



## Complex scripts

Although all characters may be displayed, there are various reasons why a script may not appear as expected.

### RIGHT-TO-LEFT LANGUAGES (HEBREW, ARABIC ETC.)

Arabic languages and Hebrew are written in a right-to-left direction (RTL). mPDF recognises both Arabic and Hebrew languages and reverses text direction automatically.

السَّلَامُ عَلَيْكُمْ    שָׁלוֹם

Arabic languages (but not Hebrew) also change the form of the letter depending on its position in the text e.g. these are the initial, medial, final, and isolated forms of arabic letter 'ain':

ع ع ع ع

The isolated characters are contained in the Unicode block 'Arabic' U+0600 - U+06FF.

The initial, medial and final forms are contained in Unicode Blocks 'Arabic Presentation Forms' A and B (U+FB50 - U+FDFF, U+FE70 - U+FEFE). Note that quite a large number of fonts contain the isolated characters but not the presentation forms. Fonts used with mPDF must contain the 'Arabic Presentation Forms' in order to display arabic text correctly. mPDF automatically converts letters to their initial/medial/final forms in several languages: arabic, persian/farsi, urdu, sindhi and pashto.

Arabic text is used for many different languages e.g. persian/farsi, urdu, pashto etc. These languages often contain letters unique to that language. 'Arabic' fonts do not always contain the full set of arabic characters necessary for all languages.

Other RTL languages (using other alphabets) are reversed in order, but not otherwise processed, by mPDF e.g. Syriac, Thaana, N'Ko, and Samaritan.

### INDIC LANGUAGES

Indic languages are also complex scripts which require some processing of characters before display. For example some vowels consist of 2 characters, to be placed before and after the adjacent consonant e.g.

U+0D1C + U+0D4C [vowel AU] = [written together as &#x0D1C;&#x0D4C;]

ജ + ഌ = ജ്ജ്

Consonant conjuncts are where two adjacent characters are written as a single 'conjunct' form e.g.

प + लृ = प्लृ

mPDF can support some of these languages, but requires specially prepared font files that are unique to mPDF. Supported languages: Bengali, Devanāgarī, Gujarāṭī, Gurmukhī, Kannada, Malayalam, Oriya, Tamil, Telugu

আসসালামু আলাইকুম নমস্ते नमस्कारो नमस्ते வணக்கம்!

Complex scripts **not** supported: Khmer, Sinhala, Tibetan, Myanmar (Burmese), Balinese

### VERTICAL WRITING

Vertical writing is not supported by mPDF (e.g. Mongolian and Phags-pa) although the individual characters can be displayed using suitable fonts.

## COMBINING DIACRITICS

In Unicode, letters with diacritics (e.g. ÁáĂăÄä) are usually represented as a single character e.g. Unicode U+0196 is an A Umlaut. There are 4 blocks in Unicode of diacritics or 'marks' which can be used to combine with adjacent letters: Combining Diacritical Marks (U+0300 - U+036F), Combining Diacritical Marks Supplement (U+1DC0 - U+1DFF), Combining Marks for Symbols (U+20D0 - U+20FF) and Combining Half Marks (U+FE20 - U+FE2F).

Software applications use special positioning information stored in OpenType font files to reposition the diacritic/mark depending on the context. mPDF does not support this repositioning and is dependent on the font design and original placement of the diacritic:

Á á Ä ä Ä ä i (Precomposed characters: DejaVu Sans Condensed)

Á á Ä ä Ä ä i (Using diacritics: DejaVu Sans Condensed)

Á á Ä ä Ä ä i (Arial Unicode MS)

Á á Ä ä Ä ä i (Times New Roman)

Á´ á´ Ä` ä` Ä¨ ä¨ i¨ (Courier New)

**It is recommended to use precomposed characters whenever possible with mPDF.**

# Unicode Supplementary Planes

The original Unicode allocated characters between x0000 and xFFFF (65,536 characters). This 'Basic Multilingual Plane' supported most characters in common use, including a large number of Unified Chinese-Japanese-Korean characters (CJK). Later the Unicode standard was extended to 16 Planes.

The first plane (plane 0), the Basic Multilingual Plane (BMP), is where most characters have been assigned so far.

Plane 1, the Supplementary Multilingual Plane (SMP), is mostly used for historic scripts such as Linear B, but is also used for musical and mathematical symbols.

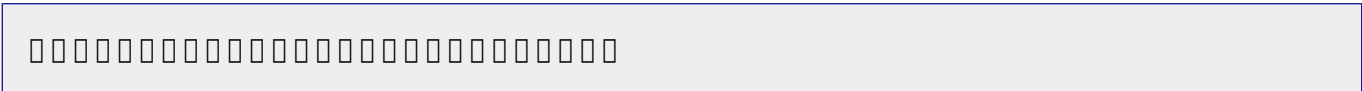
Plane 2, the Supplementary Ideographic Plane (SIP), is used for about 40,000 Unified Han (CJK) Ideographs.

mPDF version 5 supports fonts containing characters from all Unicode Planes. By choosing the correct font, almost every single character from Unicode 5 can be displayed in a PDF file.

