国天
白目永鷹
البدوصاع
كخمنلعج

Fig. 32 State of design, high contrast regular, late April 2022.

3.2 Major decisions in art direction

With an initial design established and a general design direction in mind, I started to expand my typeface into more characters and styles. During this period, A few major design principles were established, guiding the art direction of the project.

3.2.1 Screen not as a limitation

Since the beginning of the design process, I was very conscious about the intended medium of screen, and expected that it would have some limiting effects on the design.

However, my discussions with instructors and other type designers made me gradually realize that the screen might not be a limiting factor anymore. The resolution of the screens has improved greatly over the years, some of which are even better than regular printers. Some technologies developed specifically for screen are also no longer relevant, as many common digital devices have completely disregarded them (for example, the Apple devices do not display hinting anymore). During our trip to the Netherlands, I also posed the question at Typotheque whether they have specific considerations for their multi-script projects for screen, and the answer was also "not really".

Therefore, the realization was that, I should not focus too much on the limitations of the screen, but instead see it as an opportunity to explore new possibilities in type design and typography that are not previously possible in print. This new perspective changed my design process in a few different ways.

First of all, I should not cling too much to the principles regarding type design for screen from a decade ago. Many older typefaces designed for screen and their design decisions were made for low-resolution screen, which usually involve simplified details to fit the pixel grid, or modified structures to improve legibility (*Fig. 33*). Instead, I should trust the performance of high-resolution screens, which would allow me to have more freedom in my design, and include more nuanced and refined design elements in my typefaces.

Constantia

Fig. 33 Constantia is one of the typefaces in the Microsoft ClearType Font Collection, released in 2006. Many Latin typefaces designed for screen have been focusing on features such as squarish proportions or geometric details so that they fit better to the pixel grid when rendered on screen. However, as the quality of the screen has improved significantly, these considerations may not apply anymore.

Secondly, I should rethink how the styles and variations in my design space could be used in the digital media. The print media is static and have finite space, where typeface styles are designed and used for specific sizes and purposes; but the digital media includes a lot of transformations and interactivity, and the usage of the type styles might be more flexible and fluid. So instead of being limited to to specific sizes and purposes, the contrast and weight variations in my design space could focus on providing different voices, and the designers may choose to use the variations as they see fit.

Lastly, I should take advantage of the screen and the design system of my typeface, to experiment and propose new typographic solutions to my use scenarios. Currently, the best practices of typography on digital media are still not as established as in print, with a lot of room for improvement and innovation. Especially in the area of dictionaries, the online ones tend to employ much simpler typographic layouts than printed versions (as shown in chapter 1). Therefore, I should imagine how my typeface family could be utilised to typeset a digital dictionary, which would then inform the design of different styles.

3.2.2 Multiplexing

The topic of multiplexed typefaces was brought up during conversations with instructors. After some discussions, I decided to implement it to my typeface family as one of the main features.

A multiplexed typeface (also known as duplexed or uniwidth typeface) is one where each character occupies the same advance width across various weights or styles. It is different from a monowidth typeface, where all the characters have the same width (e.g. an "i" has the same width as an "w"); in a multiplexed typeface, all the characters are still proportionally-spaced, but each of them keep their respective width when switched to another weight or style (e.g. a regular weight "n" has the same width as a bold "n").

The advantage a multiplexed typeface is that, when changing weights or styles, the selected text would always occupy the same width, thus not affecting the layout of the text. In the past, it was often used in newspaper printing, as newspaper typesetting is quite fast-paced, and not altering the text flow when changing styles of a word or a sentence proved to be useful and save time. Nowadays, this feature is often used in web and interface design, where certain interactions (e.g. hover state, as shown in *Fig. 35*) would require changing the weight or style of the text but not its overall width (Staudinger, 2021).

On the other hand, the disadvantage of multiplexing is an inevitable compromise of the proportions and the shapes of letters. Since normally in a typeface family the bolder weights would be wider in order to mainting the similar proportions as the regular, keeping the width same to the regular means that the bolder weights would be more condensed. Some type designers are strongly against this feature for this reason.

