

# Introduzione a X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X

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Pochi mesi fa hanno finalmente visto la luce, dopo lunga gestazione, i font STIX (<http://www.stixfonts.org>). È una buona occasione per scrivere un'introduzione a X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X che possa servire a chi vuole cominciare ad adoperare il motore di composizione X<sub>Ǝ</sub>T<sub>E</sub>X, scritto da Jonathan Kew, mediante il formato X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X. Questo documento usa proprio i font STIX che sono basati sul noto Times New Roman, in una versione adattata a X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X da Khaled Hosny e inclusa nella T<sub>E</sub>X Live 2010.

## 1 Come si pronunciano X<sub>Ǝ</sub>T<sub>E</sub>X e X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X

La pronuncia più diffusa nel mondo di lingua inglese è, con le convenzioni IPA, /'zi:tɛx/ oppure /'zi:tɛk/. In altre parole, all'usuale pronuncia di T<sub>E</sub>X si aggiunge 'si' con la esse sonora di 'rosa' (quella che i tedeschi usano per 'sieben', se si fosse incerti sulla corretta pronuncia italiana di 'rosa'); l'accento tonico va sulla 'i'. Analogamente viene pronunciato X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X (ma con l'accento sulla 'a' che può diventare il dittongo 'er' come in 'name').

Il primo carattere non è una 'chi' dell'alfabeto greco, come l'ultimo, ma una 'ics'. Dunque un'ammissibile pronuncia italiana sarebbe /kse'tɛk/; i puristi del greco potrebbero dire /kse'tɛx/ (se legati alla pronuncia classica) o /kse'tɛx/ (il greco moderno pronuncia aperta la epsilon). Qualcuno preferisce la pronuncia palindroma, l'autore dissente.

Ciò che potrebbe stupire è che l'inizio del capoverso precedente è stato composto scrivendo

La pronuncia più diffusa nel mondo di lingua inglese è, con  
le convenzioni `\acro{IPA}`, /'zi:tɛx/ oppure /'zi:tɛk/.

Il comando `\acro` è un comando personale per ridurre il corpo negli acronimi; per il resto, gli altri caratteri, compresi quelli IPA, sono stati inseriti direttamente in un editor Unicode (Aquamacs, su Mac OS X). Il font usato nel documento, cioè STIX, contiene i caratteri necessari e quindi non c'è bisogno di acrobazie e di pacchetti aggiuntivi solo per stampare un certo carattere. Per la precisione, la 'e rovescia' nel nome è il carattere Unicode U+018E: Ǝ.

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## 2 Breve storia

Jonathan Kew, che allora lavorava per la SIL, un'organizzazione che si occupa di linguistica (<http://www.sil.org>), pubblicò nel 1996 una versione di T<sub>E</sub>X che chiamò T<sub>E</sub>XG<sub>X</sub>. La particolarità di T<sub>E</sub>XG<sub>X</sub> era che poteva impiegare i font di sistema del Mac OS 7.5, purché fossero basati sulla tecnologia QuickDraw GX della Apple. Questa tecnologia si basava, per i font, sul nuovo formato TrueType e avrebbe dovuto finalmente mettere a disposizione crenature, legature, scelta di caratteri basata sul contesto, scrittura bidirezionale e tanto altro.

Purtroppo era in atto lo scontro con il formato Type1 della Adobe che vinse. Il formato TrueType rimase, ma la tecnologia GX sparì quasi subito. Con essa morì anche il progetto T<sub>E</sub>XG<sub>X</sub>, ma Jonathan Kew non si diede per vinto e, con la comparsa di Mac OS X, produsse un nuovo motore tipografico basato su T<sub>E</sub>X a cui diede il nome X<sub>Ǝ</sub>T<sub>E</sub>X, nel 2004. Inizialmente il programma girava solo su Mac OS X, ma fu poi adattato anche ai sistemi GNU/Linux e Windows nel 2006. Dal 2007 fa parte della distribuzione T<sub>E</sub>X Live.

Una descrizione delle primitive di X<sub>Ǝ</sub>T<sub>E</sub>X si trova in Robertson (2010b). Altri interessanti documenti sono la guida *The X<sub>Ǝ</sub>T<sub>E</sub>X companion*, curata da Michel Goossens (Goossens 2010) e quella di David J. Perry (Perry 2010). Esiste anche un progetto di documentazione a <http://wiki.xelatex.org/doku.php>.

La versione di X<sub>Ǝ</sub>T<sub>E</sub>X con cui è stato composto il documento è la 0.9997.

## 3 Che cos'è X<sub>Ǝ</sub>T<sub>E</sub>X

La caratteristica principale di X<sub>Ǝ</sub>T<sub>E</sub>X è che può adoperare senza bisogno di installazioni particolari tutti i font noti al sistema che siano in formato OpenType o TrueType. Questi font sono dotati di tabelle interne con cui X<sub>Ǝ</sub>T<sub>E</sub>X è capace di creare al volo la struttura dati che nel T<sub>E</sub>X tradizionale risiede nei file TFM. Nel caso di Mac OS X, anche i font che usano la tecnologia ATSUI sono disponibili (Hoefler Text, Skia e Zapfino, per esempio). Rimane intatta la possibilità di servirsi di tutti i font che si adoperano normalmente con L<sup>A</sup>T<sub>E</sub>X o PDFL<sup>A</sup>T<sub>E</sub>X.

Altra importante caratteristica di X<sub>Ǝ</sub>T<sub>E</sub>X è che lavora direttamente con file in codifica Unicode, cioè UTF-8 oppure UTF-16. Questo esclude alcuni editor di testi che ancora non gestiscono questo formato, in particolare T<sub>E</sub>XnicCenter. Tuttavia esistono molti altri editor, anche multi-piattaforma, che non hanno problemi al riguardo, un elenco non completo è nella tabella 1; il simbolo ✓ indica che l'editor è disponibile per la piattaforma indicata, se è tra parentesi occorre qualche trucco per farlo funzionare. Aquamacs è una versione di Emacs particolarmente studiata per Mac OS X, mentre T<sub>E</sub>XShop è un ambiente completo che funziona solo in questo sistema; T<sub>E</sub>Xworks è sviluppato dallo stesso Jonathan Kew sul modello di T<sub>E</sub>XShop. Non sono elencati editor a pagamento.

Con T<sub>E</sub>Xworks è possibile annunciare nello stesso file che deve essere interpretato con la codifica UTF-8 e che lo vogliamo compilare con X<sub>Ǝ</sub>L<sup>A</sup>T<sub>E</sub>X. Basta che compaiano, fra le prime venti del file, le righe

```
% !TEX encoding = UTF-8
% !TEX program = xelatex
```

Tabella 1. Editor di testi per  $\text{X}\_{\text{L}}\text{A}\_{\text{T}}\text{E}\_{\text{X}}$

	GNU/Linux	Mac OS X	Windows
TeXworks	✓	✓	✓
Texmaker	✓	✓	✓
TexMakerX	✓	✓	✓
Emacs	✓	✓	✓
XEmacs	✓	(✓)	✓
Vim	✓	✓	✓
Kile	✓	(✓)	(✓)
TeXShop		✓	
Aquamacs		✓	

Con TeXShop la sintassi è leggermente diversa, ma TeXworks comprende anche questa variante (non viceversa):

```
% !TEX encoding = UTF-8 Unicode
% !TEX TS-program = xelatex
```

L'ordine delle due righe è irrilevante.

Si possono indicare a Emacs (o XEmacs o Aquamacs) le stesse impostazioni scrivendo, alla fine del file,<sup>1</sup>

```
%%% Local Variables:
%%% coding: utf-8
%%% mode: latex
%%% TeX-engine: xetex
%%% End:
```

Essendo righe che cominciano con %, non c'è pericolo a scriverle comunque. Si può specificare la stessa serie di valori in altro modo, scrivendo nella *prima* riga del file

```
% -*- coding: utf-8; mode: latex; TeX-engine: xetex; -*-
```

Si può anche mischiare fra inizio e fine, ricordando che i valori impostati sulla prima riga hanno la precedenza rispetto a quelli alla fine.

Con gli altri editor non c'è nulla di simile, a parte forse Vim.

## 4 Compatibilità

Il motore di composizione  $\text{X}\_{\text{L}}\text{A}\_{\text{T}}\text{E}\_{\text{X}}$  è basato su TeX nel senso che contiene tutte le primitive definite da Knuth e ne aggiunge di proprie. Perciò, a parte la faccenda delle codifiche, è perfettamente

<sup>1</sup>Occorre però AUCTeX almeno nella versione 11.86 per impostare la variabile TeX-engine con il motore di compilazione da usare. A oggi Emacs e XEmacs forniti con alcune distribuzioni GNU/Linux basate su Debian hanno ancora la 11.85; Aquamacs, invece, ha la 11.86.

compatibile con gli usuali formati. Un file che non contenga caratteri a 8 bit né riferimenti a font di sistema può essere compilato con  $\text{T}_{\text{E}}\text{X}$  o  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  senza alcuna modifica. Le distribuzioni  $\text{T}_{\text{E}}\text{X}$  come  $\text{T}_{\text{E}}\text{X}$  Live o  $\text{M}\text{i}\text{K}\text{T}_{\text{E}}\text{X}$  forniscono un eseguibile che carica il formato creato a partire da `latex.ltx` e che si chiama `xelatex`. Un semplice documento come

```
\documentclass[a4paper]{article}
\begin{document}
Hello world!
\end{document}
```

produce con  $\text{PDF}_{\text{L}}\text{A}_{\text{T}}\text{E}_{\text{X}}$  e con  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  lo stesso risultato. Tuttavia  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  non scrive direttamente un PDF, bensì un file intermedio in formato XDV (un'estensione del formato DVI) che viene convertito in PDF dal driver `xdvipdfmx`. La conversione è automatica e, se non si specifica un'apposita opzione all'atto della compilazione, il file XDV viene rimosso.

L'eseguibile contiene anche  $\text{Sync}_{\text{T}}\text{E}_{\text{X}}$ , l'estensione che permette il collegamento tra sorgente e PDF; questa caratteristica richiede qualche impostazione del visualizzatore PDF e dell'editor, si consultino i manuali dei vari programmi al riguardo.

A  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  manca ancora il supporto completo alla microtipografia; al momento è disponibile solo la protrusione nel margine: il pacchetto `microtype` non ha effetto, al momento.

I formati grafici che sono compresi da  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  sono PDF, EPS, PNG, JPEG e anche alcuni altri di minore interesse, vista la loro incompatibilità con gli altri motori  $\text{T}_{\text{E}}\text{X}$ .

Quasi tutti i pacchetti  $\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  sono compatibili con  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$ ; fanno ovviamente eccezione quelli che richiedono particolari primitive del motore di composizione o capacità del driver di stampa. Per i pacchetti che non comprendono da sé il driver usato per produrre il PDF può essere necessario specificare l'opzione `dvipdfm` o `dvipdfmx`; questo *non* va fatto per quei pacchetti che sanno individuare da soli il motore adoperato, cioè `graphicx`, `color`, `xcolor` e `hyperref`. Per quest'ultimo non è opportuno specificare l'opzione `unicode`.

Esistono due pacchetti nati proprio per  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$ : `fontspec` e `polyglossia`. Il primo definisce una serie di comandi per facilitare l'accesso ai font di sistema gestiti da  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$ , il secondo invece impiega alcune caratteristiche di  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  per migliorare il supporto alle varie lingue ed è pensato come sostituto di `babel`, con il quale però è in larga parte compatibile, nel senso che i comandi e gli ambienti sono molto simili. Il primo è praticamente obbligatorio, il secondo è facoltativo.

È ovviamente incompatibile con  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  il pacchetto `inputenc`, dal momento che  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  lavora solo con Unicode (e quindi, di solito, con file in codifica UTF-8). Per dire la verità,  $\text{X}_{\text{E}}\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$  è capace di leggere e interpretare file anche in altre codifiche, ma ormai è giunto il tempo di convertirsi a UTF-8.

## 5 Installazione

Sui sistemi GNU/Linux si installi la distribuzione  $\text{T}_{\text{E}}\text{X}$  Live 2010 seguendo le istruzioni di ([Gregorio 2010](#)); alla fine della procedura, tutti i font OpenType forniti con la  $\text{T}_{\text{E}}\text{X}$  Live saranno disponibili.

Sui sistemi Mac OS X si installi la distribuzione  $\text{Mac}_{\text{T}}\text{E}_{\text{X}}$  che però ha bisogno di un'operazione supplementare. Nel Finder si aprano due finestre e con il menù 'Go to Folder...' si

vada in `/Library/Fonts` in una e in `/usr/local/texlive/2010/texmf-dist/fonts/opentype` nell'altra. Nella seconda finestra vedremo alcune cartelle; si copino tutte le sottocartelle di queste nella prima finestra, trascinandole tenendo premuto il tasto 'Alt', omettendo le cartelle chiamate 'lm' e 'tex-gyre' se, durante l'installazione di MacTeX si sono già installati i font Latin Modern e TeX Gyre.

Ripetere la procedura con la cartella `/usr/local/texlive/2010/texmf-dist/fonts/truetype`, perché XeTeX può usare anche questi font, evitando di sostituire qualcosa di già presente (con la TeX Live 2010 è il caso di Asana Math).

Su un sistema Windows ci dovrebbe essere una strada simile a questa. Purtroppo non esiste ancora un modo per rendere facilmente disponibili al sistema i font della distribuzione TeX Live, perché solo GNU/Linux si appoggia alle stesse librerie adoperate da XeTeX, mentre Mac OS X e Windows hanno il loro metodo.

## 6 Il mio primo documento XeLaTeX

La struttura di un documento XeLaTeX è del tutto simile alla solita, con la differenza che mancheranno le chiamate di `fontenc` e `inputenc` (il primo può rivelarsi utile se si ha bisogno di qualche font tradizionale). Assumeremo l'uso di TeXworks; le righe iniziali sono comunque convenienti anche con altri editor, perché comunicano dati essenziali a chi apre il file.

```
% !TEX encoding = UTF-8
% !TEX program = xelatex
\documentclass[a4paper]{article}
\usepackage{fontspec}
\usepackage{polyglossia}
\setmainlanguage{italian}

\usepackage{metalogo,lipsum}

\begin{document}
\title{Un documento}
\author{A. U. Tore}
\maketitle

Questo è il mio primo documento composto con \XeLaTeX{},
nel quale usiamo i font Latin Modern, tanto per cominciare.

\lipsum[1]
\end{document}
```

Chiediamo il pacchetto `metalogo` solo per avere disponibile il comando `\XeLaTeX` e `lipsum` per generare un capoverso. Si vede una rappresentazione ridotta del risultato nella figura 1.

La semplice chiamata di `fontspec` sceglie automaticamente i font Latin Modern, vedremo più avanti come specificarne altri. Si noti anche la differenza fra `polyglossia` e `babel`: con il

# Un documento

A. U. Tore

18 dicembre 2010

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Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Figura I. Un esempio di documento

primo la lingua principale va specificata non come opzione al pacchetto, ma tramite il comando `\setmainlanguage`.

Vediamo un esempio un po' più complicato, il risultato è nella figura 2. Il sorgente è

```
% !TEX encoding = UTF-8
% !TEX program = xelatex
\documentclass{article}
\usepackage{fontspec}
\usepackage{mathpazo}
\setmainfont{TeX Gyre Pagella}

\usepackage{polyglossia}
\setmainlanguage{italian}

\usepackage{metalogo,lipsum,amsmath}

\begin{document}
\title{Un altro documento}
\author{A. U. Tore}
\maketitle

In questo documento usiamo un font diverso, basato sul
Palatino di Hermann Zapf. Per la matematica adoperiamo
il font tradizionale PaZo. Una formula molto importante è
\[
(a+b)^{n} = \sum_{k=0}^{n} \binom{n}{k} a^{k} b^{n-k}.
\]
\lipsum[2]

\end{document}
```

Notiamo qui il primo uso di `fontspec` per specificare un font di sistema. Il progetto `TeX Gyre` mira a realizzare versioni OpenType dei font 'standard' delle stampanti PostScript; uno di questi è la versione del Palatino, chiamato 'TeX Gyre Pagella'. Sotto questo nome lo si trova con l'applicazione Font Book su Mac OS X; sui sistemi GNU/Linux esistono programmi che esaminano i font disponibili e dai quali si può desumere il nome.

Il comando `\setmainfont` specifica il font principale del documento. Ci sono gli analoghi `\setsansfont` e `\setmonofont` con cui si specificano il font senza grazie e quello a spaziatura fissa. Se non li si usa, rimangono quelli normali, cioè Latin Modern Sans e Latin Modern Typewriter. Nel caso particolare dobbiamo chiamare `mathpazo` prima di scegliere il font principale, perché lo fa anche quel pacchetto e quindi occorre porre rimedio, visto che il Palatino scelto da `mathpazo` non è OpenType.

Lasciando perdere questo dettaglio necessario solo perché vogliamo un font matematico corrispondente, vediamo le opzioni principali disponibili con `fontspec` nella tabella 2.

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$$(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}.$$

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Figura 2. Un documento di esempio con un font diverso



Tabella 2. Principali opzioni nella scelta di un font

```
\setmainfont{TeX Gyre Schola}
Questo è un testo di esempio, con numeri 123, altri numeri 456 e anche
7890. ?Le ``virgolette" e l'apostrofo verranno?
```

```
\setmainfont[Numbers=OldStyle]{TeX Gyre Schola}
Questo è un testo di esempio, con numeri 123, altri numeri 456 e anche
7890. ?Le ``virgolette" e l'apostrofo verranno?
```

```
\setmainfont[Ligatures=TeX]{TeX Gyre Schola}
Questo è un testo di esempio, con numeri 123, altri numeri 456 e anche
7890. ¿Le “virgolette” e l’apostrofo verranno?
```

```
\setmainfont[Ligatures=TeX,Numbers=OldStyle]{TeX Gyre Schola}
Questo è un testo di esempio, con numeri 123, altri numeri 456 e anche
7890. ¿Le “virgolette” e l’apostrofo verranno?
```

L'opzione `Ligatures=TeX` non è strettamente necessaria, ma come si vede chiaramente è utile a chi non è abituato a usare caratteri Unicode per certi segni come l'apostrofo e le virgolette alte; se la specifichiamo, possiamo inserire apostrofo e virgolette al modo usuale, così come il punto interrogativo rovescio dello spagnolo con `?`` e non con il carattere Unicode `¿`. Nei primi due esempi infatti le virgolette e l'apostrofo sono sbagliati perché il documento li chiede come `'`, ```` e `''` rispettivamente, cioè al solito modo TeX. Lo stesso vale per specificare il trattino medio con `--` e quello lungo con `---`: in questo documento le due combinazioni producono infatti `-` e `—`. Di fatto l'opzione è comunque conveniente perché i font a spaziatura fissa usati nell'editor rendono difficile distinguere fra i vari trattini. Con il font Monaco usato per scrivere questo articolo avrei infatti

```
trattino      -
trattino medio -
trattino lungo -
```

ed è evidente il problema nel rivedere ciò che si è scritto. L'alternativa è di usare un font a spaziatura proporzionale anche nell'editor.

## 7 Un po' più a fondo su `fontspec`

I comandi principali del pacchetto `fontspec`, di Will Robertson e Khaled Hosny ([Robertson e Hosny 2010](#)), sono, come abbiamo visto,

```
\setmainfont
\setsansfont
\setmonofont
```

Naturalmente è possibile specificare come font principale uno senza grazie con `\setmainfont`. Un comando utile di `fontspec` è `\newfontfamily` che richiede una sintassi leggermente diversa:

```
\newfontfamily{<comando>}[<opzioni>]{<font>}
```

dove *<comando>* servirà per usare questa famiglia; ne vedremo un uso nel prossimo paragrafo, intanto diamo un esempio:

```
\newfontfamily{\greekfont}[Ligatures=TeX]{Old Standard}
```

Vediamo le opzioni più comuni che possono essere date a questi comandi: l'istruzione

```
\setmainfont[Ligatures=TeX,Numbers=OldStyle]{Linux Libertine O}
```

sceglierà il font Linux Libertine con numeri 'minuscoli' come nel seguente brano,

Nel 1978 uscì la prima versione di T<sub>E</sub>X che era molto diversa dalla versione quasi definitiva del 1982. In seguito—nel 1989—venne diffusa la versione davvero definitiva, chiamata T<sub>E</sub>X 3. La volontà di Donald E. Knuth è che alla sua morte il numero di versione di T<sub>E</sub>X sia portato a  $\pi$ .

In questo documento il font senza grazie è Gill Sans, che è stato definito con

```
\setsansfont[Ligatures=TeX,Scale=MatchLowercase]{Gill Sans}
```

in modo che l'occhio del carattere sia compatibile con quello del font principale. Nel caso di questo documento non sarebbe davvero necessario, ma se come font senza grazie scegliessimo T<sub>E</sub>X Gyre Adventor (simile ad Avant Garde) avremmo

Font principale e font senza grazie (con `Scale=MatchLowercase`)

Font principale e font senza grazie (con `Scale=MatchUppercase`)

Font principale e font senza grazie (con `Scale=0.75`)

Font principale e font senza grazie (senza specificare `Scale=...`)

e la differenza salta agli occhi. A `Scale` si può dare un valore scelto fra `MatchLowercase` e `MatchUppercase` oppure un numero che indica l'ingrandimento o la riduzione, come nell'opzione possibile `Scale=0.75`.

L'opzione `Ligatures` può avere altri valori, per scegliere legature speciali. Per esempio con

```
\setmainfont[Ligatures={TeX,Historic}]{Linux Libertine O}
```

si avrebbe

stretto, Acton, fjord

da confrontare con

stretto, Acton, fjord

che si otterrebbe senza specificare `Historic`. Si noti che la legatura in ‘fjord’ è normalmente inserita senza bisogno di nulla, se è presente nel font. Il font di questo documento non possiede le legature ‘antiche’, per mostrarle si è adoperato Linux Libertine.