## UNICODE SUPPLEMENTARY MULTILINGUAL PLANE (SMP OR PLANE 1) U+10000 - U+1FFFF

### Gothic text

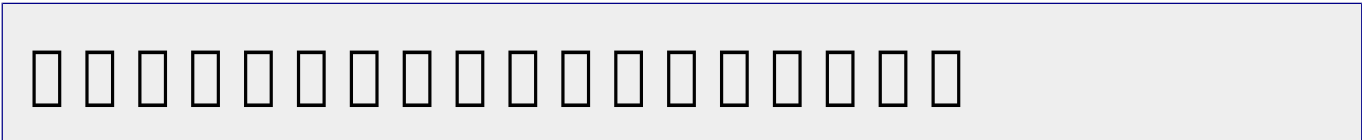
This paragraph shows Gothic text. These characters lie in the Unicode Supplementary Multilingual Plane U+10330 - U+1034F.



Font: MPH2BDamase (damase\_v.2.ttf) available from: [http://www.wazu.jp/gallery/views/View\\_MPH2BDamase.html](http://www.wazu.jp/gallery/views/View_MPH2BDamase.html)

### Egyptian Hieroglyphics

This paragraph shows Egyptian Hieroglyphics. These characters lie in the Unicode Supplementary Multilingual Plane U+13000 - U+1342F.



Font: Aegyptus.otf available from: <http://users.teilar.gr/~g1951d/>

SMP contains mainly ancient scripts - see <http://mPDF1.com/manual/index.php?tid=451> for full list.

mPDF uses a different method to embed fonts in the PDF file if they include characters from SMP or SIP, because the characters cannot be represented by a 4 character hex code 0000-FFFF. This method is less efficient than the default method, and it can be suppressed by adding the font name to the array 'BMPonly' in the config\_fonts.php configuration file.

Note that the DejaVu fonts distributed with mPDF and (GNU)FreeSans and FreeSerif fonts do contain a few characters in the SMP plane, but most users will not require them and by default they have been added to the array 'BMPonly'.





## TRUETYPE COLLECTIONS

TrueType Collections (.ttc files) contain more than one font. mPDF treats each font separately by defining the TTCfontID array in the config\_fonts.php configuration file.

This example uses the Windows MingLiU fonts, which consist of 2 files containing 6 fonts (note that mingliub is not a Bold variant):

Font collection file (mingliu.ttc) contains the following fonts:

- [1] MingLiU (mingliu) Regular
- [2] PMingLiU (pmingliu) Regular (Proportional)
- [3] MingLiU\_HKSCS (mingliu\_hkscs) Regular

Font collection file (mingliub.ttc) contains the following fonts:

- [1] MingLiU-ExtB (mingliu-extb) Regular
- [2] PMingLiU-ExtB (pmingliu-extb) Regular (Proportional)
- [3] MingLiU\_HKSCS-ExtB (mingliu\_hkscs-extb) Regular

The following text includes characters from both BMP and SIP:

```
□ □ □ □ □ □ □ □
□ □ □ □ □ □ □ □
□ □ □ □ □ □ □ □
```

This is the entry in the config\_fonts.php configuration file:

```
$this->fontdata = array(
...
    "mingliu" => array(
        'R' => "mingliu.ttc",
        'TTCfontID' => array (
            'R' => 1,
        ),
        'sip-ext' => 'mingliu-extb',
    ),
    "pmingliu" => array(
        'R' => "mingliu.ttc",
        'TTCfontID' => array (
            'R' => 2,
        ),
        'sip-ext' => 'pmingliu-extb',
    ),
    "mingliu_hkscs" => array(
        'R' => "mingliu.ttc",
        'TTCfontID' => array (
            'R' => 3,
        ),
        'sip-ext' => 'mingliu_hkscs-extb',
    ),
    "mingliu-extb" => array(
        'R' => "mingliub.ttc",
        'TTCfontID' => array (
            'R' => 1,
        ),
    ),
    "pmingliu-extb" => array(
        'R' => "mingliub.ttc",
        'TTCfontID' => array (
            'R' => 2,
        ),
    ),

```

```
),
"mingliu_hkscs-extb" => array(
    'R' => "mingliub.ttc",
    'TTCfontID' => array (
        'R' => 3,
    ),
),
...
);
```

This is the HTML code:

```
<div style="font-family:mingliu;"> &#40706; &#40742; &#40772; &#40784; &#40802; &#40809;
&#x23289; &#x2328a; </div>
<div style="font-family:mingliu_hkscs;"> &#40706; &#40742; &#40772; &#40784; &#40802; &#40809;
&#x23289; &#x2328a; </div>
<div style="font-family:pmingliu;"> &#40706; &#40742; &#40772; &#40784; &#40802; &#40809;
&#x23289; &#x2328a; </div>
```