Text remains the same length regardless of weight
Text remains the same length regardless of weight
Text remains the same length regardless of weight
Text remains the same length regardless of weight
Text remains the same length regardless of weight
Text remains the same length regardless of weight

Fig. 34 In a multiplexed typeface, the width of a given text would stay the same when the weight changes.
Typeface: Bahnschrift
Source: Microsoft [online]
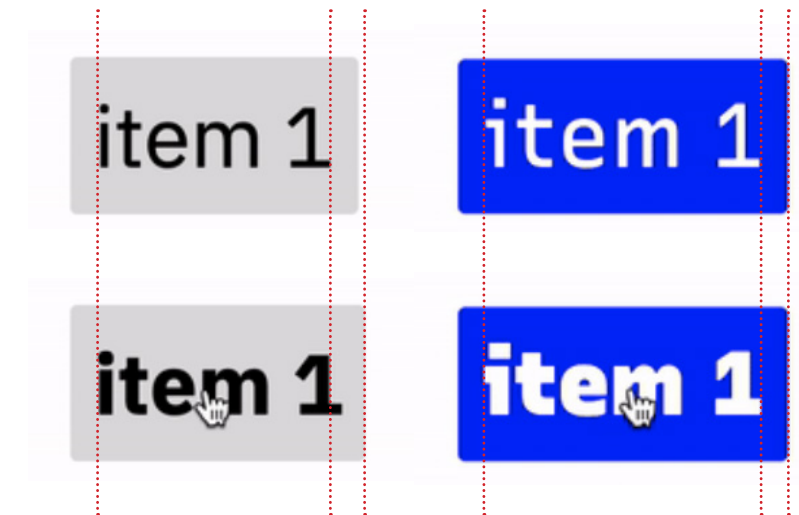
Fig. 35 Hover state is frequently used in interface design, where hovering the cursor over a text would trigger a change of style or weight. A non-multiplexed text would widen the width of the text (left), while a multiplexed one avoids this problem.
Typefaces: IBM Plex Sans (left) and Recursive (right).
Source: Lisa Staudinger [online]

The decision to make my typeface family multiplexed is based on several reasons. The most obvious one is that, as the typeface is intended for screen uses, this feature would be quite helpful for web and application design.

In addition, the change in proportions across weights would help create differentiation between styles, which is what I was looking for. The use scenario of dictionaries usually asks for a variety of distinct weights and styles, in order to help distinguish different information. Therefore, the inevitable change in proportions across weights and styles would actually be a benefit.

Lastly, this is also an opportunity to explore how the different scripts influence each other in a multi-script typeface family. While multiplexing is not a common feature for Latin or Arabic, it is actually the norm for Chinese typefaces: all Chinese characters in a typeface are confined within a 1000x1000 square frame, and changes in weight would require internal structure changes within the frames. Therefore, making this multi-script project multiplexed could be seen as an experimentation of how this Chinese feature could be translated to other scripts.

Some immediate design changes were made after multiplexing was implemented. For example, some arbitrary differences between the styles were removed, which were previously added following the logic that the high contrast variation would be more display; with multiplexing and the idea that the contrast variations do not specifically correspond to optical sizes, I decided to keep the design details consistence across the styles, and then let the multiplexing inform the changes in structures and proportions.

Fig. 36 State of design around late October, 2022, where multiplexing was first implemented in all the scripts for all the weights. From top to bottom: Low Contrast Regular, Hight Contrast Regular, Low Contrast Black, High Contrast Black. The four styles are multiplexed to each other.
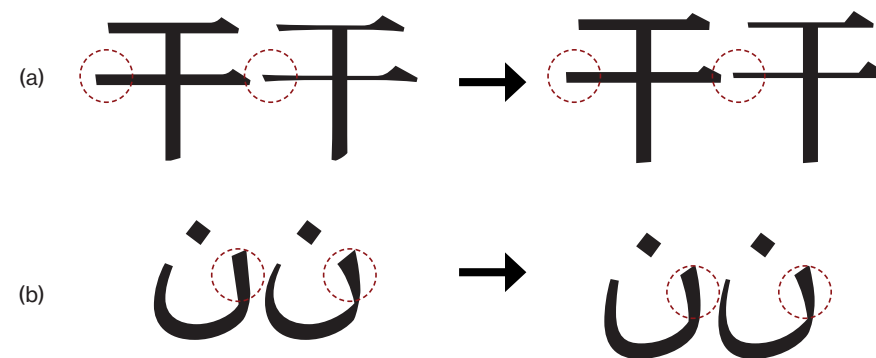
Fig. 37 Examples of design changes in terms of the relationships between styles: (a) in Chinese, previously the strokes would have more pronounced calligraphic details in the high contrast variation; now the details are kept consistent. (b) in Arabic, previously the high contrast versions would have more curved strokes; now the curvatures are kept the same.
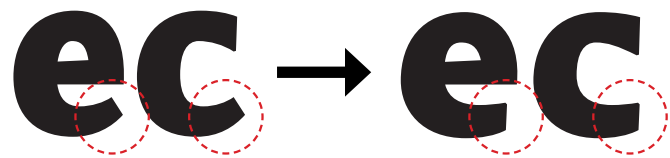
Fig. 38 Terminals are cut more vertically, so that it's more geometric, but also suggest a rotation of the broad nib pen.
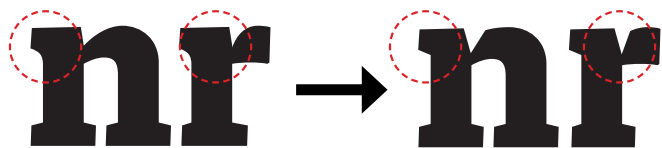
Fig. 39 Serifs are simplified, and cuts are added at the connections to imply pen movement, and also to add some sharpness to the design.
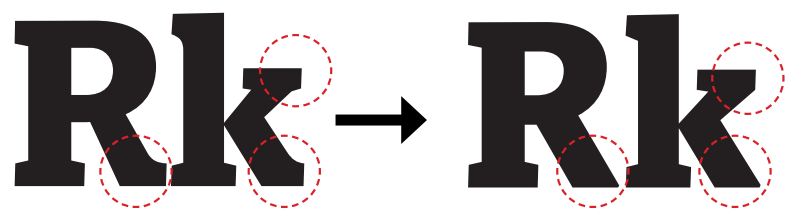
Fig. 40 Serifs on certain strokes are eliminated.
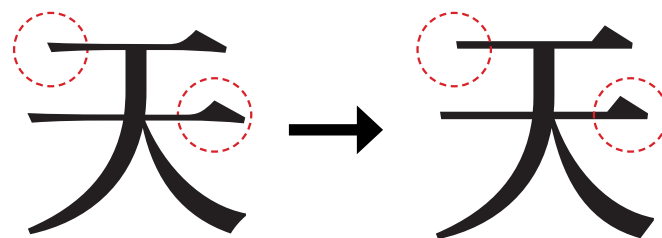
Fig. 41 Stroke details are simplified. While the these details helps add humanist impression to the design, they appear too soft and complicated.