Come si fa a sapere quali siano le caratteristiche di un font? Lo si può fare con il comando dal terminale `otfinfo`. Nel caso di Linux Libertine, si vede che la directory `/usr/local/texlive/2010/texmf-dist/fonts/opentype/libertine` contiene `fxlr.otf` (purtroppo questa è stata la scelta dello sviluppatore) e possiamo dare il comando

```
otfinfo -f /usr/local/texlive/2010/texmf-dist/fonts/\
opentype/libertine/fxlr.otf
```

(la barra rovescia alla fine indica che va tutto su una riga) ottenendo

<code>aalt</code>	Access All Alternates
<code>c2sc</code>	Small Capitals From Capitals
<code>case</code>	Case-Sensitive Forms
<code>ccmp</code>	Glyph Composition/Decomposition
<code>csp</code>	Capital Spacing
<code>dlig</code>	Discretionary Ligatures
<code>fin</code>	Terminal Forms
<code>frac</code>	Fractions
<code>hlig</code>	Historical Ligatures
<code>kern</code>	Kerning
<code>liga</code>	Standard Ligatures
<code>lnum</code>	Lining Figures
<code>mark</code>	Mark Positioning
<code>mkmk</code>	Mark to Mark Positioning
<code>nalt</code>	Alternate Annotation Forms
<code>onum</code>	Oldstyle Figures
<code>pnum</code>	Proportional Figures
<code>salt</code>	Stylistic Alternates
<code>sinf</code>	Scientific Inferiors
<code>smcp</code>	Small Capitals
<code>ss01</code>	Stylistic Set 1
<code>ss02</code>	Stylistic Set 2
<code>ss03</code>	Stylistic Set 3
<code>ss04</code>	Stylistic Set 4
<code>ss05</code>	Stylistic Set 5
<code>sup</code>	Superscript
<code>tnum</code>	Tabular Figures
<code>zero</code>	Slashed Zero

Si può cercare nel manuale di `fontspec` a che cosa corrisponda ciascuna caratteristica. Per esempio scopriamo a pagina 29 che `csp` viene gestita con `Letters=UppercaseSmallCaps`:

TESTO IN MAIUSCOLO

#### TESTO IN MAIUSCOLO

Nella prima riga il testo è composto in maiuscole; nella seconda riga, lo stesso testo diventa in maiuscoletto. È possibile aggiungere una caratteristica quando lo si desidera con il comando `\addfontfeatures` che prende come argomento una lista di opzioni. Per esempio si potrebbe definire

```
\newcommand{\spacedlowsmallcaps}[1]{\%  
  \addfontfeatures{Letters={UppercaseSmallCaps,SmallCaps},  
    LetterSpace=10}#1}}
```

e il testo `\spacedlowsmallcaps{Titolo di paragrafo}` diventerebbe, con il font Linux Libertine,

#### TITOLO DI PARAGRAFO

La coppia di graffe protegge la modifica delle caratteristiche, in modo che non si propaghi; naturalmente occorre che il font scelto possieda le caratteristiche necessarie. Il font di questo documento non le ha, per esempio; tuttavia si può ugualmente scrivere in MAIUSCOLETTO. Infatti il font principale del documento è impostato con

```
\setmainfont[Ligatures=TeX,  
  SmallCapsFont={TeX Gyre Termes},  
  SmallCapsFeatures={Letters=SmallCaps}]{XITS}
```

Si veda l'ampio manuale di `fontspec` per scoprire tutto ciò che c'è da sapere. Nel nostro caso perdiamo qualcosa, cioè i numerosi caratteri che compaiono nel font STIX e non sono presenti in Termes.

Un 'difetto' di questa situazione è che non è possibile descrivere le *features* dei font in modo generico: alcuni ne hanno molte, altri ne hanno poche; anche la stessa *feature* può dare risultati diversi in font differenti, per esempio non è detto che le legature 'antiche' siano le stesse. La gamma dei caratteri disponibili con ciascun font va sperimentata; a tal proposito può essere utile il programma `otfinfo`, ma si tenga presente che esiste qualche programma più amichevole come 'Font Book' che può dare informazioni utili. Tuttavia un uso appropriato di comandi personali può limitare i problemi che possono nascere se cambiamo il font di un documento.

La sintassi di `otfinfo` per esaminare un font è

```
otfinfo <opzione> <nome del file>
```

dove <opzione> è una delle opzioni descritte di seguito.

- i Elenca varie informazioni sul font.
- s Elenca gli alfabeti disponibili.
- f Elenca le caratteristiche (*features*) presenti nel font.
- z Dice se il font possiede diversi disegni per vari corpi.

- p Mostra il nome PostScript del font.
- a Mostra il nome della famiglia del font: questo è il nome da passare a `fontspec`.
- g Elenca i caratteri presenti.
- t Elenca le tabelle di dati comprese nel font.

In appendice si può vedere il risultato di alcune delle opzioni sul font principale di questo documento.

## 8 Più lingue con **polyglossia**

L'apertura a Unicode ha reso evidenti certi limiti di `babel` a cui il pacchetto Πολιγλωσσία, cioè **polyglossia**, cerca di porre rimedio. L'autore è François Charette ([Charette 2010](#)). Ne abbiamo già visto un uso semplice: per un documento in una sola lingua non c'è da scrivere più di

```
\usepackage{polyglossia}
\setmainlanguage{italian}
```

e questo imposta per tutto il documento le regole tipografiche, le parole fisse e la sillabazione per la lingua scelta. Le lingue per le quali è presente un modulo, magari non ancora completo, sono elencate con il nome per impostarne l'uso nella tabella 3.

Tabella 3. Lingue disponibili con `polyglossia`

albanian	amharic	arabic	armenian	asturian
bahasai	bahasam	basque	bengali	brazil
breton	bulgarian	catalan	coptic	croatian
czech	danish	divehi	dutch	english
esperanto	estonian	farsi	finnish	french
galician	german	greek	hebrew	hindi
icelandic	interlingua	irish	italian	lao
latin	latvian	lithuanian	lsorbian	magyar
malayalam	marathi	norsk	nynorsk	occitan
polish	portuges	romanian	russian	samin
sanskrit	scottish	serbian	slovak	slovenian
spanish	swedish	syriac	tamil	telugu
thai	turkish	turkmen	ukrainian	urdu
usorbian	vietnamese	welsh		

Non per tutte le lingue è disponibile la sillabazione; in questo caso, a differenza di `babel` che in mancanza di regole usa quelle dell'inglese americano, **polyglossia** rinuncia a dividere le parole.

Un documento a più lingue va impostato scegliendo la lingua principale e quelle secondarie:

```
\usepackage{polyglossia}
\setmainlanguage{italian}
\PolyglossiaSetup{italian}{indentfirst=false}
```

```
\setotherlanguages{spanish,russian,slovak}
\setotherlanguage[variant=polytonic]{greek}
```

La terza riga serve per modificare la scelta standard di `polyglossia` che, per l'italiano, fa rientrare anche il primo capoverso dopo un titolo di sezione.

Come si vede nell'ultima riga, le lingue possono ricevere opzioni che però possono essere modificate quando si vuole. Qui abbiamo scelto il greco politonico; se avessimo un brano in greco monotonic lo scriveremmo

```
\begin{otherlanguage*}[variant=monotonic]{greek}
Η Αθήνα είναι η πρωτεύουσα της Ελλάδας.
\end{otherlanguage*}
```

Per esempio, il nome di una figura è  $\Sigma\chi\tilde{\eta}\mu\alpha$  in greco politonico, mentre è  $\Sigma\chi\eta\mu\alpha$  in greco monotonic.

Gli ambienti e i comandi messi a disposizione da `polyglossia` sono gli stessi di `babel`, con la differenza che è possibile impostare una lista di opzioni, come nell'esempio precedente. Quindi si hanno i comandi `\selectlanguage` e `\foreignlanguage` e gli ambienti `otherlanguage` e `otherlanguage*`, con le stesse proprietà di `babel`. Invece di

```
\begin{otherlanguage}{spanish}
Madrid es la capital de España y de la
Comunidad de Madrid, que es uniprovincial.
\end{otherlanguage}
```

si può usare

```
\begin{spanish}
Madrid es la capital de España y de la
Comunidad de Madrid, que es uniprovincial.
\end{spanish}
```

con convenzioni analoghe per tutte le lingue specificate nel preambolo. L'eventuale opzione va data dopo il nome della lingua (per esempio, `\begin{greek}[variant=monotonic]`).

Il pacchetto collabora con `fontspec`: se è stata definita una famiglia di font con il nome `\greekfont`, le parti in greco dopo la dichiarazione `\selectlanguage{greek}` o racchiuse negli ambienti appositi saranno composte con quella famiglia. Analogamente accade per ogni lingua se è definita una famiglia con l'opportuno nome. Per esempio, per limitazioni del font STIX, le due parole greche per il nome delle figure sono state composte nel font Old Standard, per mezzo della dichiarazione

```
\newfontfamily{\greekfont}[Ligatures=TeX,
Scale=MatchUppercase]{Old Standard}
```

nel preambolo. Il font Old Standard ha un supporto praticamente completo per il greco antico, oltre che per gli alfabeti cirillici. Le due parole sono state ottenute scrivendo

Per esempio, il nome di una figura è  
`\begin{greek}[variant=polytonic]\figurename\end{greek}`  
 in greco politonico, mentre è  
`\begin{greek}[variant=monotonic]\figurename\end{greek}`  
 in greco monotonic.

Ecco un altro esempio di greco antico:

Πάτερ ἡμῶν ὁ ἐν τοῖς οὐρανοῖς·  
 ἀγισθῆτω τὸ ὄνομά σου·  
 ἐλθέτω ἡ βασιλεία σου·  
 γενηθῆτω τὸ θέλημά σου,  
 ὡς ἐν οὐρανῷ καὶ ἐπὶ γῆς·  
 τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δός ἡμῖν σήμερον·  
 καὶ ἄφες ἡμῖν τὰ ὀφειλήματα ἡμῶν,  
 ὡς καὶ ἡμεῖς ἀφήραμεν τοῖς ὀφειλέταις ἡμῶν·  
 καὶ μὴ εἰσενέγκῃς ἡμᾶς εἰς πειρασμόν,  
 ἀλλὰ ῥῦσαι ἡμᾶς ἀπὸ τοῦ πονηροῦ,  
 ὅτι σου ἔστιν ἡ βασιλεία καὶ ἡ δύναμις καὶ ἡ δόξα  
 εἰς τοὺς αἰῶνας· ἀμήν.

che è stato composto dal testo seguente.

Ecco un altro esempio di greco antico:

```
\begin{verse}
\begin{otherlanguage*}{greek}
Πάτερ ἡμῶν ὁ ἐν τοῖς οὐρανοῖς·\\
ἀγισθῆτω τὸ ὄνομά σου·\\
ἐλθέτω ἡ βασιλεία σου·\\
γενηθῆτω τὸ θέλημά σου,\\
ὡς ἐν οὐρανῷ καὶ ἐπὶ γῆς·\\
τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δός ἡμῖν σήμερον·\\
καὶ ἄφες ἡμῖν τὰ ὀφειλήματα ἡμῶν,\\
ὡς καὶ ἡμεῖς ἀφήραμεν τοῖς ὀφειλέταις ἡμῶν·\\
καὶ μὴ εἰσενέγκῃς ἡμᾶς εἰς πειρασμόν,\\
ἀλλὰ ῥῦσαι ἡμᾶς ἀπὸ τοῦ πονηροῦ,\\
ὅτι σου ἔστιν ἡ βασιλεία καὶ ἡ δύναμις καὶ ἡ δόξα\\
εἰς τοὺς αἰῶνας· ἀμήν.\\
\end{otherlanguage*}
\end{verse}
```

Se si vuole usare un particolare font per l'alfabeto cirillico, invece di definire una famiglia per ogni lingua, si può definire una famiglia collettiva `\cyrillicfont` che sarà scelta per ogni lingua che impieghi quell'alfabeto. Uno studioso che abbia bisogno del greco antico e del russo potrebbe scegliere Old Standard per entrambi, definendo `\greekfont` come prima e dando

```
\newcommand{\cyrillicfont}{\greekfont}
```

In questo modo il testo

```
\begin{otherlanguage*}{russian}
Россия --- государство, расположенное
в~Восточной Европе и Северной Азии.
\end{otherlanguage*}
```

verrebbe composto come

Россия — государство, расположенное в Восточной Европе и Северной Азии.

usando Old Standard. Si noti l'uso di ~ invece del carattere Unicode U+00A0 che non sarebbe distinguibile da un normale spazio.

## 9 Matematica

Con la  $\text{\TeX}$  Live 2010 è giunto anche il pacchetto sperimentale `unicode-math` (Robertson 2010a) che rende possibile usare i font matematici specifici per Unicode. Al momento sono disponibili i font STIX e Asana Math. Il primo è basato, come detto, su Times New Roman, il secondo è fondato su Palatino. Con un preambolo come

```
\documentclass[a4paper]{article}
\usepackage{amsmath}
\usepackage{unicode-math}
\setmainfont[Ligatures=TeX]{TeX Gyre Pagella}
\setmathfont{Asana Math}
```

i nostri documenti matematici saranno composti come al solito, ma con la possibilità supplementare di scrivere le formule con caratteri Unicode. Per i font STIX si dovranno sostituire le ultime due righe con

```
\setmainfont[Ligatures=TeX]{XITS}
\setmathfont{XITS Math}
```

Per esempio il codice

```
\begin{displaymath}
\Gamma(\zeta)=\int_{0}^{\infty}t^{\zeta-1}e^{-t}\,dt
\end{displaymath}
```

produrrà

$$\Gamma(\zeta) = \int_0^{\infty} t^{\zeta-1} e^{-t} dt$$

Non è questo l'unico vantaggio, sebbene possa rendere più leggibile un sorgente  $\text{\LaTeX}$ . Il font STIX contiene centinaia di simboli e parecchi alfabeti completi: si veda la tabella 4, i simboli



mostrati accanto a ciascun comando dicono quali alfabeti o parti di essi sono disponibili: lettere latine maiuscole o minuscole, greco maiuscolo o minuscolo, cifre. Per esempio, i simboli accanto a `\mathup` dicono che questo alfabeto dispone di lettere latine e greche, oltre che delle cifre; i simboli accanto a `\mathscr` dicono che sono disponibili le lettere latine (maiuscole e minuscole); con `\mathcal` ci sono solo le lettere latine maiuscole. Alcuni di questi alfabeti hanno anche altri simboli, per esempio con `\mathbb` si possono stampare  $\mathbb{Y}\mathbb{I}\mathbb{\pi}$ ; si veda nella lista dei simboli in appendice.

Nelle impostazioni normali i comandi `\mathscr` e `\mathcal` sono sinonimi. Tuttavia con i font STIX è disponibile una variante in modo che il risultato di `\mathcal` sia simile a quello originale di Knuth (solo per le lettere latine maiuscole); la si ottiene dando anche il comando

```
\setmathfont [range={\mathcal,\mathbfcal},StylisticSet=1]{XITS Math}
```

oltre a `\setmathfont{XITS Math}`. Nella tabella l'abbiamo usato.

Si noti che per motivi tecnici il pacchetto `amsmath` va caricato *prima* di `unicode-math`. Non si devono caricare `amssymb`, `amsfonts` e `bm`, perché `unicode-math` fa tutto il lavoro al loro posto.

Tabella 4. Tabella degli alfabeti matematici

<code>\mathup</code>	ABCabc $\alpha\beta\Gamma\Delta$ 123	<code>\mathsfup</code>	ABCabc123
<code>\mathit</code>	<i>ABCabc<math>\alpha\beta\Gamma\Delta</math></i>	<code>\mathsfit</code>	<i>ABCabc</i>
<code>\mathbb</code>	ABCabc123	<code>\mathbfup</code>	<b>ABCabc<math>\alpha\beta\Gamma\Delta</math>123</b>
<code>\mathscr</code>	<i>ABCabc</i>	<code>\mathbfit</code>	<b><i>ABCabc<math>\alpha\beta\Gamma\Delta</math></i></b>
<code>\mathcal</code>	ABC	<code>\mathbfscr</code>	<b><i>ABCabc</i></b>
<code>\mathbfcal</code>	<b>ABC</b>	<code>\mathbffrak</code>	<b><i>ABCabc</i></b>
<code>\mathfrak</code>	<i>ABCabc</i>	<code>\mathbfsfup</code>	<b>ABCabc<math>\alpha\beta\Gamma\Delta</math>123</b>
<code>\mathhtt</code>	ABCabc123	<code>\mathbfsfit</code>	<b><i>ABCabc<math>\alpha\beta\Gamma\Delta</math></i></b>

Il pacchetto `unicode-math` ha alcune opzioni, oltre al comando fondamentale `\setmathfont` per scegliere il carattere per i simboli e le lettere nelle formule. Descriverò le due più importanti tramite due tabelle prese dalla documentazione (tabelle 5 e 6).

Nella seconda tabella viene mostrato ciò che viene stampato con il comando `\mathbf`. Il valore di default è, naturalmente, TeX. Con il valore ISO le lettere appariranno secondo le convenzioni dell'ISO, quindi con le lettere greche maiuscole in corsivo. Il valore french serve per aderire all'uso tipografico francese in cui le lettere latine maiuscole sono in tondo, così come le lettere greche. Con il valore upright tutte le lettere nelle formule (a meno di non usare uno dei comandi per cambiare l'alfabeto) saranno in tondo.

Nell'appendice si trova l'elenco completo dei simboli disponibili con i font STIX e Asana Math (con quest'ultimo sono meno, come si vede dai tanti rettangolini che indicano un carattere mancante). Si ricordi che il font matematico STIX si ottiene con

```
\setmathfont{XITS Math}
```

almeno fino a quando non sarà ufficialmente disponibile la versione definitiva. Non si prenda per oro colato quanto appare stampato accanto al nome del comando, in particolare per gli alfabeti

Tabella 5. Effetti dell'opzione `math-style`

opzione	alfabeti	
	latino	greco
<code>math-style=ISO</code>	$(a, z, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$
<code>math-style=TeX</code>	$(a, z, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$
<code>math-style=french</code>	$(a, z, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$
<code>math-style=upright</code>	$(a, z, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$

Tabella 6. Effetti dell'opzione `bold-style`

opzione	alfabeti	
	latino	greco
<code>bold-style=ISO</code>	$(\mathbf{a}, \mathbf{z}, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$
<code>bold-style=TeX</code>	$(\mathbf{a}, \mathbf{z}, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$
<code>bold-style=upright</code>	$(\mathbf{a}, \mathbf{z}, \mathbf{B}, \mathbf{X})$	$(\alpha, \beta, \Gamma, \Xi)$

matematici; per ottenere una **A** (nero corsivo matematico), per esempio, si usi `\mathbf{fit}{A}` e non `\mbfitA`.<sup>2</sup>

Non è ancora prevista la possibilità di usare `\boldmath`, perché il font matematico è disponibile solo nella versione media e non in quella nera. Di fatto `\boldmath` non ha un grande uso: chi ha bisogno di formule nei titoli correnti deve semplicemente evitare il nero, perché una variabile in nero è semanticamente diversa dalla variabile con lo stesso nome ma stampata in peso medio. Analogamente non funzionano né il comando `\boldsymbol` di `amsmath` né il comando `\bm` del pacchetto `bm`. In casi di emergenza si adoperi `\pmb` oppure non si usi il pacchetto che, ricordiamo, è ancora in fase sperimentale.

In appendice si trovano anche due pagine di un articolo (Gregorio 2000) composte la prima con il font STIX, la seconda con TeX Gyre Pagella e Asana Math.

Qualche parola su come funzionano i comandi per gli alfabeti matematici. Se scriviamo

$$\mathbf{A} + \mathbf{B} = \mathbf{C}$$

otteniamo **A + B = C**, perché in questo documento vale l'opzione `bold-style=TeX`. La stessa formula con l'opzione `bold-style=ISO` darebbe **A + B = C** e il risultato precedente si otterrebbe con il comando specifico `\mathbfup`, che infatti dà **A + B = C**.

Si possono usare anche solo i simboli, definendosi da sé gli alfabeti matematici. Per esempio, se il font principale del documento è TeX Gyre Schola, si può scrivere qualcosa come

```
\setmathfont{XITS Math}
\setmathfont[range=\mathup]{TeX Gyre Schola}
```

<sup>2</sup>Allo stato attuale dello sviluppo è evidente un difetto nella resa di `\overparen`, `\underparen`, `\overbrace` e `\underbrace`.

```
\setmathfont[range=\mathbfup]{TeX Gyre Schola Bold}
\setmathfont[range=\mathit]{TeX Gyre Schola Italic}
```

per ottenere un effetto come quello mostrato di seguito.

---

Qui usiamo un font diverso e la formula di addizione del seno diventa

$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta.$$

mentre le formule diventano  $a + b = c$  e  $\mathbf{A} + \mathbf{B} = \mathbf{C}$ , ma anche  $f(x) = \alpha x^2$ . Le lettere usate, per confronto, sono ``a b c f x  $\alpha \beta$   $\mathbf{A} \mathbf{B} \mathbf{C}$`  e si vede che in effetti sono state usate le lettere in TeX Gyre Schola, che possiede anche le lettere greche di base.

---

Si faccia però attenzione che i font di testo non hanno tutti i parametri corretti per la composizione matematica. Si consulti la documentazione di `unicode-math` per maggiori dettagli, ma non si speri di trovare chissà che (ancora).

## 10 Lua<sup>A</sup>TeX

Quanto detto funziona quasi tutto anche con Lua<sup>A</sup>TeX: solo `polyglossia` non è compatibile, ancora. Invece `fontspec` e `unicode-math` possono essere usati anche con Lua<sup>A</sup>TeX. Essendo un motore basato su PDF<sup>T</sup>EX, fra i formati delle immagini da includere non c'è EPS.

## Riferimenti bibliografici

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Consultabile con `texdoc fontspec`.