3.2.3 Geometric vs. humanist

Throughout the design process, I continued to explore the balance between the humanist and the geometric. Eventually, I arrived at the direction of "geometric interpretation of humanist elements": the letterforms would have humanist structures or show features influenced by writing tools, but theses elements would be interpreted in a more geometric and simplified way.

» **Latin**

In Latin, the contrast and the structures of the letters would generally follow those of writing with a broad nib pen, and certain strokes would also imply the gestures of handwriting. However, the serifs and terminals would have straight edges instead of curves, and mostly cut at a more horizontal or vertical angle instead of perpendicular to the direction of the strokes.

Some letters would mix in Sans-serif sturctures and not have serifs on certains strokes. Since the Chinese and the Arabic both take inspirations from their Sans-serif-equivalant styles, I thought I would bring this influence to the Latin. The omission of serifs simplifies the forms and suggests more direct handwriting movements.

Another particular feature introduced is the straight cuts added to stroke connections. This gives the impression of a broad nib pen initiating the stroke, thus contributing to the humanist aspect of the design. In addition, this adds some sharpness to the letters, which makes the letters more impactful especially in the black weights, as those are intended for display purposes.

» **Chinese**

The style of Chinese Songti is based on printed characters found in woodblock-printed books from Song and Ming dynasties (10th - 17th centuries). It was developed when wood carvers would try to replicate the style of calligraphy at the time, but had to modify the character forms due to the hard texture of the wood. The structures were made more rigid, and decorative details were turned into geometric shapes. So in a way, this style already fits my art direction of "geometric intepretations of calligraphic writings".

I did however consider that the Chinese may appear too geometric, and experimented with including more humanist details to balance it.
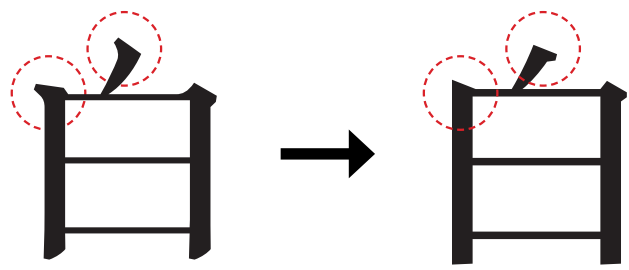
Fig. 42 In earlier versions the stroke decorations at the beginnings of vertical strokes are placed on the left instead of on the right. They were later changed into more traditional and simplified forms.
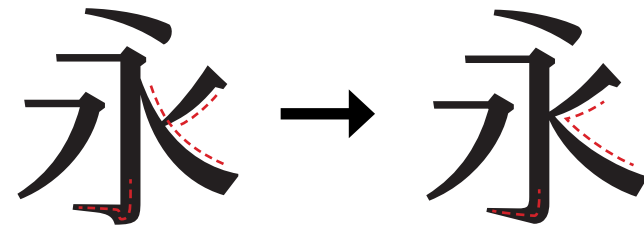
Fig. 44 The "hook" (bottom) stroke is simplified, and some connections are joined.
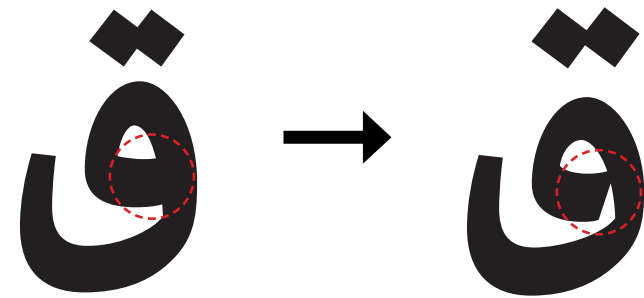
Fig. 43 Cuts at stroke connections are also introduced to the Arabic, as it makes sense for the writing tool.

In earlier versions of the Chinese I included more curves in the stroke decorations, to imply calligraphic movements. The decorative details of vertical strokes were also positioned on the left of the stroke, instead of on the right, making it rather unusual for commong Songti typefaces but bringing it closer to the calligraphic forms (*Fig. 42*). However these elements made the design look soft and too busy, going against the "simplified and modern look" I was aiming for. Eventually they were eliminated in later versions, in favor of more simple ones.

Structure-wise, I took inspirations from Heiti (the Sans-serif equivalent) typefaces or handwriting movement. For example, the hook stroke in Songti typefaces is usually an interpretation of a rather intricate calligraphic movement; in a later version of the typeface, it was simpliefied to become one single movement, closer to the Heiti form (*Fig. 44*). Some stroke connections were joined together, influenced by fast handwriting, which also helps reduce the darkness at these junctions in certain cases.

» **Arabic**

The Arabic already has a quite humanist and cursive structure, so the main consideration for Arabic was to introduce more geometric treatments. Overall I tried to calm down the energy level of the design, by keeping the structures closer to the baseline, which makes the deisgn less cursive. The teeth and certain short strokes were interpreted as completely straight strokes. I also looked into some Chinese Qur'an manuscripts, where the letterforms appear much more flat and rigid, and experiemented with incorporating it into my design, which will be discussed further in section 3.3.3.

At the same time, since Arabic is also written with a sharpedged tool, some of the stroke streatments in Latin could also be translated to Arabic. For example, the cuts at stroke connections were added to certain letters where it would make sense for the handwriting logic (*Fig. 43*).

3.3 Experimentations and discoveries

While advancing the main part of the project, I also started some researches and experimentations on the side, looking for new ideas and inspirations to incorporate into my project. Some of these did not eventually end up in the typeface, but they still led to some interesting discoveries, and contributed to my overall learning.

3.3.1 Multiplexed italic

After the decision to make the typeface multiplexed, my original plan was to make the italic also multiplexed to the Roman, which would allow the user to switch between Roman and italic without disturbing the layout. During the summer I started experimenting with the design of italic, with Sabon being my main reference, and arrived at a version as shown in *Fig. 45*. However, this did not turn out to be working as I had expected in terms of both style and function.

For the style, this version looked like a strange hybrid of two very different italics. In order to fit the italic into the Roman character width, the italic needs to be wider than usual, creating a slower and more gentle rhythm; but at the same time, the cursive structure suggests a rather fast writing speed.

On the function side, this italic did not provide enough differentiation from the Roman. Since the Italic shares the same width as the roman, the resulting texture is also closer to that of the roman, and thus does not create enough contrast. Considering my intended use scenario of dictionaries, where the italic needs to be

Fig. 45 A version of multiplexed Italic that have the same width as the Roman. Early September 2022.

Fig. 46 Testing of above version of Italic together with the Roman. The texture and the rhythl of the Italic is not distinct enough from those of the Roman.

distinct enough to signify different information, this version of the italic does not fulfil this function.

In the end, I changed my plan and developed an overall narrower italic that is only multiplexed within its own weights and contrast variations. A narrower proportion for the Italic would appear more natural, and also create distinction from the Roman, which is necessary for my use scenario. After all, the Latin Italic is in itself a separate script from the Roman, with different origins, structures, and influences, so I figured it was okay to have the Italic not multiplexed to the Roman

hamburgefontsiv

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Fig. 47 A reworked version of Italic that have narrower proportions than the Roman. The four styles of the Italic are still multiplexed to each other. Early November 2022.

3.3.2 Japanese kana and script mixing

During the summer I participated in a Japanese Kana design workshop led by Japanese typeface designer Ryota Doi, where I designed some Japanese Kana characters in the style my typeface. Although I do not have plans to complete the Kana character set for the project at the moment, learning about the Japanese script has helped me rethink how different scripts, especially those with various levels of cursiveness, could work together in a multi-script typeface family.