## A I simboli disponibili con il font STIX

"00021 \exclam !	"00303 \tilde ~
"00023 \octothorpe #	"00304 \bar ¯
"00024 \mathdollar \$	"00305 \overbar ¯
"00025 \percent %	"00306 \breve ˇ
"00026 \ampersand &	"00307 \dot ˙
"00028 \lparen (	"00308 \ddot ¨
"00029 \rparen )	"00309 \ovhook ˆ
"0002B \plus +	"0030A \ocirc ˚
"0002C \comma ,	"0030C \check ˇ
"0002E \period .	"00310 \candra ˘
"0002F \mathslash /	"00312 \turnedcomma ‘
"0003A \mathcolon :	"00315 \ocommatopright ’
"0003B \semicolon ;	"0031A \droang ˘
"0003C \less <	"00330 \wideutilde ˜
"0003D \equal =	"00331 \underbar _
"0003E \greater >	"00338 \not /
"0003F \question ?	"00391 \upAlpha A
"00040 \atsign @	"00392 \upBeta B
"0005B \lbrack [	"00393 \upGamma Γ
"0005C \backslash \	"00394 \upDelta Δ
"0005D \rbrack ]	"00395 \upEpsilon E
"0007B \lbrace {	"00396 \upZeta Z
"0007C \vert	"00397 \upEta H
"0007D \rbrace }	"00398 \upTheta Θ
"000A3 \sterling £	"00399 \upIota I
"000A5 \yen ¥	"0039A \upKappa K
"000AC \neg ¬	"0039B \upLambda Λ
"000B1 \pm ±	"0039C \upMu M
"000B7 \cdotp ·	"0039D \upNu N
"000D7 \times ×	"0039E \upXi Ξ
"000F0 \matheth ð	"0039F \upOmicron O
"000F7 \div ÷	"003A0 \upPi Π
"001B5 \Zbar Z	"003A1 \upRho P
"00300 \grave `	"003A3 \upSigma Σ
"00301 \acute ´	"003A4 \upTau T
"00302 \hat ^	"003A5 \upUpsilon Υ

"003A6 \upPhi	Φ	"003DC \upDigamma	F
"003A7 \upChi	X	"003DD \updigamma	ƒ
"003A8 \upPsi	Ψ	"003DE \upKoppa	Ϙ
"003A9 \upOmega	Ω	"003DF \upkoppa	ϙ
"003B1 \upalpha	α	"003E0 \upSampi	Ϡ
"003B2 \upbeta	β	"003E1 \upsampi	ϡ
"003B3 \upgamma	γ	"003F0 \upvarkappa	χ
"003B4 \updelta	δ	"003F1 \upvarrho	ϱ
"003B5 \upepsilon	ε	"003F4 \upvarTheta	Θ
"003B6 \upzeta	ζ	"003F5 \upvarepsilon	ε
"003B7 \upeta	η	"003F6 \upbackepsilon	ε
"003B8 \uptheta	θ	"02015 \horizbar	—
"003B9 \upiota	ι	"02016 \Vert	
"003BA \upkappa	κ	"02017 \twolowline	=
"003BB \uplambda	λ	"02020 \dagger	†
"003BC \upmu	μ	"02021 \ddagger	‡
"003BD \upnu	ν	"02022 \smbkcircle	•
"003BE \upxi	ξ	"02025 \enleadertwodots	..
"003BF \upomicron	ο	"02026 \unicodeellipsis	...
"003C0 \uppi	π	"02032 \prime	'
"003C1 \uprho	ρ	"02033 \dprime	"
"003C2 \upvarsigma	ς	"02034 \trprime	'''
"003C3 \upsigma	σ	"02035 \backprime	`
"003C4 \uptau	τ	"02036 \backdprime	˘
"003C5 \upupsilon	υ	"02037 \backtrprime	˙
"003C6 \upvarphi	φ	"02038 \caretinsert	^
"003C7 \upchi	χ	"0203C \Exclam	!!
"003C8 \uppsi	ψ	"02040 \tieconcat	ˆ
"003C9 \upomega	ω	"02043 \hyphenbullet	-
"003D0 \upvarbeta	β	"02044 \fracslash	/
"003D1 \upvartheta	θ	"02047 \Question	??
"003D2 \upUpsilon	Υ	"02050 \closure	⊂
"003D5 \upphi	φ	"02057 \qprime	'''
"003D6 \upvarpi	π	"020AC \euro	€
"003D8 \upoldKoppa	Ϙ	"020D0 \leftharpoonaccent	↵
"003D9 \upoldkoppa	ϙ	"020D1 \rightharpoonaccent	↶
"003DA \upStigma	ς	"020D2 \vertoverlay	
"003DB \upstigma	ς	"020D6 \overleftarrow	←

"020D7 \vec $\vec{\phantom{x}}$	"02129 \turnediota $\text{\textcircled{iota}}$
"020DB \dddot $\text{\textcircled{...}}$	"0212B \Angstrom $\text{\textcircled{A}}$
"020DC \ddddot $\text{\textcircled{....}}$	"0212C \mscrB $\mathcal{B}$
"020DD \enclosecircle $\text{\textcircled{\phantom{x}}}$	"0212D \mfracC $\mathfrak{C}$
"020DE \enclosesquare $\text{\textcircled{\phantom{x}}}$	"0212F \mscre $e$
"020DF \enclosediamond $\text{\textcircled{\phantom{x}}}$	"02130 \mscrE $\mathcal{E}$
"020E1 \overleftrightharpoonrightarrow $\overleftrightharpoonrightarrow$	"02131 \mscrF $\mathcal{F}$
"020E4 \enclosetriangle $\text{\textcircled{\phantom{x}}}$	"02132 \Finv $\text{\textcircled{\phantom{x}}}$
"020E7 \annuity $\text{\textcircled{\phantom{x}}}$	"02133 \mscrM $\mathcal{M}$
"020E8 \threeunderdot $\text{\textcircled{\phantom{x}}}$	"02134 \mscro $\text{\textcircled{\phantom{x}}}$
"020E9 \widebridgeabove $\text{\textcircled{\phantom{x}}}$	"02135 \aleph $\aleph$
"020EC \underrightharpoondown $\text{\textcircled{\phantom{x}}}$	"02136 \beth $\beth$
"020ED \underleftharpoondown $\text{\textcircled{\phantom{x}}}$	"02137 \gimel $\gimel$
"020EE \underleftarrow $\text{\textcircled{\phantom{x}}}$	"02138 \daleth $\daleth$
"020EF \underrightarrow $\text{\textcircled{\phantom{x}}}$	"0213C \Bbbpi $\pi$
"020F0 \asteraccent $*$	"0213D \Bbbgamma $\gamma$
"02102 \BbbC $\mathbb{C}$	"0213E \BbbGamma $\Gamma$
"02107 \Eulerconst $e$	"0213F \BbbPi $\Pi$
"0210A \mscrg $g$	"02140 \Bbbsum $\Sigma$
"0210B \mscrH $\mathcal{H}$	"02141 \Game $\text{\textcircled{\phantom{x}}}$
"0210C \mfracH $\mathfrak{H}$	"02142 \sansLturned $\text{\textcircled{\phantom{x}}}$
"0210D \BbbH $\mathbb{H}$	"02143 \sansLmirrored $\text{\textcircled{\phantom{x}}}$
"0210E \Planckconst $h$	"02144 \Yup $\text{\textcircled{\phantom{x}}}$
"0210F \hslash $\hbar$	"02145 \mitBbbD $D$
"02110 \mscrI $\mathcal{I}$	"02146 \mitBbbd $d$
"02111 \Im $\Im$	"02147 \mitBbbe $e$
"02112 \mscrL $\mathcal{L}$	"02148 \mitBbbi $i$
"02113 \ell $\ell$	"02149 \mitBbbj $j$
"02115 \BbbN $\mathbb{N}$	"0214A \PropertyLine $\text{\textcircled{\phantom{x}}}$
"02118 \wp $\wp$	"0214B \upand $\text{\textcircled{\phantom{x}}}$
"02119 \BbbP $\mathbb{P}$	"02190 \leftarrow $\leftarrow$
"0211A \BbbQ $\mathbb{Q}$	"02191 \uparrow $\uparrow$
"0211B \mscrR $\mathcal{R}$	"02192 \rightarrow $\rightarrow$
"0211C \Re $\Re$	"02193 \downarrow $\downarrow$
"0211D \BbbR $\mathbb{R}$	"02194 \leftrightharpoonrightarrow $\leftrightharpoonrightarrow$
"02124 \BbbZ $\mathbb{Z}$	"02195 \updownarrow $\updownarrow$
"02127 \mho $\text{\textcircled{\phantom{x}}}$	"02196 \nrightarrow $\nrightarrow$
"02128 \mfracZ $\mathfrak{Z}$	"02197 \nearrow $\nearrow$

"02198 \searrow ↘	"021BE \upharpoonright ↓
"02199 \swarrow ↙	"021BF \upharpoonleft ↑
"0219A \leftarrow ←	"021C0 \rightharpoonup →
"0219B \rightarrow →	"021C1 \rightharpoondown →
"0219C \leftwavedarrow ↶	"021C2 \downharpoonright ↓
"0219D \rightwavedarrow ↷	"021C3 \downharpoonleft ↓
"0219E \twoheadleftarrow ←	"021C4 \rightleftarrows ⇔
"0219F \twoheaduparrow ↑	"021C5 \updownarrows ⇕
"021A0 \twoheadrightarrow →	"021C6 \leftrightarrows ⇔
"021A1 \twoheaddownarrow ↓	"021C7 \leftleftarrows ⇐
"021A2 \leftarrowtail ←	"021C8 \upuparrows ↑↑
"021A3 \rightarrowtail →	"021C9 \rightrightarrows ⇔
"021A4 \mapsfrom ←	"021CA \downdownarrows ⇓
"021A5 \mapsto ↗	"021CB \leftrightharpoons ⇔
"021A6 \mapsto ↗	"021CC \rightleftharpoons ⇔
"021A7 \mapsdown ↓	"021CD \Leftarrow ⇐
"021A8 \updownarrowbar ⇕	"021CE \Leftrightarrow ⇔
"021A9 \hookleftarrow ↶	"021CF \Rightarrow ⇒
"021AA \hookrightarrow ↷	"021D0 \Leftarrow ⇐
"021AB \looparrowleft ↶	"021D1 \Uparrow ↑
"021AC \looparrowright ↷	"021D2 \Rightarrow ⇒
"021AD \leftrightsquigarrow ⇔	"021D3 \Downarrow ↓
"021AE \leftrightharpoonup ⇔	"021D4 \Leftrightarrow ⇔
"021AF \downzigzagarrow ↘	"021D5 \Updownarrow ⇕
"021B0 \Lsh ↶	"021D6 \Nwarrow ↖
"021B1 \Rsh ↷	"021D7 \Nearrow ↗
"021B2 \Ldsh ↶	"021D8 \Searrow ↘
"021B3 \Rdsh ↷	"021D9 \Swarrow ↙
"021B4 \linefeed ↴	"021DA \Lleftarrow ⇐
"021B5 \carriagereturn ↵	"021DB \Rrightarrow ⇒
"021B6 \curvearrowleft ↶	"021DC \leftsquigarrow ⇔
"021B7 \curvearrowright ↷	"021DD \rightsquigarrow ⇔
"021B8 \barovernorthwestarrow ↖	"021DE \nHuparrow ‡
"021B9 \barleftarrowrightarrowba ⇔	"021DF \nHdownarrow ‡
"021BA \acwopencirclearrow ↻	"021E0 \leftdasharrow ←
"021BB \cwopencirclearrow ↻	"021E1 \updasharrow ↑
"021BC \leftharpoonup ←	"021E2 \rightdasharrow →
"021BD \leftharpoondown ←	"021E3 \downdasharrow ↓










































"021E4 \barleftarrow ←	"02213 \mp ∓
"021E5 \rightarrowbar →	"02214 \dotplus †
"021E6 \leftwhitearrow ⇐	"02215 \divslash /
"021E7 \upwhitearrow ↑	"02216 \smallsetminus \
"021E8 \rightwhitearrow ⇒	"02217 \ast *
"021E9 \downwhitearrow ↓	"02218 \vysmwhtcircle ◦
"021EA \whitearrowupfrombar ⇑	"02219 \vysmblkcircle •
"021F4 \circlearrowright ↻	"0221A \sqrt √
"021F5 \downarrows ⇓	"0221B \cuberoot ∛
"021F6 \rightthreearrows ⇨	"0221C \fourthroot ∜
"021F7 \nleftarrow ⇐	"0221D \propto ∝
"021F8 \nrightarrow ⇒	"0221E \infty ∞
"021F9 \nlefttrightrightarrow ⇔	"0221F \rightangle ⊥
"021FA \nVleftarrow ⇐	"02220 \angle ∠
"021FB \nVrightarrow ⇒	"02221 \measuredangle ∟
"021FC \nVlefttrightrightarrow ⇔	"02222 \sphericalangle ∠
"021FD \leftarrowtriangle ←	"02223 \mid
"021FE \rightarrowtriangle →	"02224 \nmid †
"021FF \lefttrightrightarrowtriangle ⇔	"02225 \parallel
"02200 \forall ∀	"02226 \nparallel †
"02201 \complement ℄	"02227 \wedge ∧
"02202 \partial ∂	"02228 \vee ∨
"02203 \exists ∃	"02229 \cap ∩
"02204 \nexists ∄	"0222A \cup ∪
"02205 \varnothing ∅	"0222B \int ∫
"02206 \increment Δ	"0222C \iint ∬
"02207 \nabla ∇	"0222D \iiint ∭
"02208 \in ∈	"0222E \oint ∮
"02209 \notin ∉	"0222F \oiint ∯
"0220A \smallin ∈	"02230 \oiiint ∰
"0220B \ni ∋	"02231 \intclockwise ∫
"0220C \nni ∌	"02232 \varointclockwise ∮
"0220D \smallni ∋	"02233 \ointctrlockwise ∮
"0220E \QED ■	"02234 \therefore ∴
"0220F \prod ∏	"02235 \because ∵
"02210 \coprod ∐	"02236 \mathratio ∷
"02211 \sum ∑	"02237 \Colon ∴
"02212 \minus -	"02238 \dotminus ÷



"02239 \dashcolon -:	"0225F \questeq $\stackrel{?}{=}$
"0223A \dotsminusdots $\ddots$	"02260 \ne $\neq$
"0223B \kernelcontraction $\simeq$	"02261 \equiv $\equiv$
"0223C \sim $\sim$	"02262 \nequiv $\neq$
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"02246 \simneqq $\not\approx$	"0226C \between $\between$
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"02249 \naprox $\approx$	"0226F \ngtr $\not>$
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"0224E \Bumpeq $\approx$	"02274 \nlesssim $\not\lesssim$
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"02251 \Doteq $\doteq$	"02277 \gtrless $\gtrless$
"02252 \fallingdotseq $\fallingdotseq$	"02278 \nlessgtr $\not\lessgtr$
"02253 \risingdotseq $\risingdotseq$	"02279 \ngtrless $\not\gtrless$
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"02255 \eqcolon $\equiv$	"0227B \succ $\succ$
"02256 \eqcirc $\approx$	"0227C \preccurlyeq $\preccurlyeq$
"02257 \circeq $\approx$	"0227D \succcurlyeq $\succcurlyeq$
"02258 \arceq $\approx$	"0227E \precsim $\precsim$
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"0225D \eqdef $\stackrel{\text{def}}{=}$	"02283 \supset $\supset$
"0225E \measeq $\equiv$	"02284 \nsubset $\not\subset$

"02285 \nsupset $\not\supseteq$	"022AB \VDash $\Vdash$
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"02289 \nsupseteq $\not\supseteq$	"022AF \nVDash $\nVdash$
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"0228B \supsetneq $\supsetneq$	"022B1 \scurel $\succcurlyeq$
"0228C \cupleftarrow $\cupleftarrow$	"022B2 \vartriangleleft $\triangleleft$
"0228D \cupdot $\cup\cdot$	"022B3 \vartriangleright $\triangleright$
"0228E \uplus $\uplus$	"022B4 \trianglelefteq $\trianglelefteq$
"0228F \sqsubset $\sqsubset$	"022B5 \trianglerighteq $\trianglerighteq$
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"02291 \sqsubseteq $\sqsubseteq$	"022B7 \imageof $\bullet\circ$
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"02296 \ominus $\ominus$	"022BC \barwedge $\barwedge$
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"02298 \oslash $\oslash$	"022BE \measuredrightangle $\sphericalangle$
"02299 \odot $\odot$	"022BF \varltriangleright $\varltriangleright$
"0229A \circledcirc $\circledcirc$	"022C0 \bigwedge $\bigwedge$
"0229B \circledast $\circledast$	"022C1 \bigvee $\bigvee$
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"0229D \circleddash $\circleddash$	"022C3 \bigcup $\bigcup$
"0229E \boxplus $\boxplus$	"022C4 \smwhtdiamond $\diamond$
"0229F \boxminus $\boxminus$	"022C5 \cdot $\cdot$
"022A0 \boxtimes $\boxtimes$	"022C6 \star $\star$
"022A1 \boxdot $\boxdot$	"022C7 \divideontimes $\div$
"022A2 \vdash $\vdash$	"022C8 \bowtie $\bowtie$
"022A3 \dashv $\dashv$	"022C9 \ltimes $\ltimes$
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"022A5 \bot $\bot$	"022CB \leftthreetimes $\leftthreetimes$
"022A6 \assert $\vdash$	"022CC \rightthreetimes $\rightthreetimes$
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"022A9 \Vdash $\Vdash$	"022CF \curlywedge $\curlywedge$
"022AA \Vvdash $\Vvdash$	"022D0 \Subset $\Subset$

"022D1 \Supset $\supseteq$	"022F7 \isinobar $\bar{\in}$
"022D2 \Cap $\cap$	"022F8 \isinvb $\Subset$
"022D3 \Cup $\cup$	"022F9 \isinE $\in$
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"022D6 \lessdot $\lessdot$	"022FC \nis $\ni$
"022D7 \gtrdot $\gtrdot$	"022FD \varniobar $\bar{\ni}$
"022D8 \lll $\lll$	"022FE \niobar $\bar{\ni}$
"022D9 \ggg $\ggg$	"022FF \bagmember $\in$
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"022DB \gtreqless $\gtreqless$	"02302 \house $\triangle$
"022DC \eqless $\eqless$	"02305 \varbarwedge $\bar{\wedge}$
"022DD \eqgtr $\eqgtr$	"02306 \vardoublebarwedge $\bar{\bar{\wedge}}$
"022DE \curlyeqprec $\curlyeqprec$	"02308 \lceil $\lceil$
"022DF \curlyeqsucc $\curlyeqsucc$	"02309 \rceil $\rceil$
"022E0 \nprec curlyeq $\nprec$	"0230A \lfloor $\lfloor$
"022E1 \nsucc curlyeq $\nsucc$	"0230B \rfloor $\rfloor$
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"022E3 \nsqsupseteq $\nsqsupseteq$	"02311 \sqlozenge $\square$
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"022E5 \sqsupseteq $\sqsupseteq$	"02313 \profsurf $\triangle$
"022E6 \lnsim $\sim$	"02317 \viewdata $\#$
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"022EA \ntriangleleft $\ntriangleleft$	"0231E \llcorner $\llcorner$
"022EB \ntriangleright $\ntriangleright$	"0231F \lrcorner $\lrcorner$
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"022EE \vdots $\vdots$	"02322 \frown $\frown$
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"0237C \rangledownzigzagarrow 	"023DF \underbrace  {z}
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"0239C \lparenxtender	"023E2 \trapezium 
"0239D \lparenlend (	"023E3 \benzenr 
"0239E \rparenuend )	"023E4 \strns —
"0239F \rparenxtender	"023E5 \fltns 
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"023A1 \lbrackkuend [	"023E7 \elinters 
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"023AB \vbraceuend }	"025A0 \mdlgblksquare 
"023AC \vbracemid }	"025A1 \mdlgwhtsquare 
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"023AE \intxtender	"025A3 \blackinwhitesquare 
"023AF \harrowxtender -	"025A4 \squarehfill 
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"023B1 \rmoustache }	"025A6 \squarehvfill 
"023B2 \sumtop 	"025A7 \squarenwseffill 
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"023B4 \overbracket	"025A9 \squarecrossfill 
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"023B6 \bbrktbrk 	"025AB \smwhtsquare 
"023B7 \sqrtbottom 	"025AC \hrectangleblack 
"023B8 \lvboxline	"025AD \hrectangle 
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"023CE \varcarriagereturn 	"025AF \vrectangle 
"023DC \overparen	"025B0 \parallelogramblack 
"023DD \underparen	"025B1 \parallelogram 