The Japanese script is actually a combination of three different scripts, Hiragana, Katakana, and Kanji, each with different origins, usages, and styles:

- Hiragana is derived from Chinese cursive calligraphy, and is naturally quite cursive. It includes many round structures, as well as entry and exit strokes to show brush movement.
- Katakana is developed from Chinese regular script calligraphy. It is less cursive, but still retains many calligraphic and handwriting features.
- Kanji, which is Chinese characters in Japanese, is similar to Chinese characters in Chinese. Their principal printing type style, Mincho, has the same origin as the Chinese Songti style, and is quite geometric and rigid by nature.

あ ア 私

Fig. 48 The three scripts that consist of the Japanese script: (from left to right) Hiragina, Katakana, and Kanji.
Typeface: Kozuka Mincho

In a traditional Mincho style typeface, these three scripts mix with each other and retain there own distinct style and cursiveness. This means a Japanese text is naturally muti-script, mixed with various styles of scripts and levels of cursiveness. This mixture is quite normal for Japanese readers.

This has made me rethink the relationship of different scripts in a multi-script projects, and how I would approach them during the design process. As I'm developing a project with Chinese and Arabic, I have been wondering how to address the fact that they are quite on the opposite end of the spectrum in terms of their cursiveness, and if there is a need to bridge them so that visually they match better with each other. However, looking at the Japanese script where 3 different script coexisting with each other, I realized that maybe it is not necessary: as long as they appear normal and readable to their intended readers, the various levels of cursiveness could very much work well in the same text. Moreover, their mixture could lead to a unique texture for the multi-script text, such as in the case of Japanese.

海外の日本人向けの日本語チャンネル、NHK ワールド・プレミアムは、国内で放送されているニュース・情報番組、ドラマ、音楽番組、子ども番組、スポーツ中継などから選んだ番組を 24 時間編成しています。世界の 100 以上の国・地域の約 2,000 万世帯で視聴できます。

Fig. 49 A Japanese text set in a Mincho style typeface, and it includes Kanji (in green), Hiragana (in blue), Katakana, (in red), and Latin (in black).
Source: Text from NHK website, annotation prepared by the author.
Typeface: Kozuka Mincho

あいうかこさすたてはひまイカクサスタテナフホラル

Fig. 50 A few Kana characters designed for the low contrast variation.

3.3.3 Arabic in the Chinese style

The art of Arabic calligraphy has spread far and wide, including to China, where it has developed into a unique style. This Chinese-Arabic style has always interested me, and as I'm creating a typeface including Chinese and Arabic, I decided to investigate this topic, and to see if there are any elements that could contribute to the design of the project.

Although the Chinese-Arabic calligraphic style is usually referred to as "Sini" (in Arabic: الخط الصيني, "the Chinese script"), it actually covers a variety of styles with very different formal characteristics. According to Sini calligrapher Haji Noor Deen, the Sini calligraphy could be divided into sub-categories based on the tools used (wood stick, soft brush, stone carving, etc.), the Chinese calligraphic influences they draw from, or their intended purposes. The most commonly-known style of Sini calligraphy is probably a rounded, flowing one written with soft brush (*Fig. 51*). Since this style is usually more associated with expressive display usages, I figured it would not be suitable for adaption to a text typeface.

I then looked into the calligraphy found in Chinese Qur'an manuscripts, which in fact feature a rather unique and interesting style. Most of the surviving Chinese Qur'an manuscripts are written in a peculiar variant of the muhaqqaq script, which, according to Sheila S. Blair (2006, pp. 373), may had been influenced by the works of a provincial group in eastern Anatolia/north-west Iran. This style features an overall rather flat baseline, very thin vertical strokes, exaggerated tails, and other uncommon counter shapes and letter connections. As it is a style used for Qur'anic text, I thought there might be potential to convert it into a text style.

Fig. 51 Sini calligraphy work by Haji Noor Denn, which features a rounded and fluid style.
Source: Graduate Theological Union Library [online], original size 27 x 38 cm.

Fig. 52 A spread from a Chinese Qur'an manuscript, in the 18th century. The texts are written in a more rigid style, quite different from the one in the previous image.
Source: Roseberys London [online], original size 25 x 18.5cm.

تقع بكين في الطرف الشمالي من سهل شمال الصين، تمتد الجبال في غربها وشمالها وشرقها، أما في جنوبها الشرقي فتنبسط السهول. يسود بكين المناخ القاري للمنطقة المعتدلة وتتباين الفصول الأربعة فيها تباينا واضحا، الربيع قصير والصيف ممطر ورطب والشتاء بارد قارس وطويل، أما

Fig. 53 Cambaluc, the typeface developed based on the Chinese Qur'an style.