"025B2 \bigblacktriangleup ▲	"025D8 \inversebullet ■
"025B3 \bigtriangleup △	"025D9 \inversewhitecircle ●
"025B4 \blacktriangle ▲	"025DA \invwhiteupperhalfcircle ◐
"025B5 \vartriangle △	"025DB \invwhitelowerhalfcircle ◑
"025B6 \blacktriangleright ►	"025DC \ularc ⤿
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"025B8 \smallblacktriangleright ►	"025DE \lrarc ⤵
"025B9 \smalltriangleright ▷	"025DF \llarc ⤴
"025BA \blackpointerright ►	"025E0 \topsemicircle ⤿
"025BB \whitepointerright ▷	"025E1 \botsemicircle ⤵
"025BC \bigblacktriangledown ▼	"025E2 \lrblacktriangle ▲
"025BD \bigtriangledown ▽	"025E3 \llblacktriangle ►
"025BE \blacktriangledown ▼	"025E4 \ulblacktriangle ►
"025BF \triangledown ▽	"025E5 \urblacktriangle ▼
"025C0 \blacktriangleleft ◀	"025E6 \smwhtcircle ○
"025C1 \triangleleft ◁	"025E7 \squareleftblack ◼
"025C2 \smallblacktriangleleft ◀	"025E8 \squarerightblack ◼
"025C3 \smalltriangleleft ◁	"025E9 \squareulblack ◼
"025C4 \blackpointerleft ◀	"025EA \squarelrblack ◼
"025C5 \whitepointerleft ◁	"025EB \boxbar ◻
"025C6 \mdlgblkdiamond ◆	"025EC \triangleleftdot ◄
"025C7 \mdlgwhtdiamond ◇	"025ED \triangleleftblack ◄
"025C8 \blackinwhitediamond ◆	"025EE \trianglerightblack ▶
"025C9 \fisheye ●	"025EF \lgwhtcircle ○
"025CA \mdlgwhtlozenge ◇	"025F0 \squareulquad ◻
"025CB \mdlgwhtcircle ○	"025F1 \squarellquad ◻
"025CC \dottedcircle ○	"025F2 \squarelrquad ◻
"025CD \circlevertfill ◉	"025F3 \squareurquad ◻
"025CE \bullseye ◎	"025F4 \circleulquad ⊕
"025CF \mdlgblkcircle ●	"025F5 \circlellquad ⊕
"025D0 \circlelefthalfblack ◐	"025F6 \circlelrquad ⊕
"025D1 \circlerighthalfblack ◑	"025F7 \circleurquad ⊕
"025D2 \circlebottomhalfblack ◒	"025F8 \ultriangle ▽
"025D3 \cirtophalfblack ◓	"025F9 \urtriangle ▽
"025D4 \circleurquadblack ◑	"025FA \lltriangle ▽
"025D5 \blackcircleulquadwhite ◐	"025FB \mdwhtsquare ◻
"025D6 \blacklefthalfcircle ◐	"025FC \mdblksquare ■
"025D7 \blackrighthalfcircle ◑	"025FD \mdsmwhtsquare ◻

"025FE \mdsmbksquare ■	"026AA \mdwhtcircle ○
"025FF \lrtriangle △	"026AB \mdblkcircle ●
"02605 \bigstar ★	"026AC \mdsmwhtcircle ◦
"02606 \bigwhitestar ☆	"026B2 \neuter ♀
"02609 \astrosun ☉	"02713 \checkmark ✓
"02621 \danger ☹	"02720 \maltese ✠
"0263B \blacksmiley 😊	"0272A \circledstar ☆
"0263C \sun ☀	"02736 \varstar *
"0263D \rightmoon ☾	"0273D \dingasterisk *
"0263E \leftmoon ☾	"02772 \lbrbrak ⌋
"02640 \female ♀	"02773 \rbrbrak ⌌
"02642 \male ♂	"0279B \draftingarrow →
"02660 \spadesuit ♠	"027C0 \threedangle ⚡
"02661 \heartsuit ♥	"027C1 \whiteinwhitetriangle ▲
"02662 \diamondsuit ♦	"027C2 \perp ⊥
"02663 \clubsuit ♣	"027C3 \subsetcirc ⊆
"02664 \varspadesuit ♠	"027C4 \supsetcirc ⊇
"02665 \varheartsuit ♥	"027C5 \lbag ∫
"02666 \vardiamondsuit ♦	"027C6 \rbag ∫
"02667 \varclubsuit ♣	"027C7 \veedot ∇
"02669 \quarternote ♪	"027C8 \bsolhsb ∟
"0266A \eighthnote ♫	"027C9 \suphsol ∽
"0266B \twonotes ♪	"027CC \longdivision ∕
"0266D \flat ♭	"027D0 \diamondcdot ⬠
"0266E \natural ♮	"027D1 \wedgedot ⋈
"0266F \sharp ♯	"027D2 \upin ∪
"0267E \acidfree ∞	"027D3 \pullback ↵
"02680 \dicei 🎲	"027D4 \pushout ↶
"02681 \diceii 🎲	"027D5 \leftouterjoin ⋈
"02682 \diceiii 🎲	"027D6 \rightouterjoin ⋈
"02683 \diceiv 🎲	"027D7 \fullouterjoin ⋈
"02684 \dicev 🎲	"027D8 \bigbot ⊥
"02685 \dicevi 🎲	"027D9 \bigtop ⊤
"02686 \circledrightdot ⊙	"027DA \DashVDash ≡
"02687 \circledtwodots ⊕	"027DB \dashVdash ≡
"02688 \blackcircledrightdot ●	"027DC \multimapin ↯
"02689 \blackcircledtwodots ●	"027DD \vlongdash ≡
"026A5 \Hermaphrodite ♀	"027DE \longdashv ≡

"027DF \cirbot ⓘ	"02907 \Mapsto ⇨
"027E0 \lozengeminus ⋄	"02908 \downarrowbarred ↓
"027E1 \concavediamond ⋄	"02909 \uparrowbarred ↑
"027E2 \concavediamondtickleft ⋄	"0290A \Uparrow ⇩
"027E3 \concavediamondtickright ⋄	"0290B \Ddownarrow ⇩
"027E4 \whitesquaretickleft ◻	"0290C \leftbkarrow ←
"027E5 \whitesquaretickright ◻	"0290D \rightbkarrow →
"027E6 \lBrack ⌊	"0290E \leftdbkarrow ←
"027E7 \rBrack ⌋	"0290F \dbkarow →
"027E8 \langle ‹	"02910 \drbkarow ›
"027E9 \rangle ›	"02911 \rightdotarrow →
"027EA \lAngle ‹	"02912 \baruparrow ↑
"027EB \rAngle ›	"02913 \downarrowbar ↓
"027EC \Lbrak ⌊	"02914 \nvrightarrowtail ⇨
"027ED \Rbrak ⌋	"02915 \nVrightarrowtail ⇨
"027F0 \UUparrow ⇩	"02916 \twoheadrightarrowtail ⇨
"027F1 \DDownarrow ⇩	"02917 \nvtwoheadrightarrowtail ⇨
"027F2 \acwgapcirclearrow ↻	"02918 \nVtwoheadrightarrowtail ⇨
"027F3 \cwgapcirclearrow ↻	"02919 \lefttail ←
"027F4 \rightarrowonoplus ⊕	"0291A \righttail →
"027F5 \longleftarrow ←	"0291B \leftdbltail ←
"027F6 \longrightarrow →	"0291C \rightdbltail →
"027F7 \longleftarrowrightarrow ↔	"0291D \diamondleftarrow ←
"027F8 \Longleftarrow ⇐	"0291E \rightarrowdiamond →
"027F9 \longrightarrow ⇒	"0291F \diamondleftarrowbar ⇐
"027FA \Longleftarrowrightarrow ⇔	"02920 \barrightarrowdiamond ⇨
"027FB \longmapsfrom ↦	"02921 \nwsearrow ↘
"027FC \longmapsto ↗	"02922 \neswarrow ↗
"027FD \Longmapsfrom ⇐	"02923 \hknwarrow ↘
"027FE \Longmapsto ⇨	"02924 \hknearrow ↗
"027FF \longrightsquigarrow ↗	"02925 \hksearrow ↘
"02900 \nvtwoheadrightarrow ⇨	"02926 \hkswarrow ↗
"02901 \nVtwoheadrightarrow ⇨	"02927 \tona ✕
"02902 \nvLeftarrow ⇐	"02928 \toea ✕
"02903 \nvRightarrow ⇨	"02929 \tosa ✕
"02904 \nvLeftrightarrow ⇐	"0292A \towa ✕
"02905 \twoheadmapsto ↗	"0292B \rdiagovfdiag ✕
"02906 \Mapsfrom ⇐	"0292C \fdiagovrdiag ✕

"0292D \seovnearrow ↗	"02953 \rightharpoonupbar →
"0292E \neovsearrow ↗	"02954 \barupharpoonright ↑
"0292F \fdiagovnearrow ↗	"02955 \downharpoonrightbar ↓
"02930 \rdiagovsearrow ↘	"02956 \barleftharpoondown ←
"02931 \neovnwarrow ↘	"02957 \rightharpoondownbar →
"02932 \nwovnearrow ↘	"02958 \barupharpoonleft ↑
"02933 \rightcurvedarrow ~	"02959 \downharpoonleftbar ↓
"02934 \uprightcurvearrow ↗	"0295A \leftharpoonupbar ←
"02935 \downrightcurvedarrow ~	"0295B \barrightharpoonup →
"02936 \leftdowncurvedarrow ↘	"0295C \upharpoonrightbar ↑
"02937 \rightdowncurvedarrow ↘	"0295D \bardownharpoonright ↓
"02938 \cwrightarcarrow )	"0295E \leftharpoondownbar ←
"02939 \acwleftarcarrow (	"0295F \barrightharpoondown →
"0293A \acwoverarcarrow ⤵	"02960 \upharpoonleftbar ↓
"0293B \acwunderarcarrow ⤴	"02961 \bardownharpoonleft ↓
"0293C \curvearrowrightminus ↻	"02962 \leftharpoonsupdown ⇌
"0293D \curvearrowleftplus ↻	"02963 \upharpoonsleftright ⇌
"0293E \cwundercurvearrow ↻	"02964 \rightharpoonsupdown ⇌
"0293F \ccwundercurvearrow ↻	"02965 \downharpoonsleftright ⇌
"02940 \acwcirculararrow ↻	"02966 \leftrightharpoonsup ⇌
"02941 \cwcirculararrow ↻	"02967 \leftrightharpoonsdown ⇌
"02942 \rightarrowshortleftarrow ⇄	"02968 \rightleftharpoonsup ⇌
"02943 \leftarrowshortrightarrow ⇄	"02969 \rightleftharpoonsdown ⇌
"02944 \shortrightarrowleftarrow ⇄	"0296A \leftharpoonupdash ⇌
"02945 \rightarrowplus ⇄	"0296B \dashleftharpoondown ⇌
"02946 \leftarrowplus ⇄	"0296C \rightharpoonupdash ⇌
"02947 \rightarrowx ⇄	"0296D \dashrightharpoondown ⇌
"02948 \leftrightharpoonupcircle ⇄	"0296E \updownharpoonsleftright ⇌
"02949 \twoheaduparrowcircle †	"0296F \downupharpoonsleftright ⇌
"0294A \leftrightharpoonupdown ⇄	"02970 \rightimply =
"0294B \leftrightharpoondownup ⇄	"02971 \equalrightarrow ⇒
"0294C \updownharpoonrightleft ↓	"02972 \similarrightarrow ⇒
"0294D \updownharpoonleftright ↓	"02973 \leftarrowsimilar ⇐
"0294E \leftrightharpoonupup ⇄	"02974 \rightarrowsimilar ⇒
"0294F \updownharpoonrightright ↓	"02975 \rightarrowapprox ≈
"02950 \leftrightharpoondowndown ⇄	"02976 \ltlarr ≲
"02951 \updownharpoonleftleft ↓	"02977 \leftarrowless ≪
"02952 \barleftharpoonup ←	"02978 \gtrarr ≳



"02979 \subrarr $\zeta$	"0299F \angdnr $\angle$
"0297A \leftarrowsubset $\leftarrowleftarrow$	"029A0 \gtlpar $\triangleright$
"0297B \suplarr $\supsetleftarrow$	"029A1 \sphericalangleleup $\nabla$
"0297C \leftffishtail $\leftarrowleftarrow$	"029A2 \turnangle $\sphericalangle$
"0297D \rightffishtail $\rightarrowrightarrow$	"029A3 \revangle $\sphericalangle$
"0297E \upfishtail $\uparrow$	"029A4 \angleubar $\leq$
"0297F \downfishtail $\downarrow$	"029A5 \revangleubar $\geq$
"02980 \Vvert $\equiv$	"029A6 \wideangledown $\sphericalangle$
"02981 \mdsmbllkcircle $\bullet$	"029A7 \wideangleup $\sphericalangle$
"02982 \typecolon $:$	"029A8 \measanglerutone $\sphericalangle$
"02983 \lBrace $\{$	"029A9 \measanglelutonw $\sphericalangle$
"02984 \rBrace $\}$	"029AA \measanglerdtose $\sphericalangle$
"02985 \lParen $($	"029AB \measangleldtosw $\sphericalangle$
"02986 \rParen $)$	"029AC \measangleurtone $\sphericalangle$
"02987 \llparenthesis $($	"029AD \measangleultonw $\sphericalangle$
"02988 \rrparenthesis $)$	"029AE \measangledrtose $\sphericalangle$
"02989 \llangle $\langle$	"029AF \measangledltosw $\sphericalangle$
"0298A \rrangle $\rangle$	"029B0 \revemptyset $\emptyset$
"0298B \lbrackubar $[$	"029B1 \emptysetsetobar $\emptyset$
"0298C \rbrackubar $]$	"029B2 \emptysetsetocirc $\emptyset$
"0298D \lbrackultick $[$	"029B3 \emptysetsetoarr $\emptyset$
"0298E \rbracklrtick $]$	"029B4 \emptysetsetoarrl $\emptyset$
"0298F \lbracklltick $[$	"029B5 \circlehbar $\ominus$
"02990 \rbrackurtick $]$	"029B6 \circledvert $\ominus$
"02991 \langledot $\langle$	"029B7 \circledparallel $\ominus$
"02992 \rangledot $\rangle$	"029B8 \obslash $\oslash$
"02993 \lparenless $\leftarrowleftarrow$	"029B9 \operp $\oplus$
"02994 \rparengrtr $\rightarrowrightarrow$	"029BA \obot $\oplus$
"02995 \Lparengrtr $\leftarrowleftarrow$	"029BB \olcross $\otimes$
"02996 \Rparenless $\rightarrowrightarrow$	"029BC \odotslashdot $\otimes$
"02997 \lblkbrbrak $($	"029BD \uparrowoncircle $\uparrow$
"02998 \rblkbrbrak $)$	"029BE \circledwhitebullet $\odot$
"02999 \fourvdots $\vdots$	"029BF \circledbullet $\odot$
"0299A \vzigzag $\{$	"029C0 \olessthan $\ominus$
"0299B \measuredangleleft $\sphericalangle$	"029C1 \ogreaterthan $\ominus$
"0299C \rightanglesqr $\perp$	"029C2 \cirscir $\circ$
"0299D \rightanglemdot $\perp$	"029C3 \cirE $\circ$
"0299E \angles $\sphericalangle$	"029C4 \boxdiag $\square$

"029C5 \boxslash $\boxslash$	"029EB \mdlgbklklozenge $\blacklozenge$
"029C6 \boxast $\boxast$	"029EC \circledownarrow $\circledownarrow$
"029C7 \boxcircle $\boxcircle$	"029ED \blackcircledownarrow $\blackcircledownarrow$
"029C8 \boxbox $\boxbox$	"029EE \errbarsquare $\errbarsquare$
"029C9 \boxonbox $\boxonbox$	"029EF \errbarblacksquare $\errbarblacksquare$
"029CA \triangleodot $\triangleodot$	"029F0 \errbardiamond $\errbardiamond$
"029CB \triangleubar $\triangleubar$	"029F1 \errbarblackdiamond $\errbarblackdiamond$
"029CC \triangles $\triangles$	"029F2 \errbarcircle $\errbarcircle$
"029CD \triangleserifs $\triangleserifs$	"029F3 \errbarblackcircle $\errbarblackcircle$
"029CE \rtriltri $\rtriltri$	"029F4 \ruledelayed $\rightarrow$
"029CF \ltrivb $\leftarrow$	"029F5 \setminusminus $\setminus$
"029D0 \vbrtri $\triangleright$	"029F6 \dsol $\overline{\setminus}$
"029D1 \lfbowtie $\bowtie$	"029F7 \rsolbar $\overline{\setminus}$
"029D2 \rfbowtie $\bowtie$	"029F8 \xsol $\overline{\setminus}$
"029D3 \fbowtie $\bowtie$	"029F9 \xbsol $\overline{\setminus}$
"029D4 \lftimes $\times$	"029FA \doubleplus $\#$
"029D5 \rftimes $\times$	"029FB \tripleplus $\#$
"029D6 \hourglass $\times$	"029FC \lcurvyangle $\langle$
"029D7 \blackhourglass $\blacktimes$	"029FD \rcurvyangle $\rangle$
"029D8 \lvzigzag $\{$	"029FE \tplus $+$
"029D9 \rvzigzag $\{$	"029FF \tminus $-$
"029DA \Lvzigzag $\{$	"02A00 \bigodot $\odot$
"029DB \Rvzigzag $\{$	"02A01 \bigoplus $\oplus$
"029DC \iinfin $\infty$	"02A02 \bigotimes $\otimes$
"029DD \tieinfty $\infty$	"02A03 \bigcupdot $\cup$
"029DE \nvinfty $\infty$	"02A04 \biguplus $\uplus$
"029DF \dualmap $\infty$	"02A05 \bigsqcap $\sqcap$
"029E0 \laplac $\square$	"02A06 \bigsqcup $\sqcup$
"029E1 \lrtriangleleq $\trianglelefteq$	"02A07 \conjquant $\wedge$
"029E2 \shuffle $\sqcup$	"02A08 \disjquant $\vee$
"029E3 \eparsl $\#$	"02A09 \bigtimes $\times$
"029E4 \smeparsl $\#$	"02A0A \modtwosum $\Sigma$
"029E5 \eqvparsl $\#$	"02A0B \sumint $\int$
"029E6 \gleichstark $\equiv$	"02A0C \iiint $\iiint$
"029E7 \thermod $\ddagger$	"02A0D \intbar $\int$
"029E8 \downtriangleleftblack $\blacktriangleleft$	"02A0E \intBar $\int$
"029E9 \downtrianglerightblack $\blacktriangleright$	"02A0F \fint $\int$
"029EA \blackdiamonddownarrow $\blacklozenge$	"02A10 \cirfnint $\oint$

"02A11 \awint $\int$	"02A37 \Otimes $\otimes$
"02A12 \rppolint $\int$	"02A38 \odiv $\oplus$
"02A13 \scpolint $\int$	"02A39 \triangleplus $\triangleplus$
"02A14 \npolint $\int$	"02A3A \triangleminus $\triangleminus$
"02A15 \pointint $\oint$	"02A3B \triangleletimes $\triangleletimes$
"02A16 \sqint $\int$	"02A3C \intprod $\intprod$
"02A17 \intlarhk $\int$	"02A3D \intprodr $\intprodr$
"02A18 \intx $\int$	"02A3E \fcup ;
"02A19 \intcap $\intcap$	"02A3F \amalg $\amalg$
"02A1A \intcup $\intcup$	"02A40 \capdot $\capdot$
"02A1B \upint $\int$	"02A41 \uminus $\ominus$
"02A1C \lowint $\int$	"02A42 \barcup $\barcup$
"02A1D \Join $\Join$	"02A43 \barcap $\barcap$
"02A1E \bigtriangleleft $\triangleleft$	"02A44 \capwedge $\capwedge$
"02A1F \zcmp $\zcmp$	"02A45 \cupvee $\cupvee$
"02A20 \zpipe $\gg$	"02A46 \cupovercap $\cupovercap$
"02A21 \zproject $\uparrow$	"02A47 \cupovercup $\cupovercup$
"02A22 \ringplus $\dagger$	"02A48 \cupbarcap $\cupbarcap$
"02A23 \plushat $\dagger$	"02A49 \capbarcup $\capbarcup$
"02A24 \simplus $\ddagger$	"02A4A \twocups $\cupcup$
"02A25 \plusdot $\ddagger$	"02A4B \twocaps $\capcap$
"02A26 \plussim $\ddagger$	"02A4C \closedvarcup $\cup$
"02A27 \plussubtwo $\ddagger$	"02A4D \closedvarcap $\cap$
"02A28 \plustrif $\ddagger$	"02A4E \Sqcap $\sqcap$
"02A29 \commaminus $\ddagger$	"02A4F \Sqcup $\sqcup$
"02A2A \minusdot $\ddagger$	"02A50 \closedvarcupsmashprod $\cup$
"02A2B \minusfdots $\ddagger$	"02A51 \wedgeodot $\wedgeodot$
"02A2C \minusrdots $\ddagger$	"02A52 \veeodot $\veeodot$
"02A2D \opluslhrim $\oplus$	"02A53 \Wedge $\wedge$
"02A2E \oplusrhrim $\oplus$	"02A54 \Vee $\vee$
"02A2F \vectimes $\times$	"02A55 \wedgeonwedge $\wedgeonwedge$
"02A30 \dottimes $\dot{\times}$	"02A56 \veeonvee $\veeonvee$
"02A31 \timesbar $\bar{\times}$	"02A57 \bigslodpedvee $\bigslodpedvee$
"02A32 \btimes $\times$	"02A58 \bigslodpedwedge $\bigslodpedwedge$
"02A33 \smashtimes $\ast$	"02A59 \veeonwedge $\veeonwedge$
"02A34 \otimeslhrim $\otimes$	"02A5A \wedgemidvert $\wedge$
"02A35 \otimesrhrim $\otimes$	"02A5B \veemidvert $\vee$
"02A36 \otimesshat $\hat{\otimes}$	"02A5C \midbarwedge $\wedge$