الخط العربي هو فن وتصميم الكتابة في مختلف اللغات التي تستعمل الحروف العربية.

Fig. 54 An earlier version of the Arabic, taking inspirations from the Chinese Qur'an letterforms. The baseline is overall quite flat, and some structures and strokes are made more rigid. Early September 2022.

الخط العربي هو فن وتصميم الكتابة في مختلف اللغات التي تستعمل الحروف العربية.

Fig. 55 A reworked version of the Arabic. The structures are slightly more dynamic than the above version, making it more natural. Early November 2022.

During the summer, I attended an Arabic typeface design course led by Dr. Nadine Chahine, during which I developed a typeface project based on this specific style. Over the design process, I explored adapting manuscript letterforms into digital type, where I observed and analysed a few Chinese Qur'an manuscripts, identified key design features, and developed an Arabic typeface based on these forms. Since many letters in this style are very unusual to modern Arabic readers, the design process also included creating alternative glyphs that are closer to the traditional Naskh structures, so that they are easier to recognize. The resulting typeface is shown in *Fig. 53*.

Returning to the Arabic of my EsadType project, I then experimented with importing some of the features from the Chinese Qur'an style into my current design, attempting to create a hybrid. However, the results did not turn out to be very promising: due to the flatness of the baseline, the design appeared closer to the aforementioned Simplified Arabic style, which is something I meant to avoid. In addition, as many letter shapes are quite different from traditional Naskh, inserting these peculiar forms would hinder the readability of the typeface for regular Arabic readers.

In the end, I decided to tone down the influences from this Chinese Qur'an style, so that the core of the Arabic would still remain a more traditional Naskh design. I eliminated the unusual structures, and reduced the flatness and the rigidness of the strokes, so that they appear more fluid and natural. I still managed to retain some hints from the Chinese Qur'an style, such as the shape of the bow or the direction of the tail.
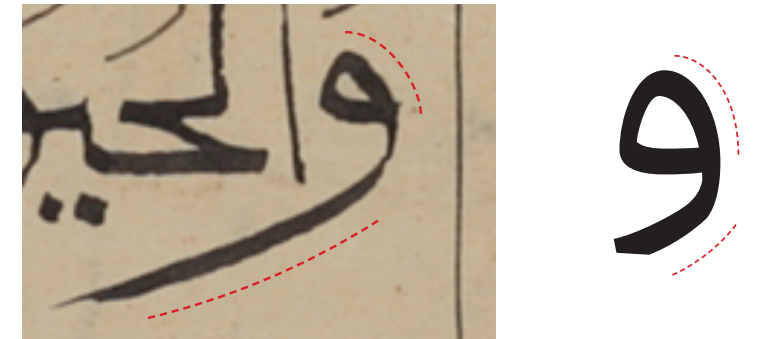
Fig. 56 In the end, only some hints from the Chinese Qur'an manuscript are kept in the typeface, such as in, where the top counter is leaning forward, and the tail is more straight and pointing downward.

Advantageous Repressibility *Nonsignificant Misapplication*

永国时字今真汉
言拉相花苦言辞

متشرف بمعرفتك
كيف تختار الكتاب

Fig. 57 State of design, low contrast regular, early February 2023.

Fig. 58 State of design, high contrast regular, early February 2023.

Advantageous

Repressibility

Nonsignificant

Misapplication

永国时字今真汉

言拉相花苦言辞

متشرف بمعرفتك

كيف تختار الكتاب

Fig. 59 State of design, low contrast black, early February 2023.

Advantageous

Repressibility

Nonsignificant

Misapplication

永国时字今真汉

言拉相花苦言辞

متشرف بمعرفتك

كيف تختار الكتاب

*Fig. 60* State of design, high contrast black, early February 2023.

4. Testing and finalizing

4.1 Building a mock-up

While developing the design of the typeface, I also started building a mock-up of a digital dictionary application in Figma, so that I could test my typeface. On a regular basis, I would import my typeface into the mock-up, display it on my phone, and to see how the typeface performs in the actual intended environment.

An early version of the mock-up focused on establishing an typograpic hiearachy, to help determine the ideal weight and sizes for the design. The "Definitions" page presents a traditional dictionary typesetting scenario, with lexicographic informations organized into a hierarchical sturcture, while the "Etymology" page includes some other typesetting situations, such as image captions and long texts. As Figma supports variable fonts, I was able to import a variable version of my typeface, and test the intermediate interpolations, and how to establish hierarchy using various combinations of the two axes (*Fig. 61*).