"02A5D \midbarvee $\veebar$	"02A83 \lesdotor $\lesdot$
"02A5E \doublebarwedge $\bar{\wedge}$	"02A84 \gesdoto1 $\gesdot1$
"02A5F \wedgebar $\bar{\wedge}$	"02A85 \lessapprox $\lesapprox$
"02A60 \wedgedoublebar $\underline{\wedge}$	"02A86 \gtrapprox $\gtrapprox$
"02A61 \varveebar $\veebar$	"02A87 \lneq $\lneq$
"02A62 \doublebarvee $\bar{\vee}$	"02A88 \gneq $\gneq$
"02A63 \veedoublebar $\underline{\vee}$	"02A89 \lnapprox $\lnapprox$
"02A64 \dsub $\triangleleft$	"02A8A \gnapprox $\gnapprox$
"02A65 \rsub $\triangleright$	"02A8B \lesseqqgtr $\lesseqqgtr$
"02A66 \eqdot $\equiv$	"02A8C \gtreqqless $\gtreqqless$
"02A67 \dotequiv $\doteq$	"02A8D \lsime $\lsime$
"02A68 \equivVert $\equiv$	"02A8E \gsime $\gsime$
"02A69 \equivVvert $\equiv$	"02A8F \lsimg $\lsimg$
"02A6A \dotsim $\sim$	"02A90 \gsiml $\gsiml$
"02A6B \simrdots $\sim$	"02A91 \lgE $\lgE$
"02A6C \simminussim $\approx$	"02A92 \glE $\glE$
"02A6D \congdot $\cong$	"02A93 \lesges $\lesges$
"02A6E \asteq $\ast$	"02A94 \gesles $\gesles$
"02A6F \hatapprox $\hat{\approx}$	"02A95 \eqslantless $\eqslantless$
"02A70 \approxeq $\approx$	"02A96 \eqslantgtr $\eqslantgtr$
"02A71 \eqqplus $\eqqplus$	"02A97 \elsdot $\elsdot$
"02A72 \pluseq $\pm$	"02A98 \egsdot $\egsdot$
"02A73 \eqqsim $\approx$	"02A99 \eqqless $\eqqless$
"02A74 \Coloneq $\equiv$	"02A9A \eqqgtr $\eqqgtr$
"02A75 \eqeq $=$	"02A9B \eqqslantless $\eqqslantless$
"02A76 \eqeqeq $===$	"02A9C \eqqslantgtr $\eqqslantgtr$
"02A77 \ddotseq $\ddot{=}$	"02A9D \simless $\simless$
"02A78 \equivDD $\equiv$	"02A9E \simgtr $\simgtr$
"02A79 \ltcir $\llcirc$	"02A9F \simlE $\simlE$
"02A7A \gtcir $\ggcirc$	"02AA0 \simgE $\simgE$
"02A7B \ltquest $\llcirc$	"02AA1 \Lt $\ll$
"02A7C \gtquest $\ggcirc$	"02AA2 \Gt $\gg$
"02A7D \leqslant $\leq$	"02AA3 \partialmeetcontraction $\leq$
"02A7E \geqslant $\geq$	"02AA4 \glj $\times$
"02A7F \lesdot $\lesdot$	"02AA5 \gla $\times$
"02A80 \gesdot $\gesdot$	"02AA6 \ltcc $\triangleleft$
"02A81 \lesdoto $\lesdot$	"02AA7 \gtcc $\triangleright$
"02A82 \gesdoto $\gesdot$	"02AA8 \lescc $\triangleleft$

"02AA9 \gescc $\triangleright$	"02ACF \csub $\sqsubset$
"02AAA \smt $\leftarrow$	"02AD0 \csup $\sqsupset$
"02AAB \lat $\triangleright$	"02AD1 \csube $\sqsubset$
"02AAC \smt e $\leftarrow$	"02AD2 \csupe $\sqsupset$
"02AAD \late $\triangleright$	"02AD3 \subsup $\sqsupset$
"02AAE \bumpeq $\approx$	"02AD4 \supsub $\sqsubset$
"02AAF \preceq $\prec$	"02AD5 \subsub $\sqsubset$
"02AB0 \succeq $\succ$	"02AD6 \supsup $\sqsupset$
"02AB1 \precneq $\prec$	"02AD7 \suphsub $\supset$
"02AB2 \succneq $\succ$	"02AD8 \supdsub $\supset$
"02AB3 \preceqq $\approx$	"02AD9 \forkv $\pitchfork$
"02AB4 \succeqq $\approx$	"02ADA \topfork $\pitchfork$
"02AB5 \precneqq $\approx$	"02ADB \mlcp $\pitchfork$
"02AB6 \succneqq $\approx$	"02ADC \forks $\pitchfork$
"02AB7 \precapprox $\approx$	"02ADD \forksnot $\pitchfork$
"02AB8 \succapprox $\approx$	"02ADE \shortlefttack $\dashleftarrow$
"02AB9 \precnapprox $\approx$	"02ADF \shortdowntack $\dashrightarrow$
"02ABA \succnapprox $\approx$	"02AE0 \shortuptack $\dashleftarrow$
"02ABB \Prec $\leftarrow$	"02AE1 \perps $\perp$
"02ABC \Succ $\rightarrow$	"02AE2 \vDdash $\Vdash$
"02ABD \subsetdot $\subset$	"02AE3 \dashV $\dashv$
"02ABE \supsetdot $\supset$	"02AE4 \Dashv $\Dashv$
"02ABF \subsetplus $\subset$	"02AE5 \DashV $\DashV$
"02AC0 \supsetplus $\supset$	"02AE6 \varVdash $\Vdash$
"02AC1 \submult $\subset$	"02AE7 \Barv $\bar{\vee}$
"02AC2 \supmult $\supset$	"02AE8 \vBar $\bar{\vee}$
"02AC3 \subedot $\subset$	"02AE9 \vBarv $\bar{\vee}$
"02AC4 \supedot $\supset$	"02AEA \barV $\bar{\vee}$
"02AC5 \subseteq $\subset$	"02AEB \Vbar $\bar{\vee}$
"02AC6 \supseteq $\supset$	"02AEC \Not $\neg$
"02AC7 \subsim $\subset$	"02AED \bNot $\neg$
"02AC8 \supsim $\supset$	"02AEE \revnmid $\dashv$
"02AC9 \subsetapprox $\subset$	"02AEF \circmid $\circ$
"02ACA \supsetapprox $\supset$	"02AF0 \midcir $\circ$
"02ACB \subsetneqq $\subset$	"02AF1 \topcir $\circ$
"02ACC \supsetneqq $\supset$	"02AF2 \nhpar $\#$
"02ACD \lsqhook $\sqsubset$	"02AF3 \parsim $\#$
"02ACE \rsqhook $\sqsupset$	"02AF4 \interleave $\#$

"02AF5 \nhVvert	‡	"02B2D \whthorzoval	○
"02AF6 \threedotcolon	:	"02B2E \blkvertoval	●
"02AF7 \lllnest	≪≪	"02B2F \whtvertoval	○
"02AF8 \gggnest	≫≫	"02B30 \circleonleftarrow	↶
"02AF9 \leqqslant	≲	"02B31 \leftthreearrows	⇌
"02AFA \geqqslant	≳	"02B32 \leftarrowonoplus	⊕←
"02AFB \trslash	///	"02B33 \longleftsquigarrow	↵
"02AFC \biginterleave		"02B34 \nvtwoheadleftarrow	↶
"02AFD \sslash	//	"02B35 \nVtwoheadleftarrow	↶
"02AFE \talloblong	▭	"02B36 \twoheadmapsfrom	↶
"02AFF \bigtalloblong	▭	"02B37 \twoheadleftdbkarrow	↶↶
"02B12 \squaretopblack	■	"02B38 \leftdotarrow	↶
"02B13 \squarebotblack	■	"02B39 \nvleftarrowtail	↶
"02B14 \squareurblack	■	"02B3A \nVleftarrowtail	↶
"02B15 \squarellblack	■	"02B3B \twoheadleftarrowtail	↶
"02B16 \diamondleftblack	◆	"02B3C \nvtwoheadleftarrowtail	↶
"02B17 \diamondrightblack	◆	"02B3D \nVtwoheadleftarrowtail	↶
"02B18 \diamondtopblack	◆	"02B3E \leftarrowx	↶
"02B19 \diamondbotblack	◆	"02B3F \leftcurvedarrow	↶
"02B1A \dottedsquare	□	"02B40 \equalleftarrow	↶
"02B1B \lgblksquare	■	"02B41 \bsimilarleftarrow	↶
"02B1C \lgwhtsquare	□	"02B42 \leftarrowbackapprox	↶
"02B1D \vysmblksquare	▪	"02B43 \rightarrowgtr	➤
"02B1E \vysmwhtsquare	◦	"02B44 \rightarrowsupset	➤
"02B1F \pentagonblack	⬛	"02B45 \Lleftarrow	⇐
"02B20 \pentagon	⬠	"02B46 \RRrightarrow	⇒
"02B21 \varhexagon	⬡	"02B47 \bsimilarrrightarrow	⇒
"02B22 \varhexagonblack	⬛	"02B48 \rightarrowbackapprox	⇒
"02B23 \hexagonblack	⬛	"02B49 \similarleftarrow	↶
"02B24 \lgblkcircle	●	"02B4A \leftarrowapprox	↶
"02B25 \mdblkdiamond	◆	"02B4B \leftarrowbsimilar	↶
"02B26 \mdwhtdiamond	◇	"02B4C \rightarrowbsimilar	➤
"02B27 \mdblkllozenge	◆	"02B50 \medwhitestar	☆
"02B28 \mdwhtlozenge	◇	"02B51 \medblackstar	★
"02B29 \smbldiamond	◆	"02B52 \smwhitestar	☆
"02B2A \smbkllozenge	◇	"02B53 \rightpentagonblack	⬛
"02B2B \smwhtlozenge	◇	"02B54 \rightpentagon	⬠
"02B2C \blkhorzoval	●	"03012 \postalmark	〒

"03014 \lbrbrak	␣	"1D421 \mbfh	<b>h</b>
"03015 \rbrbrak	␣	"1D422 \mbfi	<b>i</b>
"03018 \Lbrbrak	␣	"1D423 \mbfj	<b>j</b>
"03019 \Rbrbrak	␣	"1D424 \mbfk	<b>k</b>
"03030 \hzigzag	≈	"1D425 \mbfl	<b>l</b>
"1D400 \mbfA	<b>A</b>	"1D426 \mbfm	<b>m</b>
"1D401 \mbfB	<b>B</b>	"1D427 \mbfn	<b>n</b>
"1D402 \mbfC	<b>C</b>	"1D428 \mbfo	<b>o</b>
"1D403 \mbfD	<b>D</b>	"1D429 \mbfp	<b>p</b>
"1D404 \mbfE	<b>E</b>	"1D42A \mbfq	<b>q</b>
"1D405 \mbfF	<b>F</b>	"1D42B \mbfr	<b>r</b>
"1D406 \mbfG	<b>G</b>	"1D42C \mbfs	<b>s</b>
"1D407 \mbfH	<b>H</b>	"1D42D \mbft	<b>t</b>
"1D408 \mbfI	<b>I</b>	"1D42E \mbfu	<b>u</b>
"1D409 \mbfJ	<b>J</b>	"1D42F \mbfv	<b>v</b>
"1D40A \mbfK	<b>K</b>	"1D430 \mbfw	<b>w</b>
"1D40B \mbfL	<b>L</b>	"1D431 \mbfx	<b>x</b>
"1D40C \mbfM	<b>M</b>	"1D432 \mbfy	<b>y</b>
"1D40D \mbfN	<b>N</b>	"1D433 \mbfz	<b>z</b>
"1D40E \mbfO	<b>O</b>	"1D434 \mitA	<b>A</b>
"1D40F \mbfP	<b>P</b>	"1D435 \mitB	<b>B</b>
"1D410 \mbfQ	<b>Q</b>	"1D436 \mitC	<b>C</b>
"1D411 \mbfR	<b>R</b>	"1D437 \mitD	<b>D</b>
"1D412 \mbfS	<b>S</b>	"1D438 \mitE	<b>E</b>
"1D413 \mbfT	<b>T</b>	"1D439 \mitF	<b>F</b>
"1D414 \mbfU	<b>U</b>	"1D43A \mitG	<b>G</b>
"1D415 \mbfV	<b>V</b>	"1D43B \mitH	<b>H</b>
"1D416 \mbfW	<b>W</b>	"1D43C \mitI	<b>I</b>
"1D417 \mbfX	<b>X</b>	"1D43D \mitJ	<b>J</b>
"1D418 \mbfY	<b>Y</b>	"1D43E \mitK	<b>K</b>
"1D419 \mbfZ	<b>Z</b>	"1D43F \mitL	<b>L</b>
"1D41A \mbfa	<b>a</b>	"1D440 \mitM	<b>M</b>
"1D41B \mbfb	<b>b</b>	"1D441 \mitN	<b>N</b>
"1D41C \mbfc	<b>c</b>	"1D442 \mitO	<b>O</b>
"1D41D \mbfd	<b>d</b>	"1D443 \mitP	<b>P</b>
"1D41E \mbfe	<b>e</b>	"1D444 \mitQ	<b>Q</b>
"1D41F \mbff	<b>f</b>	"1D445 \mitR	<b>R</b>
"1D420 \mbfg	<b>g</b>	"1D446 \mitS	<b>S</b>

"1D447 \mitT	<i>T</i>	"1D46E \mbfitG	<i>G</i>
"1D448 \mitU	<i>U</i>	"1D46F \mbfitH	<i>H</i>
"1D449 \mitV	<i>V</i>	"1D470 \mbfitI	<i>I</i>
"1D44A \mitW	<i>W</i>	"1D471 \mbfitJ	<i>J</i>
"1D44B \mitX	<i>X</i>	"1D472 \mbfitK	<i>K</i>
"1D44C \mitY	<i>Y</i>	"1D473 \mbfitL	<i>L</i>
"1D44D \mitZ	<i>Z</i>	"1D474 \mbfitM	<i>M</i>
"1D44E \mita	<i>a</i>	"1D475 \mbfitN	<i>N</i>
"1D44F \mitb	<i>b</i>	"1D476 \mbfitO	<i>O</i>
"1D450 \mitc	<i>c</i>	"1D477 \mbfitP	<i>P</i>
"1D451 \mitd	<i>d</i>	"1D478 \mbfitQ	<i>Q</i>
"1D452 \mite	<i>e</i>	"1D479 \mbfitR	<i>R</i>
"1D453 \mitf	<i>f</i>	"1D47A \mbfitS	<i>S</i>
"1D454 \mitg	<i>g</i>	"1D47B \mbfitT	<i>T</i>
"1D456 \miti	<i>i</i>	"1D47C \mbfitU	<i>U</i>
"1D457 \mitj	<i>j</i>	"1D47D \mbfitV	<i>V</i>
"1D458 \mitk	<i>k</i>	"1D47E \mbfitW	<i>W</i>
"1D459 \mitl	<i>l</i>	"1D47F \mbfitX	<i>X</i>
"1D45A \mitm	<i>m</i>	"1D480 \mbfitY	<i>Y</i>
"1D45B \mitn	<i>n</i>	"1D481 \mbfitZ	<i>Z</i>
"1D45C \mito	<i>o</i>	"1D482 \mbfita	<i>a</i>
"1D45D \mitp	<i>p</i>	"1D483 \mbfitb	<i>b</i>
"1D45E \mitq	<i>q</i>	"1D484 \mbfitc	<i>c</i>
"1D45F \mitr	<i>r</i>	"1D485 \mbfitd	<i>d</i>
"1D460 \mits	<i>s</i>	"1D486 \mbfite	<i>e</i>
"1D461 \mitt	<i>t</i>	"1D487 \mbfitf	<i>f</i>
"1D462 \mitu	<i>u</i>	"1D488 \mbfitg	<i>g</i>
"1D463 \mitv	<i>v</i>	"1D489 \mbfith	<i>h</i>
"1D464 \mitw	<i>w</i>	"1D48A \mbfiti	<i>i</i>
"1D465 \mitx	<i>x</i>	"1D48B \mbfitj	<i>j</i>
"1D466 \mity	<i>y</i>	"1D48C \mbfitk	<i>k</i>
"1D467 \mitz	<i>z</i>	"1D48D \mbfitl	<i>l</i>
"1D468 \mbfitA	<b>A</b>	"1D48E \mbfitm	<i>m</i>
"1D469 \mbfitB	<b>B</b>	"1D48F \mbfitn	<i>n</i>
"1D46A \mbfitC	<b>C</b>	"1D490 \mbfito	<i>o</i>
"1D46B \mbfitD	<b>D</b>	"1D491 \mbfitp	<i>p</i>
"1D46C \mbfitE	<b>E</b>	"1D492 \mbfitq	<i>q</i>
"1D46D \mbfitF	<b>F</b>	"1D493 \mbfitr	<i>r</i>



"1D494 \mbfits	<i>s</i>	"1D4C5 \mscrp	<i>p</i>
"1D495 \mbfitt	<i>t</i>	"1D4C6 \mscrq	<i>q</i>
"1D496 \mbfitu	<i>u</i>	"1D4C7 \mscrr	<i>r</i>
"1D497 \mbfitv	<i>v</i>	"1D4C8 \mscrs	<i>s</i>
"1D498 \mbfitw	<i>w</i>	"1D4C9 \mscrt	<i>t</i>
"1D499 \mbfitx	<i>x</i>	"1D4CA \mscru	<i>u</i>
"1D49A \mbfity	<i>y</i>	"1D4CB \mscrv	<i>v</i>
"1D49B \mbfitz	<i>z</i>	"1D4CC \mscrw	<i>w</i>
"1D49C \mscrA	<i>A</i>	"1D4CD \mscrx	<i>x</i>
"1D49E \mscrC	<i>C</i>	"1D4CE \mscry	<i>y</i>
"1D49F \mscrD	<i>D</i>	"1D4CF \mscrz	<i>z</i>
"1D4A2 \mscrG	<i>G</i>	"1D4D0 \mbfscrA	<i>A</i>
"1D4A5 \mscrJ	<i>J</i>	"1D4D1 \mbfscrB	<i>B</i>
"1D4A6 \mscrK	<i>K</i>	"1D4D2 \mbfscrC	<i>C</i>
"1D4A9 \mscrN	<i>N</i>	"1D4D3 \mbfscrD	<i>D</i>
"1D4AA \mscrO	<i>O</i>	"1D4D4 \mbfscrE	<i>E</i>
"1D4AB \mscrP	<i>P</i>	"1D4D5 \mbfscrF	<i>F</i>
"1D4AC \mscrQ	<i>Q</i>	"1D4D6 \mbfscrG	<i>G</i>
"1D4AE \mscrS	<i>S</i>	"1D4D7 \mbfscrH	<i>H</i>
"1D4AF \mscrT	<i>T</i>	"1D4D8 \mbfscrI	<i>I</i>
"1D4B0 \mscrU	<i>U</i>	"1D4D9 \mbfscrJ	<i>J</i>
"1D4B1 \mscrV	<i>V</i>	"1D4DA \mbfscrK	<i>K</i>
"1D4B2 \mscrW	<i>W</i>	"1D4DB \mbfscrL	<i>L</i>
"1D4B3 \mscrX	<i>X</i>	"1D4DC \mbfscrM	<i>M</i>
"1D4B4 \mscrY	<i>Y</i>	"1D4DD \mbfscrN	<i>N</i>
"1D4B5 \mscrZ	<i>Z</i>	"1D4DE \mbfscrO	<i>O</i>
"1D4B6 \mscra	<i>a</i>	"1D4DF \mbfscrP	<i>P</i>
"1D4B7 \mscrb	<i>b</i>	"1D4E0 \mbfscrQ	<i>Q</i>
"1D4B8 \mscrc	<i>c</i>	"1D4E1 \mbfscrR	<i>R</i>
"1D4B9 \mscrd	<i>d</i>	"1D4E2 \mbfscrS	<i>S</i>
"1D4BB \mscrf	<i>f</i>	"1D4E3 \mbfscrT	<i>T</i>
"1D4BD \mscrh	<i>h</i>	"1D4E4 \mbfscrU	<i>U</i>
"1D4BE \mscri	<i>i</i>	"1D4E5 \mbfscrV	<i>V</i>
"1D4BF \mscrj	<i>j</i>	"1D4E6 \mbfscrW	<i>W</i>
"1D4C0 \mscrk	<i>k</i>	"1D4E7 \mbfscrX	<i>X</i>
"1D4C1 \mscrl	<i>l</i>	"1D4E8 \mbfscrY	<i>Y</i>
"1D4C2 \mscrm	<i>m</i>	"1D4E9 \mbfscrZ	<i>Z</i>
"1D4C3 \mscrn	<i>n</i>	"1D4EA \mbfscra	<i>a</i>

"1D4EB \mbfscrb	$\mathfrak{b}$	"1D514 \mfracQ	$\mathfrak{Q}$
"1D4EC \mbfscrc	$\mathfrak{c}$	"1D516 \mfracS	$\mathfrak{S}$
"1D4ED \mbfscrd	$\mathfrak{d}$	"1D517 \mfracT	$\mathfrak{T}$
"1D4EE \mbfscre	$\mathfrak{e}$	"1D518 \mfracU	$\mathfrak{U}$
"1D4EF \mbfscr f	$\mathfrak{f}$	"1D519 \mfracV	$\mathfrak{V}$
"1D4F0 \mbfscrg	$\mathfrak{g}$	"1D51A \mfracW	$\mathfrak{W}$
"1D4F1 \mbfscrh	$\mathfrak{h}$	"1D51B \mfracX	$\mathfrak{X}$
"1D4F2 \mbfscri	$\mathfrak{i}$	"1D51C \mfracY	$\mathfrak{Y}$
"1D4F3 \mbfscrj	$\mathfrak{j}$	"1D51E \mfraka	$\mathfrak{a}$
"1D4F4 \mbfscrk	$\mathfrak{k}$	"1D51F \mfracb	$\mathfrak{b}$
"1D4F5 \mbfscr l	$\mathfrak{l}$	"1D520 \mfracc	$\mathfrak{c}$
"1D4F6 \mbfscrm	$\mathfrak{m}$	"1D521 \mfracd	$\mathfrak{d}$
"1D4F7 \mbfscrn	$\mathfrak{n}$	"1D522 \mfrace	$\mathfrak{e}$
"1D4F8 \mbfscro	$\mathfrak{o}$	"1D523 \mfracf	$\mathfrak{f}$
"1D4F9 \mbfscrp	$\mathfrak{p}$	"1D524 \mfracg	$\mathfrak{g}$
"1D4FA \mbfscrq	$\mathfrak{q}$	"1D525 \mfrach	$\mathfrak{h}$
"1D4FB \mbfscr r	$\mathfrak{r}$	"1D526 \mfraci	$\mathfrak{i}$
"1D4FC \mbfscr s	$\mathfrak{s}$	"1D527 \mfracj	$\mathfrak{j}$
"1D4FD \mbfscr t	$\mathfrak{t}$	"1D528 \mfrack	$\mathfrak{k}$
"1D4FE \mbfscru	$\mathfrak{u}$	"1D529 \mfracl	$\mathfrak{l}$
"1D4FF \mbfscr v	$\mathfrak{v}$	"1D52A \mfracm	$\mathfrak{m}$
"1D500 \mbfscr w	$\mathfrak{w}$	"1D52B \mfracn	$\mathfrak{n}$
"1D501 \mbfscr x	$\mathfrak{x}$	"1D52C \mfraco	$\mathfrak{o}$
"1D502 \mbfscry	$\mathfrak{y}$	"1D52D \mfracp	$\mathfrak{p}$
"1D503 \mbfscrz	$\mathfrak{z}$	"1D52E \mfracq	$\mathfrak{q}$
"1D504 \mfracA	$\mathfrak{A}$	"1D52F \mfracr	$\mathfrak{r}$
"1D505 \mfracB	$\mathfrak{B}$	"1D530 \mfrac s	$\mathfrak{s}$
"1D507 \mfracD	$\mathfrak{D}$	"1D531 \mfrac t	$\mathfrak{t}$
"1D508 \mfracE	$\mathfrak{E}$	"1D532 \mfracu	$\mathfrak{u}$
"1D509 \mfracF	$\mathfrak{F}$	"1D533 \mfracv	$\mathfrak{v}$
"1D50A \mfracG	$\mathfrak{G}$	"1D534 \mfracw	$\mathfrak{w}$
"1D50D \mfracJ	$\mathfrak{J}$	"1D535 \mfracx	$\mathfrak{x}$
"1D50E \mfracK	$\mathfrak{K}$	"1D536 \mfracy	$\mathfrak{y}$
"1D50F \mfracL	$\mathfrak{L}$	"1D537 \mfracz	$\mathfrak{z}$
"1D510 \mfracM	$\mathfrak{M}$	"1D538 \BbbA	$\mathbb{A}$
"1D511 \mfracN	$\mathfrak{N}$	"1D539 \BbbB	$\mathbb{B}$
"1D512 \mfracO	$\mathfrak{O}$	"1D53B \BbbD	$\mathbb{D}$
"1D513 \mfracP	$\mathfrak{P}$	"1D53C \BbbE	$\mathbb{E}$

"1D53D \BbbF	F	"1D569 \Bbbx	x
"1D53E \BbbG	G	"1D56A \Bbby	y
"1D540 \BbbI	I	"1D56B \Bbbz	z
"1D541 \BbbJ	J	"1D56C \mbffrakA	$\mathbb{A}$
"1D542 \BbbK	K	"1D56D \mbffrakB	$\mathbb{B}$
"1D543 \BbbL	L	"1D56E \mbffrakC	$\mathbb{C}$
"1D544 \BbbM	M	"1D56F \mbffrakD	$\mathbb{D}$
"1D546 \BbbO	O	"1D570 \mbffrakE	$\mathbb{E}$
"1D54A \BbbS	S	"1D571 \mbffrakF	$\mathbb{F}$
"1D54B \BbbT	T	"1D572 \mbffrakG	$\mathbb{G}$
"1D54C \BbbU	U	"1D573 \mbffrakH	$\mathbb{H}$
"1D54D \BbbV	V	"1D574 \mbffrakI	$\mathbb{I}$
"1D54E \BbbW	W	"1D575 \mbffrakJ	$\mathbb{J}$
"1D54F \BbbX	X	"1D576 \mbffrakK	$\mathbb{K}$
"1D550 \BbbY	Y	"1D577 \mbffrakL	$\mathbb{L}$
"1D552 \Bbba	a	"1D578 \mbffrakM	$\mathbb{M}$
"1D553 \Bbbb	b	"1D579 \mbffrakN	$\mathbb{N}$
"1D554 \Bbbc	c	"1D57A \mbffrakO	$\mathbb{O}$
"1D555 \Bbbd	d	"1D57B \mbffrakP	$\mathbb{P}$
"1D556 \Bbbe	e	"1D57C \mbffrakQ	$\mathbb{Q}$
"1D557 \Bbbf	f	"1D57D \mbffrakR	$\mathbb{R}$
"1D558 \Bbbg	g	"1D57E \mbffrakS	$\mathbb{S}$
"1D559 \Bbbh	h	"1D57F \mbffrakT	$\mathbb{T}$
"1D55A \Bbbi	i	"1D580 \mbffrakU	$\mathbb{U}$
"1D55B \Bbbj	j	"1D581 \mbffrakV	$\mathbb{V}$
"1D55C \Bbbk	k	"1D582 \mbffrakW	$\mathbb{W}$
"1D55D \Bbb1	l	"1D583 \mbffrakX	$\mathbb{X}$
"1D55E \Bbbm	m	"1D584 \mbffrakY	$\mathbb{Y}$
"1D55F \Bbbn	n	"1D585 \mbffrakZ	$\mathbb{Z}$
"1D560 \Bbbo	o	"1D586 \mbffraka	$\mathbb{a}$
"1D561 \Bbbp	p	"1D587 \mbffrakb	$\mathbb{b}$
"1D562 \Bbbq	q	"1D588 \mbffrakc	$\mathbb{c}$
"1D563 \Bbbr	r	"1D589 \mbffrakd	$\mathbb{d}$
"1D564 \Bbbs	s	"1D58A \mbffrake	$\mathbb{e}$
"1D565 \Bbbt	t	"1D58B \mbffrakf	$\mathbb{f}$
"1D566 \Bbbu	u	"1D58C \mbffrakg	$\mathbb{g}$
"1D567 \Bbbv	v	"1D58D \mbffrakh	$\mathbb{h}$
"1D568 \Bbbw	w	"1D58E \mbffraki	$\mathbb{i}$

"1D58F \mbffrakj	<b>j</b>	"1D5B5 \msansV	V
"1D590 \mbffrakk	<b>k</b>	"1D5B6 \msansW	W
"1D591 \mbffrakl	<b>l</b>	"1D5B7 \msansX	X
"1D592 \mbffrakm	<b>m</b>	"1D5B8 \msansY	Y
"1D593 \mbffrakn	<b>n</b>	"1D5B9 \msansZ	Z
"1D594 \mbffrako	<b>o</b>	"1D5BA \msansa	a
"1D595 \mbffrakp	<b>p</b>	"1D5BB \msansb	b
"1D596 \mbffrakq	<b>q</b>	"1D5BC \msansc	c
"1D597 \mbffrakr	<b>r</b>	"1D5BD \msansd	d
"1D598 \mbffraks	<b>s</b>	"1D5BE \msanse	e
"1D599 \mbffrakt	<b>t</b>	"1D5BF \msansf	f
"1D59A \mbffraku	<b>u</b>	"1D5C0 \msansg	g
"1D59B \mbffrakv	<b>v</b>	"1D5C1 \msansh	h
"1D59C \mbffrakw	<b>w</b>	"1D5C2 \msansi	i
"1D59D \mbffrakx	<b>x</b>	"1D5C3 \msansj	j
"1D59E \mbffraky	<b>y</b>	"1D5C4 \msansk	k
"1D59F \mbffrakz	<b>z</b>	"1D5C5 \msansl	l
"1D5A0 \msansA	A	"1D5C6 \msansm	m
"1D5A1 \msansB	B	"1D5C7 \msansn	n
"1D5A2 \msansC	C	"1D5C8 \msanso	o
"1D5A3 \msansD	D	"1D5C9 \msansp	p
"1D5A4 \msansE	E	"1D5CA \msansq	q
"1D5A5 \msansF	F	"1D5CB \msansr	r
"1D5A6 \msansG	G	"1D5CC \msanss	s
"1D5A7 \msansH	H	"1D5CD \msanst	t
"1D5A8 \msansI	I	"1D5CE \msansu	u
"1D5A9 \msansJ	J	"1D5CF \msansv	v
"1D5AA \msansK	K	"1D5D0 \msansw	w
"1D5AB \msansL	L	"1D5D1 \msansx	x
"1D5AC \msansM	M	"1D5D2 \msansy	y
"1D5AD \msansN	N	"1D5D3 \msansz	z
"1D5AE \msansO	O	"1D5D4 \mbfsansA	<b>A</b>
"1D5AF \msansP	P	"1D5D5 \mbfsansB	<b>B</b>
"1D5B0 \msansQ	Q	"1D5D6 \mbfsansC	<b>C</b>
"1D5B1 \msansR	R	"1D5D7 \mbfsansD	<b>D</b>
"1D5B2 \msansS	S	"1D5D8 \mbfsansE	<b>E</b>
"1D5B3 \msansT	T	"1D5D9 \mbfsansF	<b>F</b>
"1D5B4 \msansU	U	"1D5DA \mbfsansG	<b>G</b>

"1D5DB \mbfsansH	<b>H</b>	"1D601 \mbfsanst	<b>t</b>
"1D5DC \mbfsansI	<b>I</b>	"1D602 \mbfsansu	<b>u</b>
"1D5DD \mbfsansJ	<b>J</b>	"1D603 \mbfsansv	<b>v</b>
"1D5DE \mbfsansK	<b>K</b>	"1D604 \mbfsansw	<b>w</b>
"1D5DF \mbfsansL	<b>L</b>	"1D605 \mbfsansx	<b>x</b>
"1D5E0 \mbfsansM	<b>M</b>	"1D606 \mbfsansy	<b>y</b>
"1D5E1 \mbfsansN	<b>N</b>	"1D607 \mbfsansz	<b>z</b>
"1D5E2 \mbfsansO	<b>O</b>	"1D608 \mitsansA	<b>A</b>
"1D5E3 \mbfsansP	<b>P</b>	"1D609 \mitsansB	<b>B</b>
"1D5E4 \mbfsansQ	<b>Q</b>	"1D60A \mitsansC	<b>C</b>
"1D5E5 \mbfsansR	<b>R</b>	"1D60B \mitsansD	<b>D</b>
"1D5E6 \mbfsansS	<b>S</b>	"1D60C \mitsansE	<b>E</b>
"1D5E7 \mbfsansT	<b>T</b>	"1D60D \mitsansF	<b>F</b>
"1D5E8 \mbfsansU	<b>U</b>	"1D60E \mitsansG	<b>G</b>
"1D5E9 \mbfsansV	<b>V</b>	"1D60F \mitsansH	<b>H</b>
"1D5EA \mbfsansW	<b>W</b>	"1D610 \mitsansI	<b>I</b>
"1D5EB \mbfsansX	<b>X</b>	"1D611 \mitsansJ	<b>J</b>
"1D5EC \mbfsansY	<b>Y</b>	"1D612 \mitsansK	<b>K</b>
"1D5ED \mbfsansZ	<b>Z</b>	"1D613 \mitsansL	<b>L</b>
"1D5EE \mbfsansa	<b>a</b>	"1D614 \mitsansM	<b>M</b>
"1D5EF \mbfsansb	<b>b</b>	"1D615 \mitsansN	<b>N</b>
"1D5F0 \mbfsansc	<b>c</b>	"1D616 \mitsansO	<b>O</b>
"1D5F1 \mbfsansd	<b>d</b>	"1D617 \mitsansP	<b>P</b>
"1D5F2 \mbfsanse	<b>e</b>	"1D618 \mitsansQ	<b>Q</b>
"1D5F3 \mbfsansf	<b>f</b>	"1D619 \mitsansR	<b>R</b>
"1D5F4 \mbfsansg	<b>g</b>	"1D61A \mitsansS	<b>S</b>
"1D5F5 \mbfsansh	<b>h</b>	"1D61B \mitsansT	<b>T</b>
"1D5F6 \mbfsansi	<b>i</b>	"1D61C \mitsansU	<b>U</b>
"1D5F7 \mbfsansj	<b>j</b>	"1D61D \mitsansV	<b>V</b>
"1D5F8 \mbfsansk	<b>k</b>	"1D61E \mitsansW	<b>W</b>
"1D5F9 \mbfsansl	<b>l</b>	"1D61F \mitsansX	<b>X</b>
"1D5FA \mbfsansm	<b>m</b>	"1D620 \mitsansY	<b>Y</b>
"1D5FB \mbfsansn	<b>n</b>	"1D621 \mitsansZ	<b>Z</b>
"1D5FC \mbfsanso	<b>o</b>	"1D622 \mitsansa	<b>a</b>
"1D5FD \mbfsansp	<b>p</b>	"1D623 \mitsansb	<b>b</b>
"1D5FE \mbfsansq	<b>q</b>	"1D624 \mitsansc	<b>c</b>
"1D5FF \mbfsansr	<b>r</b>	"1D625 \mitsansd	<b>d</b>
"1D600 \mbfsanss	<b>s</b>	"1D626 \mitsanse	<b>e</b>

"1D627 \mitsansf	<i>f</i>	"1D64D \mbfitsansR	<b>R</b>
"1D628 \mitsansg	<i>g</i>	"1D64E \mbfitsansS	<b>S</b>
"1D629 \mitsansh	<i>h</i>	"1D64F \mbfitsansT	<b>T</b>
"1D62A \mitsansi	<i>i</i>	"1D650 \mbfitsansU	<b>U</b>
"1D62B \mitsansj	<i>j</i>	"1D651 \mbfitsansV	<b>V</b>
"1D62C \mitsansk	<i>k</i>	"1D652 \mbfitsansW	<b>W</b>
"1D62D \mitsansl	<i>l</i>	"1D653 \mbfitsansX	<b>X</b>
"1D62E \mitsansm	<i>m</i>	"1D654 \mbfitsansY	<b>Y</b>
"1D62F \mitsansn	<i>n</i>	"1D655 \mbfitsansZ	<b>Z</b>
"1D630 \mitsanso	<i>o</i>	"1D656 \mbfitsansa	<b>a</b>
"1D631 \mitsansp	<i>p</i>	"1D657 \mbfitsansb	<b>b</b>
"1D632 \mitsansq	<i>q</i>	"1D658 \mbfitsansc	<b>c</b>
"1D633 \mitsansr	<i>r</i>	"1D659 \mbfitsansd	<b>d</b>
"1D634 \mitsanss	<i>s</i>	"1D65A \mbfitsanse	<b>e</b>
"1D635 \mitsanst	<i>t</i>	"1D65B \mbfitsansf	<b>f</b>
"1D636 \mitsansu	<i>u</i>	"1D65C \mbfitsansg	<b>g</b>
"1D637 \mitsansv	<i>v</i>	"1D65D \mbfitsansh	<b>h</b>
"1D638 \mitsansw	<i>w</i>	"1D65E \mbfitsansi	<b>i</b>
"1D639 \mitsansx	<i>x</i>	"1D65F \mbfitsansj	<b>j</b>
"1D63A \mitsansy	<i>y</i>	"1D660 \mbfitsansk	<b>k</b>
"1D63B \mitsansz	<i>z</i>	"1D661 \mbfitsansl	<b>l</b>
"1D63C \mbfitsansA	<b>A</b>	"1D662 \mbfitsansm	<b>m</b>
"1D63D \mbfitsansB	<b>B</b>	"1D663 \mbfitsansn	<b>n</b>
"1D63E \mbfitsansC	<b>C</b>	"1D664 \mbfitsanso	<b>o</b>
"1D63F \mbfitsansD	<b>D</b>	"1D665 \mbfitsansp	<b>p</b>
"1D640 \mbfitsansE	<b>E</b>	"1D666 \mbfitsansq	<b>q</b>
"1D641 \mbfitsansF	<b>F</b>	"1D667 \mbfitsansr	<b>r</b>
"1D642 \mbfitsansG	<b>G</b>	"1D668 \mbfitsanss	<b>s</b>
"1D643 \mbfitsansH	<b>H</b>	"1D669 \mbfitsanst	<b>t</b>
"1D644 \mbfitsansI	<b>I</b>	"1D66A \mbfitsansu	<b>u</b>
"1D645 \mbfitsansJ	<b>J</b>	"1D66B \mbfitsansv	<b>v</b>
"1D646 \mbfitsansK	<b>K</b>	"1D66C \mbfitsansw	<b>w</b>
"1D647 \mbfitsansL	<b>L</b>	"1D66D \mbfitsansx	<b>x</b>
"1D648 \mbfitsansM	<b>M</b>	"1D66E \mbfitsansy	<b>y</b>
"1D649 \mbfitsansN	<b>N</b>	"1D66F \mbfitsansz	<b>z</b>
"1D64A \mbfitsansO	<b>O</b>	"1D670 \mttA	<b>A</b>
"1D64B \mbfitsansP	<b>P</b>	"1D671 \mttB	<b>B</b>
"1D64C \mbfitsansQ	<b>Q</b>	"1D672 \mttC	<b>C</b>

"1D673 \mttD	D	"1D699 \mttp	p
"1D674 \mttE	E	"1D69A \mttq	q
"1D675 \mttF	F	"1D69B \mttr	r
"1D676 \mttG	G	"1D69C \mtts	s
"1D677 \mttH	H	"1D69D \mttt	t
"1D678 \mttI	I	"1D69E \mttu	u
"1D679 \mttJ	J	"1D69F \mttv	v
"1D67A \mttK	K	"1D6A0 \mttw	w
"1D67B \mttL	L	"1D6A1 \mttx	x
"1D67C \mttM	M	"1D6A2 \mtty	y
"1D67D \mttN	N	"1D6A3 \mttz	z
"1D67E \mttO	O	"1D6A4 \imath	$\iota$
"1D67F \mttP	P	"1D6A5 \jmath	$j$
"1D680 \mttQ	Q	"1D6A8 \mbfAlpha	<b>A</b>
"1D681 \mttR	R	"1D6A9 \mbfBeta	<b>B</b>
"1D682 \mttS	S	"1D6AA \mbfGamma	<b>Γ</b>
"1D683 \mttT	T	"1D6AB \mbfDelta	<b>Δ</b>
"1D684 \mttU	U	"1D6AC \mbfEpsilon	<b>E</b>
"1D685 \mttV	V	"1D6AD \mbfZeta	<b>Z</b>
"1D686 \mttW	W	"1D6AE \mbfEta	<b>H</b>
"1D687 \mttX	X	"1D6AF \mbfTheta	<b>Θ</b>
"1D688 \mttY	Y	"1D6B0 \mbfIota	<b>I</b>
"1D689 \mttZ	Z	"1D6B1 \mbfKappa	<b>K</b>
"1D68A \mtta	a	"1D6B2 \mbfLambda	<b>Λ</b>
"1D68B \mttb	b	"1D6B3 \mbfMu	<b>M</b>
"1D68C \mttc	c	"1D6B4 \mbfNu	<b>N</b>
"1D68D \mttd	d	"1D6B5 \mbfXi	<b>Ξ</b>
"1D68E \mtte	e	"1D6B6 \mbfOmicron	<b>O</b>
"1D68F \mttf	f	"1D6B7 \mbfPi	<b>Π</b>
"1D690 \mttg	g	"1D6B8 \mbfRho	<b>P</b>
"1D691 \mtth	h	"1D6B9 \mbfvarTheta	<b>Θ</b>
"1D692 \mtti	i	"1D6BA \mbfSigma	<b>Σ</b>
"1D693 \mttj	j	"1D6BB \mbfTau	<b>T</b>
"1D694 \mttk	k	"1D6BC \mbfUpsilon	<b>Υ</b>
"1D695 \mttl	l	"1D6BD \mbfPhi	<b>Φ</b>
"1D696 \mttm	m	"1D6BE \mbfChi	<b>X</b>
"1D697 \mttn	n	"1D6BF \mbfPsi	<b>Ψ</b>
"1D698 \mtto	o	"1D6C0 \mbfOmega	<b>Ω</b>

"1D6C1 \mbfnabla $\nabla$	"1D6E7 \mitZeta $Z$
"1D6C2 \mbfalphabet $\alpha$	"1D6E8 \mitEta $H$
"1D6C3 \mbfbeta $\beta$	"1D6E9 \mitTheta $\Theta$
"1D6C4 \mbfgamma $\gamma$	"1D6EA \mitIota $I$
"1D6C5 \mbfdelta $\delta$	"1D6EB \mitKappa $K$
"1D6C6 \mbfepsilon $\epsilon$	"1D6EC \mitLambda $\Lambda$
"1D6C7 \mbfzeta $\zeta$	"1D6ED \mitMu $M$
"1D6C8 \mbfeta $\eta$	"1D6EE \mitNu $N$
"1D6C9 \mbftheta $\theta$	"1D6EF \mitXi $\Xi$
"1D6CA \mbfiota $\iota$	"1D6F0 \mitOmicron $O$
"1D6CB \mbfkappa $\kappa$	"1D6F1 \mitPi $\Pi$
"1D6CC \mbflambda $\lambda$	"1D6F2 \mitRho $P$
"1D6CD \mbfmu $\mu$	"1D6F3 \mitvarTheta $\Theta$
"1D6CE \mbfnu $\nu$	"1D6F4 \mitSigma $\Sigma$
"1D6CF \mbfxi $\xi$	"1D6F5 \mitTau $T$
"1D6D0 \mbfomicron $o$	"1D6F6 \mitUpsilon $Y$
"1D6D1 \mbfpi $\pi$	"1D6F7 \mitPhi $\Phi$
"1D6D2 \mbfrho $\rho$	"1D6F8 \mitChi $X$
"1D6D3 \mbfvarsigma $\varsigma$	"1D6F9 \mitPsi $\Psi$
"1D6D4 \mbfsigma $\sigma$	"1D6FA \mitOmega $\Omega$
"1D6D5 \mbftau $\tau$	"1D6FB \mitnabla $\nabla$
"1D6D6 \mbfupsilon $\upsilon$	"1D6FC \mitalpha $\alpha$
"1D6D7 \mbfvarphi $\varphi$	"1D6FD \mitbeta $\beta$
"1D6D8 \mbfchi $\chi$	"1D6FE \mitgamma $\gamma$
"1D6D9 \mbfpsi $\psi$	"1D6FF \mitdelta $\delta$
"1D6DA \mbfomega $\omega$	"1D700 \mitepsilon $\epsilon$
"1D6DB \mbfpartial $\partial$	"1D701 \mitzeta $\zeta$
"1D6DC \mbfvarepsilon $\epsilon$	"1D702 \miteta $\eta$
"1D6DD \mbfvartheta $\vartheta$	"1D703 \mittheta $\theta$
"1D6DE \mbfvarkappa $\kappa$	"1D704 \mitiota $\iota$
"1D6DF \mbfphi $\phi$	"1D705 \mitkappa $\kappa$
"1D6E0 \mbfvarrho $\rho$	"1D706 \mitlambda $\lambda$
"1D6E1 \mbfvarpi $\varpi$	"1D707 \mitmu $\mu$
"1D6E2 \mitAlpha $A$	"1D708 \mitnu $\nu$
"1D6E3 \mitBeta $B$	"1D709 \mitxi $\xi$
"1D6E4 \mitGamma $\Gamma$	"1D70A \mitomicron $o$
"1D6E5 \mitDelta $\Delta$	"1D70B \mitpi $\pi$
"1D6E6 \mitEpsilon $E$	"1D70C \mitrho $\rho$