As the design was progressing and more letters and characters were added, I was able to expand the mock-up to include more content and script combinations. Eventually, the mock-up include a Chinese-English, a Chinese-Arabic, and a Arabic-English dictionary to showcase the different scripts and what the typeface is capable of.

白

bai

Definitions   Etymology   Related Words
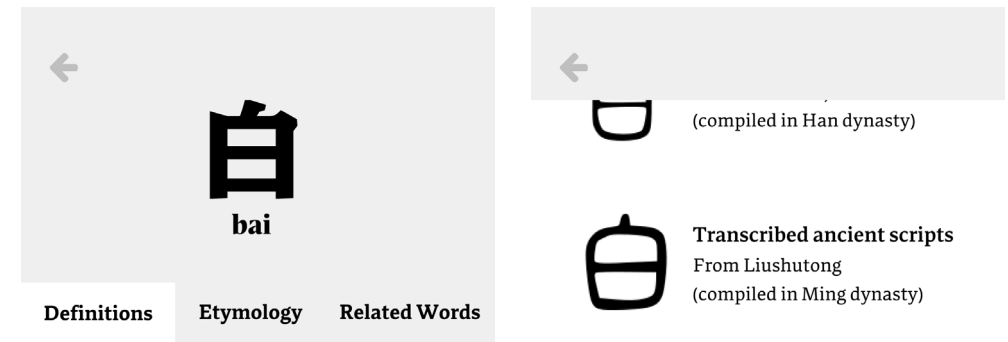
> **ADJECTIVE**

❶ white, opposite of black

白 *bai*
white color

三白 *nanbai*
three white-coloured foods

❷ bright

白天 *bailian*
daytime

> **ADVERB**

❶ in vain, to no purpose, for nothing

白干一天 *baihanlician*
do a whole day's work for nothing

(compiled in Han dynasty)

Transcribed ancient scripts
From Liushutong
(compiled in Ming dynasty)

> **CHARACTER ORIGIN**

Unclear, probably a pictogram. Luo dsuggests that it represents a thumb and is original form of mu, or more probably, pan. Alternatively, Unger (apud Schuessler) suggests that it represents an acorn, noting its use in the words oak and acorn. STEDT derives it from Proto-ino-Tibetan ba (time), hence also Proto-bodo-baro (bok, white), Limbu (pho, white) also compare Protoon-Lhmer (white, grey). However, Tchuessler finds it difficult to reconcile these forms with middle Chinese due to the lack of medial r. Instead, he proposes a derivation from Proto-Sino-Tibetan bar (white).

Fig. 61 An early version of the application mock-up. A variable version of the typeface is used, and the different weights and styles are the interpolated results of the two variable axes.

Chinese English Dictionary
英汉字典

Search

The Commercial Press

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bai

白 [bái]
white; bright; clear; wrong...

百 [bǎi]
hundred

柏 [bǎi]
cypress

佰 [bǎi]
hundred (used in banking)

拜 [bài]
do obeisance; pay a visit; sa...

白 [bái]

白 5 strokes
Independent Structure

Definitions   Etymology   Related Words

Adjectives

❶ the colour white, like the colour of snow or milk; opposite of "black".

白色 [báisè]
the white colour

他头发白了 [tā tóufa báile]
His hair has turned gray

❷ bright, illuminated by light

大白天 [báitiān]
in broad daylight

东方发白 [tā tóufa báile]
The day is dawning in the east.

Historical forms

...ll seal script
...an dynasty

Transcribed ancient scripts
Ming dynasty

Scroll left and right to view the forms

Character origin

Unclear, probably a pictogram.

Guo (1954) suggests that it represents a thumb and is original form of *"mu"*, or more probably, *"pan"*. Alternatively, Unger (apud Schuessler, 2007) suggests that it represents an acorn, noting its use in the words oak and acorn. STEDT derives it from Proto-Sino-Tibetan "ba" (time), hence also Proto-bodo-baro *"bok"*, (white), Limbu *"pho"*, (white) also compare Proto-...

Fig. 62 Screenshots from the Chinese-English dictionary application mock-up.

Arabic English Dictionary
قاموس عربي إنجليزي

Search

The Commercial Press

كتب

كَتَب to write, to note down, to...

كِتْب verbal noun of كَتَب

كَتَّب to cause to write, to make...

كَتَّب to cause to write, to make...

كُتُب books, plural of كِتَاب

كَتَب

verb I يَكْتُب

Definitions   Conjugation   Examples   R...