"1D70D \mitvarsigma $\zeta$	"1D733 \mbfitPsi $\Psi$
"1D70E \mitsigma $\sigma$	"1D734 \mbfitOmega $\Omega$
"1D70F \mittau $\tau$	"1D735 \mbfitnabla $\nabla$
"1D710 \mitupsilon $\upsilon$	"1D736 \mbfitalpha $\alpha$
"1D711 \mitphi $\varphi$	"1D737 \mbfitbeta $\beta$
"1D712 \mitchi $\chi$	"1D738 \mbfitgamma $\gamma$
"1D713 \mitpsi $\psi$	"1D739 \mbfitdelta $\delta$
"1D714 \mitomega $\omega$	"1D73A \mbfitepsilon $\epsilon$
"1D715 \mitpartial $\partial$	"1D73B \mbfitzeta $\zeta$
"1D716 \mitvarepsilon $\epsilon$	"1D73C \mbfiteta $\eta$
"1D717 \mitvartheta $\vartheta$	"1D73D \mbfittheta $\theta$
"1D718 \mitvarkappa $\varkappa$	"1D73E \mbfitiota $\iota$
"1D719 \mitvarphi $\phi$	"1D73F \mbfitkappa $\kappa$
"1D71A \mitvarrho $\varrho$	"1D740 \mbfitlambda $\lambda$
"1D71B \mitvarpi $\varpi$	"1D741 \mbfitmu $\mu$
"1D71C \mbfitAlpha $A$	"1D742 \mbfitnu $\nu$
"1D71D \mbfitBeta $B$	"1D743 \mbfitxi $\xi$
"1D71E \mbfitGamma $\Gamma$	"1D744 \mbfitomicron $o$
"1D71F \mbfitDelta $\Delta$	"1D745 \mbfitpi $\pi$
"1D720 \mbfitEpsilon $E$	"1D746 \mbfitrho $\rho$
"1D721 \mbfitZeta $Z$	"1D747 \mbfitvarsigma $\varsigma$
"1D722 \mbfitEta $H$	"1D748 \mbfitsigma $\sigma$
"1D723 \mbfitTheta $\Theta$	"1D749 \mbfittau $\tau$
"1D724 \mbfitIota $I$	"1D74A \mbfitupsilon $\upsilon$
"1D725 \mbfitKappa $K$	"1D74B \mbfitphi $\phi$
"1D726 \mbfitLambda $\Lambda$	"1D74C \mbfitchi $\chi$
"1D727 \mbfitMu $M$	"1D74D \mbfitpsi $\psi$
"1D728 \mbfitNu $N$	"1D74E \mbfitomega $\omega$
"1D729 \mbfitXi $\Xi$	"1D74F \mbfitpartial $\partial$
"1D72A \mbfitOmicron $O$	"1D750 \mbfitvarepsilon $\epsilon$
"1D72B \mbfitPi $\Pi$	"1D751 \mbfitvartheta $\vartheta$
"1D72C \mbfitRho $P$	"1D752 \mbfitvarkappa $\varkappa$
"1D72D \mbfitvarTheta $\Theta$	"1D753 \mbfitvarphi $\phi$
"1D72E \mbfitSigma $\Sigma$	"1D754 \mbfitvarrho $\varrho$
"1D72F \mbfitTau $T$	"1D755 \mbfitvarpi $\varpi$
"1D730 \mbfitUpsilon $Y$	"1D756 \mbfsansAlpha $A$
"1D731 \mbfitPhi $\Phi$	"1D757 \mbfsansBeta $B$
"1D732 \mbfitChi $X$	"1D758 \mbfsansGamma $\Gamma$

"1D759 \mbfsansDelta $\Delta$	"1D77F \mbfsanspi $\pi$
"1D75A \mbfsansEpsilon $E$	"1D780 \mbfsansrho $\rho$
"1D75B \mbfsansZeta $Z$	"1D781 \mbfsansvarsigma $\varsigma$
"1D75C \mbfsansEta $H$	"1D782 \mbfsanssigma $\sigma$
"1D75D \mbfsansTheta $\Theta$	"1D783 \mbfsanstau $\tau$
"1D75E \mbfsansIota $I$	"1D784 \mbfsansupsilon $\upsilon$
"1D75F \mbfsansKappa $K$	"1D785 \mbfsansphi $\varphi$
"1D760 \mbfsansLambda $\Lambda$	"1D786 \mbfsanschi $\chi$
"1D761 \mbfsansMu $M$	"1D787 \mbfsanspsi $\psi$
"1D762 \mbfsansNu $N$	"1D788 \mbfsansomega $\omega$
"1D763 \mbfsansXi $\Xi$	"1D789 \mbfsanspartial $\partial$
"1D764 \mbfsansOmicron $O$	"1D78A \mbfsansvarepsilon $\epsilon$
"1D765 \mbfsansPi $\Pi$	"1D78B \mbfsansvartheta $\vartheta$
"1D766 \mbfsansRho $P$	"1D78C \mbfsansvarkappa $\varkappa$
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"1D768 \mbfsansSigma $\Sigma$	"1D78E \mbfsansvarrho $\varrho$
"1D769 \mbfsansTau $T$	"1D78F \mbfsansvarpi $\varpi$
"1D76A \mbfsansUpsilon $Y$	"1D790 \mbffitsansAlpha $A$
"1D76B \mbfsansPhi $\Phi$	"1D791 \mbffitsansBeta $B$
"1D76C \mbfsansChi $X$	"1D792 \mbffitsansGamma $\Gamma$
"1D76D \mbfsansPsi $\Psi$	"1D793 \mbffitsansDelta $\Delta$
"1D76E \mbfsansOmega $\Omega$	"1D794 \mbffitsansEpsilon $E$
"1D76F \mbfsansnabla $\nabla$	"1D795 \mbffitsansZeta $Z$
"1D770 \mbfsansalpha $\alpha$	"1D796 \mbffitsansEta $H$
"1D771 \mbfsansbeta $\beta$	"1D797 \mbffitsansTheta $\Theta$
"1D772 \mbfsansgamma $\gamma$	"1D798 \mbffitsansIota $I$
"1D773 \mbfsansdelta $\delta$	"1D799 \mbffitsansKappa $K$
"1D774 \mbfsansepsilon $\epsilon$	"1D79A \mbffitsansLambda $\Lambda$
"1D775 \mbfsanszeta $\zeta$	"1D79B \mbffitsansMu $M$
"1D776 \mbfsanseta $\eta$	"1D79C \mbffitsansNu $N$
"1D777 \mbfsanstheta $\theta$	"1D79D \mbffitsansXi $\Xi$
"1D778 \mbfsansiota $\iota$	"1D79E \mbffitsansOmicron $O$
"1D779 \mbfsanskappa $\kappa$	"1D79F \mbffitsansPi $\Pi$
"1D77A \mbfsanslambda $\lambda$	"1D7A0 \mbffitsansRho $P$
"1D77B \mbfsansmu $\mu$	"1D7A1 \mbffitsansvarTheta $\Theta$
"1D77C \mbfsansnu $\nu$	"1D7A2 \mbffitsansSigma $\Sigma$
"1D77D \mbfsansxi $\xi$	"1D7A3 \mbffitsansTau $T$
"1D77E \mbfsansomicron $o$	"1D7A4 \mbffitsansUpsilon $Y$

"1D7A5 \mbfitsansPhi $\Phi$	"1D7CB \mbfdigamma <b>F</b>
"1D7A6 \mbfitsansChi $\chi$	"1D7CE \mbfzero <b>0</b>
"1D7A7 \mbfitsansPsi $\Psi$	"1D7CF \mbfone <b>1</b>
"1D7A8 \mbfitsansOmega $\Omega$	"1D7D0 \mbftwo <b>2</b>
"1D7A9 \mbfitsansnabla $\nabla$	"1D7D1 \mbfthree <b>3</b>
"1D7AA \mbfitsansalpha $\alpha$	"1D7D2 \mbffour <b>4</b>
"1D7AB \mbfitsansbeta $\beta$	"1D7D3 \mbffive <b>5</b>
"1D7AC \mbfitsansgamma $\gamma$	"1D7D4 \mbfsix <b>6</b>
"1D7AD \mbfitsansdelta $\delta$	"1D7D5 \mbfseven <b>7</b>
"1D7AE \mbfitsansepsilon $\epsilon$	"1D7D6 \mbfeight <b>8</b>
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"1D7C0 \mbfitsanschi $\chi$	"1D7E8 \msanssix <b>6</b>
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"1D7F8 \mtttwo	2	"1D7FF \mttnine	9
"1D7F9 \mttthree	3		

## B I simboli disponibili con il font Asana Math

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"00023 \octothorpe	#	"000D7 \times	×
"00024 \mathdollar	\$	"000F0 \matheth	ö
"00025 \percent	%	"000F7 \div	÷
"00026 \ampersand	&	"001B5 \Zbar	□
"00028 \lparen	(	"00300 \grave	˘
"00029 \rparen	)	"00301 \acute	˘
"0002B \plus	+	"00302 \hat	ˆ
"0002C \comma	,	"00303 \tilde	˜
"0002E \period	.	"00304 \bar	¯
"0002F \mathslash	/	"00305 \overbar	¯
"0003A \mathcolon	:	"00306 \breve	˘
"0003B \semicolon	;	"00307 \dot	˙
"0003C \less	<	"00308 \ddot	¨
"0003D \equal	=	"00309 \ovhook	□
"0003E \greater	>	"0030A \ocirc	°
"0003F \question	?	"0030C \check	˘
"00040 \atsign	@	"00310 \candra	□
"0005B \lbrack	[	"00312 \oturnedcomma	□
"0005C \backslash	\	"00315 \ocommatopright	□
"0005D \rbrack	]	"0031A \droang	□
"0007B \lbrace	{	"00330 \wideutilde	□
"0007C \vert		"00331 \underbar	□
"0007D \rbrace	}	"00338 \not	/
"000A3 \sterling	£	"00391 \upAlpha	Α
"000A5 \yen	¥	"00392 \upBeta	Β
"000AC \neg	¬	"00393 \upGamma	Γ
"000B1 \pm	±	"00394 \upDelta	Δ

"00395 \upEpsilon E	"003C3 \upsigma σ
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"0039B \upLambda Λ	"003C9 \upomega ω
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"003A3 \upSigma Σ	"003D9 \upoldkoppa ϟ
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"003B2 \upbeta β	"003E1 \upsampi ϡ
"003B3 \upgamma γ	"003F0 \upvarkappa κ
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"003B7 \upeta η	"003F6 \upbackepsilon Ϟ
"003B8 \uptheta θ	"02015 \horizbar Ϟ
"003B9 \upiota ι	"02016 \Vert
"003BA \upkappa κ	"02017 \twolowline Ϟ
"003BB \uplambda λ	"02020 \dagger †
"003BC \upmu μ	"02021 \ddagger ‡
"003BD \upnu ν	"02022 \smblkcircle •
"003BE \upxi ξ	"02025 \enleadertwodots ..
"003BF \upomicron ο	"02026 \unicodeellipsis ...
"003C0 \uppi π	"02032 \prime '
"003C1 \uprho ρ	"02033 \dprime "
"003C2 \upvarsigma Ϛ	"02034 \trprime "'

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"02044 \fracslash /	"02118 \wp $\wp$
"02047 \Question ◻	"02119 \BbbP $\mathbb{P}$
"02050 \closure $\circ$	"0211A \BbbQ $\mathbb{Q}$
"02057 \qprime `	"0211B \mscrR $\mathcal{R}$
"020AC \euro €	"0211C \Re $\Re$
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"020D2 \vertoverlay	"02127 \mho $\text{\O}$
"020D6 \overleftarrow $\leftarrow$	"02128 \mfracZ $\mathbb{3}$
"020D7 \vec $\rightarrow$	"02129 \turnediota $\text{\textcircled{1}}$
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"020DC \ddddot `	"0212C \mscrB $\mathcal{B}$
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"020DE \enclosesquare $\text{\textcircled{□}}$	"0212F \mscre $e$
"020DF \enclosediamond $\text{\textcircled{◇}}$	"02130 \mscrE $\mathcal{E}$
"020E1 \overleftrightharrow $\leftrightarrow$	"02131 \mscrF $\mathcal{F}$
"020E4 \enclosetriangle $\text{\textcircled{△}}$	"02132 \Finv $\text{\textcircled{F}}$
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"020E8 \threeunderdot ...	"02134 \mscro $o$
"020E9 \widebridgeabove $\text{\textcircled{⌈}}$	"02135 \aleph $\aleph$
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"02102 \BbbC $\mathbb{C}$	"0213E \BbbGamma $\Gamma$
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"0210C \mfracH $\mathcal{H}$	"02142 \sansLturned $\text{\textcircled{⌋}}$
"0210D \BbbH $\mathbb{H}$	"02143 \sansLmirrored $\text{\textcircled{⌋}}$

"02144 \Yup 人	"021AE \nleftrightharrow $\Leftrightarrow$
"02145 \mitBbbD $\mathbb{D}$	"021AF \downzigzagarrow $\Downarrow$
"02146 \mitBbbd $\mathbb{d}$	"021B0 \Lsh $\llcorner$
"02147 \mitBbbe $\mathbb{e}$	"021B1 \Rsh $\lrcorner$
"02148 \mitBbbi $\mathbb{i}$	"021B2 \Ldsh $\llcorner$
"02149 \mitBbbj $\mathbb{j}$	"021B3 \Rdsh $\lrcorner$
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"0214B \upand $\mathfrak{A}$	"021B5 \carriagereturn $\lrcorner$
"02190 \leftarrow $\leftarrow$	"021B6 \curvearrowleft $\curvearrowleft$
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"02193 \downarrow $\downarrow$	"021B9 \barleftarrowrightarrowba $\Leftrightarrow$
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"0219D \rightwvearrow $\rightwvearrow$	"021C3 \downharpoonleft $\downharpoonleft$
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"021A9 \hookleftarrow $\hookleftarrow$	"021CF \nRrightarrow $\nRrightarrow$
"021AA \hookrightarrow $\hookrightarrow$	"021D0 \Leftarrow $\Leftarrow$
"021AB \looparrowleft $\looparrowleft$	"021D1 \Uparrow $\Uparrow$
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




































































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"021D7 \Nearrow	$\Nearrow$	"02206 \increment	$\Delta$
"021D8 \Searrow	$\Searrow$	"02207 \nabla	$\nabla$
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"021DA \Lleftarrow	$\Lleftarrow$	"02209 \notin	$\notin$
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"021E3 \downdasharrow	$\downdasharrow$	"02212 \minus	$-$
"021E4 \barleftarrow	$\barleftarrow$	"02213 \mp	$\mp$
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"021E6 \leftwhitearrow	$\leftwhitearrow$	"02215 \divslash	$/$
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"021E9 \downwhitearrow	$\downwhitearrow$	"02218 \vysmwhtcircle	$\circ$
"021EA \whitearrowupfrombar	$\whitearrowupfrombar$	"02219 \vysmblkcircle	$\cdot$
"021F4 \circlearrowright	$\circlearrowright$	"0221A \sqrt	$\sqrt{\quad}$
"021F5 \downuparrows	$\downuparrows$	"0221B \cuberoot	$\sqrt[3]{\quad}$
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"02201 \complement	$\complement$	"02227 \wedge	$\wedge$
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"02290 \sqsupset $\sqsupset$	"022B6 \origof $\circ\bullet$
"02291 \sqsubseteq $\sqsubseteq$	"022B7 \imageof $\bullet\circ$
"02292 \sqsupseteq $\sqsupseteq$	"022B8 \multimap $\multimap$
"02293 \sqcap $\sqcap$	"022B9 \hermitmatrix $\dagger$
"02294 \sqcup $\sqcup$	"022BA \intercal $\intercal$
"02295 \oplus $\oplus$	"022BB \veebar $\veebar$
"02296 \ominus $\ominus$	"022BC \barwedge $\barwedge$
"02297 \otimes $\otimes$	"022BD \barvee $\barvee$
"02298 \oslash $\oslash$	"022BE \measuredrightangle $\sphericalangle$
"02299 \odot $\odot$	"022BF \varltriangleright $\varltriangleright$
"0229A \circledcirc $\circledcirc$	"022C0 \bigwedge $\bigwedge$

"022C1 \bigvee $\bigvee$	"022E7 \gnsim $\gtrsim$
"022C2 \bigcap $\bigcap$	"022E8 \precnsim $\precnsim$
"022C3 \bigcup $\bigcup$	"022E9 \succnsim $\succnsim$
"022C4 \smwhtdiamond $\diamond$	"022EA \ntriangleleft $\ntriangleleft$
"022C5 \cdot $\cdot$	"022EB \ntriangleright $\ntriangleright$
"022C6 \star $\star$	"022EC \ntrianglelefteq $\ntrianglelefteq$
"022C7 \divideontimes $\div$	"022ED \ntrianglerighteq $\ntrianglerighteq$
"022C8 \bowtie $\bowtie$	"022EE \vdots $\vdots$
"022C9 \ltimes $\ltimes$	"022EF \unicodecdots $\dots$
"022CA \rtimes $\rtimes$	"022F0 \adots $\adots$
"022CB \leftthreetimes $\leftthreetimes$	"022F1 \ddots $\ddots$
"022CC \rightthreetimes $\rightthreetimes$	"022F2 \disin $\disin$
"022CD \backsimeq $\backsimeq$	"022F3 \varisins $\varisins$
"022CE \curlyvee $\curlyvee$	"022F4 \isins $\isins$
"022CF \curlywedge $\curlywedge$	"022F5 \isindot $\isindot$
"022D0 \Subset $\Subset$	"022F6 \varisinobar $\varisinobar$
"022D1 \Supset $\Supset$	"022F7 \isinobar $\isinobar$
"022D2 \Cap $\Cap$	"022F8 \isinvb $\isinvb$
"022D3 \Cup $\Cup$	"022F9 \isinE $\isinE$
"022D4 \pitchfork $\pitchfork$	"022FA \nisd $\nisd$
"022D5 \equalparallel $\equalparallel$	"022FB \varnis $\varnis$
"022D6 \lessdot $\lessdot$	"022FC \nis $\nis$
"022D7 \gtrdot $\gtrdot$	"022FD \varniobar $\varniobar$
"022D8 \lll $\lll$	"022FE \niobar $\niobar$
"022D9 \ggg $\ggg$	"022FF \bagmember $\bagmember$
"022DA \lesseqgtr $\lesseqgtr$	"02300 \diameter $\diameter$
"022DB \gtreqless $\gtreqless$	"02302 \house $\house$
"022DC \eqless $\eqless$	"02305 \varbarwedge $\varbarwedge$
"022DD \eqgtr $\eqgtr$	"02306 \vardoublebarwedge $\vardoublebarwedge$
"022DE \curlyeqprec $\curlyeqprec$	"02308 \lceil $\lceil$
"022DF \curlyeqsucc $\curlyeqsucc$	"02309 \rceil $\rceil$
"022E0 \nprec curlyeq $\nprec curlyeq$	"0230A \lfloor $\lfloor$
"022E1 \nsucc curlyeq $\nsucc curlyeq$	"0230B \rfloor $\rfloor$
"022E2 \nsqsubseteq $\nsqsubseteq$	"02310 \invnot $\invnot$
"022E3 \nsqsupseteq $\nsqsupseteq$	"02311 \sqlozenge $\sqlozenge$
"022E4 \sqsubseteq $\sqsubseteq$	"02312 \proflines $\proflines$
"022E5 \sqsupseteq $\sqsupseteq$	"02313 \profsurf $\profsurf$
"022E6 \lnsim $\lnsim$	"02317 \viewdata $\viewdata$

"02319 \turnednot		"023AE \intextender	
"0231C \ulcorner		"023AF \harrowextender	
"0231D \urcorner		"023B0 \lmoustache	
"0231E \llcorner		"023B1 \rmoustache	
"0231F \lrcorner		"023B2 \sumtop	
"02320 \inttop		"023B3 \sumbottom	
"02321 \intbottom		"023B4 \overbracket	
"02322 \frown		"023B5 \underbracket	
"02323 \smile		"023B6 \bbrktbrk	
"0232C \varhexagonlrbonds		"023B7 \sqrtbottom	
"02332 \conictaper		"023B8 \lvboxline	
"02336 \topbot		"023B9 \rvboxline	
"0233D \obar		"023CE \varcarriagereturn	
"0233F \APLnotslash		"023DC \overparen	
"02340 \APLnotbackslash		"023DD \underparen	
"02353 \APLboxupcaret		"023DE \overbrace	
"02370 \APLboxquestion		"023DF \underbrace	
"0237C \rangledownzigzagarrow			
"02394 \hexagon		"023E0 \obrbrak	
"0239B \lparenuend		"023E1 \ubrbrak	
"0239C \lparenextender		"023E2 \trapezium	
"0239D \lparenlend		"023E3 \benzenr	
"0239E \rparenuend		"023E4 \strns	
"0239F \rparenextender		"023E5 \fltns	
"023A0 \rparenlend		"023E6 \accurrent	
"023A1 \lbrackkuend		"023E7 \elinters	
"023A2 \lbrackextender		"02506 \bdtriplevdash	
"023A3 \lbracklend		"02580 \blockuphalf	
"023A4 \rbrackkuend		"02584 \blocklowhalf	
"023A5 \rbrackextender		"02588 \blockfull	
"023A6 \rbracklend		"0258C \blocklefthalf	
"023A7 \lbraceuend		"02590 \blockrighthalf	
"023A8 \lbracemid		"02591 \blockqtrshaded	
"023A9 \lbracelend		"02592 \blockhalfshaded	
"023AA \vbraceextender		"02593 \blockthreeqtrshaded	
"023AB \rbraceuend		"025A0 \mdlgblksquare	
"023AC \rbracemid		"025A1 \mdlgwhtsquare	
"023AD \rbracelend		"025A2 \squoval	