❶ to write, to note down, to compose, to draw up

كَتَب رِسالةً
to write a letter

كَتَب (شيئاً) على وَرقةٍ
to write (something) on a piece of paper

كَتَب هذا الكِتابَ كاتِبٌ مَشهور
a famous writer wrote this book

❷ to predestine, to preordain, to foreordain

كَتَب على شَخْص شيئاً

Definitions   Conjugation   Examples   R

Active Voice

Past (perfect) indicative

كَتَب هو	كَتَبْتُ انت
كَتَب هي	كَتَبْتِ انتِ
كَتَبا هما	كَتَبْتُما أنتما
كَتَبتا هما	
كَتَبوا هم	كَتَبْتُم أنتم
كَتَبْن هن	كَتَبْتُنَّ أنتن

Non-past (imperfect) indicative

يَكْتُب هو	تَكْتُب انت
تَكْتُب هي	تَكْتُبين انتِ
يَكْتُبان هما	تَكْتُبان أنتما
تَكْتُبان هما	
يَكْتُبون هم	تَكْتُبون أنتم
يَكْتُبْن هن	تَكْتُبْن أنتن

Fig. 63 Screenshots from the Arabic-English dictionary application mock-up.

4.2 Naming

The project is named after Arcadio Huang (黄家略), a Chinese linguist and lexicographer working in France in the early 18th century.

Huang was originally from the Fujian province of China, and brought to Paris by French misssionaries in the early 1700s. During his time in France, his works include the compilation of the first Chinese-French lexion and the first Chinese grammar in French. He translated Chinese novels into French, and introduced the Chinese radial system to the European world. It is alleged that he also worked as the Chinese interpreter of Louis XIV, and a librarian at the Royal Library cataloging Chinese books. Overall, Huang has made signifiant contribution to the development of Sinology and the spread of the teaching of the Chinese language in Frane.

Fig. 64 Screenshots from the Chinese-Arabic dictionary application mock-up.

4.3 Character Set

Character set as of early February 2023:

Latin Roman Low Contrast Regular

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z

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Latin Roman High Contrast Regular

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Latin Italic Low Contrast Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzfifl
.,:;!?-()

Latin Italic High Contrast Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzfifl
.,:;!?-()

Latin Italic Low Contrast Black

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzfifl
.,:;!?-()

Latin Italic High Contrast Black

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyzfifl
.,:;!?-()

Chinese Low Contrast Regular

一七万丈三上不东个中为主么义之也书乾了二
于云五人什仁今仔他以任休伯体作你佰元入八
公六兰关典写几刃力化十千华去发变口古句可
吃合同吠否含吴嘉四回国土在地声夏多大天太
失头好子字学宀宇宋宙小少山川已布干平广开
式形得成我拉拜文方无日时明昔是月有朝木本
朵李杯柏样梓母气水永汉江没河法注泽洪活流
火犬猫玄玉王生画略白百的目相真种秦称胡自
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式形得成我拉拜文方无日时明昔是月有朝木本
朵李杯柏样梓母气水永汉江没河法注泽洪活流
火犬猫玄玉王生画略白百的目相真种秦称胡自
色艹节花英荒行言讠计认识词诗话语轩辞里门
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失头好子字学宀宇宋宙小少山川已布干平广开
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ء أ أ ؤ إ إ ئ ئ آ آ ا ا ب بب ت تت ث ثث پ
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Arabic Low Contrast Black

ء أ أ ؤ إ إ ئ ئ ئ ئ آ آ ا ا ب يب ب ت تت ت تتت ث ثث پ
پپپ ج ججج ح ححح ح حح ج چچچ چ خخخ خ خخخ د ذ ذ ر
رز ز ژ ژ س سسس ش ششش ع ععع غ غغغ ص
صصص ض ضضض ط ططط ظ ظظظ ف ففف ق
ققق ك ككك ک ككك گ گگگ ل للل م ممم ن ننن ه
ههه و و ي يي ى ييى ى لا لا لأ لأ لإ لإ لآ لآ قٔ قٔ ف فٔ فٔ
؟ ؛ ، . ٠١٢٣٤٥٦٧٨٩

Arabic High Contrast Black

ء أ أ ؤ إ إ ئ ئ ئ ئ آ آ ا ا ب يب ب ت تت ت تتت ث ثث پ
پپپ ج ججج ح ححح ح حح ج چچچ چ خخخ خ خخخ د ذ ذ ر
رز ز ژ ژ س سسس ش ششش ع ععع غ غغغ ص
صصص ض ضضض ط ططط ظ ظظظ ف ففف ق
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Fig. 1 (c) https://www.frdic.com/dicts/fr/%E6%88%91 [Accessed 15 June 2022]

Fig. 2 http://www.uyghurche.com/cgi-bin/search.pl [Accessed 15 June 2022]

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Fig. 51 http://www.gtuarchives.org/imaging/deen.html [Accessed 10 February 2023]

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