"025A3 \blackinwhitesquare □	"025C9 \fisheye □
"025A4 \squarehfill □	"025CA \mdlgwhtlozenge □
"025A5 \squarevfill □	"025CB \mdlgwhtcircle ○
"025A6 \squarehvfill □	"025CC \dottedcircle □
"025A7 \squarenwseffill □	"025CD \circlevertfill □
"025A8 \squareneswfill □	"025CE \bullseye ◎
"025A9 \squarecrossfill □	"025CF \mdlgblkcircle ●
"025AA \smbklsquare □	"025D0 \circlelefthalfblack □
"025AB \smwhtsquare □	"025D1 \circlerighthalfblack □
"025AC \hrectangleblack □	"025D2 \circlebottomhalfblack □
"025AD \hrectangle □	"025D3 \circletophalfblack □
"025AE \vrectangleblack □	"025D4 \circleurquadblack □
"025AF \vrectangle □	"025D5 \blackcircleulquadwhite □
"025B0 \parallelogramblack □	"025D6 \blacklefthalfcircle □
"025B1 \parallelogram □	"025D7 \blackrighthalfcircle □
"025B2 \bigblacktriangleup ▲	"025D8 \inversebullet □
"025B3 \bigtriangleup △	"025D9 \inversewhitecircle □
"025B4 \blacktriangle □	"025DA \invwhiteupperhalfcircle □
"025B5 \vartriangle □	"025DB \invwhitelowerhalfcircle □
"025B6 \blacktriangleright ►	"025DC \ularc □
"025B7 \triangleright ▷	"025DD \urarc □
"025B8 \smallblacktriangleright □	"025DE \lrarc □
"025B9 \smalltriangleright □	"025DF \llarc □
"025BA \blackpointerright ►	"025E0 \topsemicircle □
"025BB \whitepointerright ▷	"025E1 \botsemicircle □
"025BC \bigblacktriangledown ▼	"025E2 \lrblacktriangle □
"025BD \bigtriangledown ▽	"025E3 \llblacktriangle □
"025BE \blacktriangledown □	"025E4 \ulblacktriangle □
"025BF \triangledown □	"025E5 \urblacktriangle □
"025C0 \blacktriangleleft ◀	"025E6 \smwhtcircle ○
"025C1 \triangleleft ◁	"025E7 \squareleftblack ■
"025C2 \smallblacktriangleleft □	"025E8 \squarerightblack ■
"025C3 \smalltriangleleft □	"025E9 \squareulblack □
"025C4 \blackpointerleft ◀	"025EA \squarelrblack □
"025C5 \whitepointerleft ◁	"025EB \boxbar □
"025C6 \mdlgblkdiamond □	"025EC \triangleleftdot □
"025C7 \mdlgwhtdiamond □	"025ED \triangleleftblack □
"025C8 \blackinwhitediamond □	"025EE \trianglerightblack □

"025EF \lgwhtcircle ◻	"0266D \flat ♭
"025F0 \squareulquad ◻	"0266E \natural ♮
"025F1 \squareellquad ◻	"0266F \sharp ♯
"025F2 \squarelrquad ◻	"0267E \acidfree ◻
"025F3 \squareurquad ◻	"02680 \dicei ◻
"025F4 \circleulquad ◻	"02681 \diceii ◻
"025F5 \circlellquad ◻	"02682 \diceiii ◻
"025F6 \circlelrquad ◻	"02683 \diceiv ◻
"025F7 \circleurquad ◻	"02684 \dicev ◻
"025F8 \ultriangle ◻	"02685 \dicevi ◻
"025F9 \urtriangle ◻	"02686 \circledrightdot ◻
"025FA \lltriangle ◻	"02687 \circledtwodots ◻
"025FB \mdwhtsquare ◻	"02688 \blackcircledrightdot ◻
"025FC \mdblksquare ■	"02689 \blackcircledtwodots ◻
"025FD \mdsmwhtsquare ◻	"026A5 \Hermaphrodite ◻
"025FE \mdsmblksquare ◻	"026AA \mdwhtcircle ◻
"025FF \lrtriangle ◻	"026AB \mdblkcircle ◻
"02605 \bigstar ★	"026AC \mdsmwhtcircle ◻
"02606 \bigwhitestar ☆	"026B2 \neuter ◻
"02609 \astrosun ☀	"02713 \checkmark ✓
"02621 \danger ☠	"02720 \maltese ✠
"0263B \blacksmiley ☹	"0272A \circledstar ◻
"0263C \sun ☀	"02736 \varstar *
"0263D \rightmoon ☾	"0273D \dingasterisk ◻
"0263E \leftmoon ☾	"02772 \lbrbrak {
"02640 \female ♀	"02773 \rbrbrak }
"02642 \male ♂	"0279B \draftingarrow ↗
"02660 \spadesuit ♠	"027C0 \threedangle ↯
"02661 \heartsuit ♥	"027C1 \whiteinwhitetriangle ▲
"02662 \diamondsuit ♦	"027C2 \perp ⊥
"02663 \clubsuit ♣	"027C3 \subsetcirc ⊆
"02664 \varspadesuit ♠	"027C4 \supsetcirc ⊇
"02665 \varheartsuit ♥	"027C5 \lbag {
"02666 \vardiamondsuit ♦	"027C6 \rbag }
"02667 \varclubsuit ♣	"027C7 \veedot ∇
"02669 \quarternote ♮	"027C8 \bsolhsb \C
"0266A \eighthnote ♯	"027C9 \suphsol ∽
"0266B \twonotes ◻	"027CC \longdivision ◻

"027D0 \diamondcdot $\diamond$	"027F8 \Longleftarrow $\Leftarrow$
"027D1 \wedgedot $\wedge$	"027F9 \Longrightarrow $\Rightarrow$
"027D2 \upin $\uplus$	"027FA \Longleftrightarrow $\Leftrightarrow$
"027D3 \pullback $\lrcorner$	"027FB \longmapsfrom $\longleftarrow$
"027D4 \pushout $\lrcorner$	"027FC \longmapsto $\mapsto$
"027D5 \leftouterjoin $\bowtie$	"027FD \Longmapsfrom $\Leftarrow$
"027D6 \rightouterjoin $\bowtie$	"027FE \Longmapsto $\Rightarrow$
"027D7 \fullouterjoin $\bowtie$	"027FF \longrightsquigarrow $\rightsquigarrow$
"027D8 \bigbot $\perp$	"02900 \nvtwoheadrightarrow $\twoheadrightarrow$
"027D9 \bigtop $\top$	"02901 \nVtwoheadrightarrow $\Twoheadrightarrow$
"027DA \DashVDash $\dashed$	"02902 \nvLeftarrow $\nLeftarrow$
"027DB \dashVdash $\dashv$	"02903 \nvRightarrow $\nRightarrow$
"027DC \multimapin $\multimap$	"02904 \nvLeftrightarrow $\nLeftrightarrow$
"027DD \vlongdash $\dashv$	"02905 \twoheadmapsto $\twoheadmapsto$
"027DE \longdashv $\dashv$	"02906 \Mapsfrom $\Leftarrow$
"027DF \cirbot $\perp$	"02907 \Mapsto $\Rightarrow$
"027E0 \lozengeminus $\diamond$	"02908 \downarrowbarred $\downarrow$
"027E1 \concavediamond $\diamond$	"02909 \uparrowbarred $\uparrow$
"027E2 \concavediamondtickleft $\diamond$	"0290A \Uparrow $\Uparrow$
"027E3 \concavediamondtickright $\diamond$	"0290B \Ddownarrow $\Downarrow$
"027E4 \whitesquaretickleft $\square$	"0290C \leftbkarow $\leftarrow$
"027E5 \whitesquaretickright $\square$	"0290D \rightbkarow $\rightarrow$
"027E6 \lBrack $\llbracket$	"0290E \leftdbkarow $\leftarrow$
"027E7 \rBrack $\rrbracket$	"0290F \dbkarow $\rightarrow$
"027E8 \langle $\langle$	"02910 \drbkarow $\rangle$
"027E9 \rangle $\rangle$	"02911 \rightdotarrow $\rightarrow$
"027EA \lAngle $\langle\langle$	"02912 \baruparrow $\uparrow$
"027EB \rAngle $\rangle\rangle$	"02913 \downarrowbar $\downarrow$
"027EC \Lbrak $\langle$	"02914 \nvrightarrowtail $\twoheadrightarrow$
"027ED \Rbrak $\rangle$	"02915 \nVrightarrowtail $\Twoheadrightarrow$
"027F0 \Uparrow $\Uparrow$	"02916 \twoheadrightarrowtail $\twoheadrightarrow$
"027F1 \Ddownarrow $\Downarrow$	"02917 \nvtwoheadrightarrowtail $\twoheadrightarrow$
"027F2 \acwgapcirclearrow $\circlearrowleft$	"02918 \nVtwoheadrightarrowtail $\Twoheadrightarrow$
"027F3 \cwgapcirclearrow $\circlearrowright$	"02919 \lefttail $\leftarrow$
"027F4 \rightarrowonoplus $\oplus$	"0291A \righttail $\rightarrow$
"027F5 \longleftarrow $\leftarrow$	"0291B \leftdbltail $\leftarrow$
"027F6 \longrightarrow $\rightarrow$	"0291C \rightdbltail $\rightarrow$
"027F7 \longleftrightarrow $\longleftrightarrow$	"0291D \diamondleftarrow $\diamondleftarrow$

"0291E \rightarrowdiamond $\rightarrow\blacklozenge$	"02944 \shortrightarrowleftarrow $\leftrightarrow$
"0291F \diamondleftarrowbar $\blacklozenge\leftarrow$	"02945 \rightarrowplus $\Rightarrow$
"02920 \barrightrightarrowdiamond $\blacklozenge\rightarrow$	"02946 \leftarrowplus $\Leftarrow$
"02921 \nwsearrow $\swarrow$	"02947 \rightarrowx $\leftrightarrow$
"02922 \neswarrow $\nearrow$	"02948 \leftrightharpoonocircle $\Leftrightarrow$
"02923 \hknwarrow $\swarrow$	"02949 \twoheaduparrowcircle $\Updownarrow$
"02924 \hknearrow $\nearrow$	"0294A \leftrightharpoonupdown $\Leftrightarrow$
"02925 \hksearrow $\swarrow$	"0294B \leftrightharpoonodownup $\Leftrightarrow$
"02926 \hkswarrow $\swarrow$	"0294C \updownharpoonrightleft $\Updownarrow$
"02927 \tona $\swarrow$	"0294D \updownharpoonleftright $\Updownarrow$
"02928 \toea $\swarrow$	"0294E \leftrightharpoonupup $\Leftrightarrow$
"02929 \tosa $\swarrow$	"0294F \updownharpoonrightright $\Updownarrow$
"0292A \towa $\swarrow$	"02950 \leftrightharpoonodowndown $\Leftrightarrow$
"0292B \rdiagovfdiag $\times$	"02951 \updownharpoonleftleft $\Updownarrow$
"0292C \fdiagovrdiag $\times$	"02952 \barleftharpoonup $\leftarrow$
"0292D \seovnearrow $\swarrow$	"02953 \rightharpoonupbar $\rightarrow$
"0292E \neovsearrow $\swarrow$	"02954 \barupharpoonright $\uparrow$
"0292F \fdiagovnearrow $\times$	"02955 \downharpoonrightbar $\downarrow$
"02930 \rdiagovsearrow $\times$	"02956 \barleftharpoonodown $\leftarrow$
"02931 \neovnwarrow $\swarrow$	"02957 \rightharpoonodownbar $\rightarrow$
"02932 \nwovnearrow $\swarrow$	"02958 \barupharpoonleft $\uparrow$
"02933 \rightcurvedarrow $\curvearrowright$	"02959 \downharpoonleftbar $\downarrow$
"02934 \uprightcurvearrow $\curvearrowright$	"0295A \leftharpoonupbar $\leftarrow$
"02935 \downrightcurvedarrow $\curvearrowright$	"0295B \barrightharpoonup $\rightarrow$
"02936 \leftdowncurvedarrow $\curvearrowleft$	"0295C \upharpoonrightbar $\uparrow$
"02937 \rightdowncurvedarrow $\curvearrowleft$	"0295D \bardownharpoonright $\uparrow$
"02938 \cwrightarcarrow $\curvearrowright$	"0295E \leftharpoonodownbar $\leftarrow$
"02939 \acwleftarcarrow $\curvearrowleft$	"0295F \barrightharpoonodown $\rightarrow$
"0293A \acwoverarcarrow $\curvearrowright$	"02960 \upharpoonleftbar $\uparrow$
"0293B \acwunderarcarrow $\curvearrowleft$	"02961 \bardownharpoonleft $\uparrow$
"0293C \curvearrowrightminus $\curvearrowright$	"02962 \leftharpoonsupdown $\Leftrightarrow$
"0293D \curvearrowleftplus $\curvearrowleft$	"02963 \upharpoonsleftright $\Leftrightarrow$
"0293E \cwundercurvearrow $\curvearrowright$	"02964 \rightharpoonsupdown $\Rightarrow$
"0293F \ccwundercurvearrow $\curvearrowleft$	"02965 \downharpoonsleftright $\Downarrow$
"02940 \acwcirculararrow $\circlearrowleft$	"02966 \leftrightharpoonsup $\Leftrightarrow$
"02941 \cwcirculararrow $\circlearrowright$	"02967 \leftrightharpoonsdown $\Leftrightarrow$
"02942 \rightarrowshortleftarrow $\leftrightarrow$	"02968 \rightleftharpoonsup $\Leftrightarrow$
"02943 \leftarrowshortrightarrow $\leftrightarrow$	"02969 \rightleftharpoonsdown $\Leftrightarrow$



"0296A \leftharpoonupdash $\Leftarrow$	"02990 \rbrackurtick $\}]$
"0296B \dashleftharpoondown $\Leftarrow$	"02991 \langedot $\langle$
"0296C \rightharpoonupdash $\Rightarrow$	"02992 \rangedot $\rangle$
"0296D \dashrightharpoondown $\Rightarrow$	"02993 \lparenless $\langle\langle$
"0296E \updownharpoonsleftright $\Updownarrow$	"02994 \rparengrtr $\rangle\rangle$
"0296F \downupharpoonsleftright $\Downarrow$	"02995 \Lparengrtr $\langle\langle\langle$
"02970 \rightimply $\Rightarrow$	"02996 \Rparenless $\rangle\rangle\rangle$
"02971 \equalrightarrow $\Rightarrow$	"02997 \lblkbrak $\{$
"02972 \similarrightarrow $\Rightarrow$	"02998 \rblkbrak $\}$
"02973 \leftarrowsimilar $\Leftarrow$	"02999 \fourvdots $\vdots$
"02974 \rightarrowsimilar $\Rightarrow$	"0299A \vzigzag $\sim$
"02975 \rightarrowapprox $\approx$	"0299B \measuredangleleft $\sphericalangle$
"02976 \ltlarr $\Leftarrow$	"0299C \rightanglesqr $\sqsupset$
"02977 \leftarrowless $\Leftarrow$	"0299D \rightanglemdot $\sphericalangle$
"02978 \gtrarr $\gtrrightarrow$	"0299E \angles $\sphericalangle$
"02979 \subrarr $\subset$	"0299F \angdnr $\sphericalangle$
"0297A \leftarrowsubset $\Leftarrow$	"029A0 \gtlpar $\triangleright$
"0297B \suplarr $\supset$	"029A1 \sphericalangleleup $\sphericalangle$
"0297C \leftfishtail $\Leftarrow$	"029A2 \turnangle $\curvearrowright$
"0297D \rightfishtail $\rightarrow$	"029A3 \revangle $\sphericalangle$
"0297E \upfishtail $\Uparrow$	"029A4 \angleubar $\sphericalangle$
"0297F \downfishtail $\Downarrow$	"029A5 \revangleubar $\sphericalangle$
"02980 \Vvert $\mathbb{V}$	"029A6 \wideangledown $\sphericalangle$
"02981 \mdsmbkcircle $\bullet$	"029A7 \wideangleup $\sphericalangle$
"02982 \typecolon $\circ$	"029A8 \measanglerutone $\sphericalangle$
"02983 \lBrace $\{$	"029A9 \measanglelutonw $\sphericalangle$
"02984 \rBrace $\}$	"029AA \measanglerdtose $\sphericalangle$
"02985 \lParen $($	"029AB \measangleldtosw $\sphericalangle$
"02986 \rParen $)$	"029AC \measangleurtone $\sphericalangle$
"02987 \llparenthesis $($	"029AD \measangleultonw $\sphericalangle$
"02988 \rrparenthesis $)$	"029AE \measangledrtose $\sphericalangle$
"02989 \llangle $\langle$	"029AF \measangledltosw $\sphericalangle$
"0298A \rrangle $\rangle$	"029B0 \reemptyset $\emptyset$
"0298B \lbrackubar $[$	"029B1 \emptysettoabar $\emptyset$
"0298C \rbrackubar $]$	"029B2 \emptysettocirc $\emptyset$
"0298D \lbrackultick $[$	"029B3 \emptysettoarr $\emptyset$
"0298E \rbracklrtick $]$	"029B4 \emptysettoarrl $\emptyset$
"0298F \lbracklltick $[$	"029B5 \circlehbar $\ominus$

"029B6 \circledvert	$\textcircled{\updownarrow}$	"029DC \iinfin	$\infty$
"029B7 \circledparallel	$\textcircled{\parallel}$	"029DD \tieinfty	$\infty$
"029B8 \obslash	$\oslash$	"029DE \nvinfty	$\infty$
"029B9 \operp	$\perp$	"029DF \dualmap	$\circ\circ$
"029BA \obot	$\oplus$	"029E0 \laplac	$\square$
"029BB \olcross	$\boxtimes$	"029E1 \lrtriangleeq	$\trianglelefteq$
"029BC \odotslashdot	$\odot$	"029E2 \shuffle	$\sqcup$
"029BD \uparrowoncircle	$\uparrow$	"029E3 \eparsl	$\#$
"029BE \circledwhitebullet	$\textcircled{\bullet}$	"029E4 \smeparsl	$\#$
"029BF \circledbullet	$\textcircled{\bullet}$	"029E5 \eqvparsl	$\#$
"029C0 \olessthan	$\lessdot$	"029E6 \gleichstark	$\equiv$
"029C1 \ogreaterthan	$\gtrdot$	"029E7 \thermod	$\#$
"029C2 \cirscir	$\circ$	"029E8 \downtriangleleftblack	$\blacktriangleleft$
"029C3 \cirE	$\circ$	"029E9 \downtrianglerightblack	$\blacktriangleright$
"029C4 \boxdiag	$\boxtimes$	"029EA \blackdiamonddownarrow	$\blacklozenge$
"029C5 \boxbslash	$\boxtimes$	"029EB \mdlgblklozenge	$\blacklozenge$
"029C6 \boxast	$\boxtimes$	"029EC \circledownarrow	$\circ$
"029C7 \boxcircle	$\boxtimes$	"029ED \blackcircledownarrow	$\bullet$
"029C8 \boxbox	$\boxtimes$	"029EE \errbarsquare	$\square$
"029C9 \boxonbox	$\boxtimes$	"029EF \errbarblacksquare	$\blacksquare$
"029CA \triangleodot	$\triangle$	"029F0 \errbardiamond	$\diamond$
"029CB \triangleubar	$\triangle$	"029F1 \errbarblackdiamond	$\blacklozenge$
"029CC \triangles	$\triangle$	"029F2 \errbarcircle	$\circ$
"029CD \triangleserifs	$\triangle$	"029F3 \errbarblackcircle	$\bullet$
"029CE \rtriltri	$\triangleright$	"029F4 \ruledelayed	$\rightarrow$
"029CF \ltrivb	$\triangleleft$	"029F5 \setminusminus	$\setminus$
"029D0 \vbrtri	$\triangleright$	"029F6 \dsol	$\bar{\setminus}$
"029D1 \lfbowtie	$\bowtie$	"029F7 \rsolbar	$\bar{\setminus}$
"029D2 \rfbowtie	$\bowtie$	"029F8 \xsol	$\setminus$
"029D3 \fbowtie	$\bowtie$	"029F9 \xbsol	$\setminus$
"029D4 \lftimes	$\times$	"029FA \doubleplus	$\#$
"029D5 \rftimes	$\times$	"029FB \tripleplus	$\#$
"029D6 \hourglass	$\times$	"029FC \lcurvyangle	$\langle$
"029D7 \blackhourglass	$\times$	"029FD \rcurvyangle	$\rangle$
"029D8 \lvzigzag	$\zigzag$	"029FE \tplus	$\#$
"029D9 \rvzigzag	$\zigzag$	"029FF \tminus	$\#$
"029DA \Lvzigzag	$\zigzag$	"02A00 \bigodot	$\textcircled{\bullet}$
"029DB \Rvzigzag	$\zigzag$	"02A01 \bigoplus	$\textcircled{\oplus}$

"02A02 \bigotimes	$\otimes$	"02A28 \plustrif	$\dagger$
"02A03 \bigcup	$\cup$	"02A29 \commaminus	$\ddagger$
"02A04 \biguplus	$\uplus$	"02A2A \minusdot	$\ddagger$
"02A05 \bigsqcap	$\sqcap$	"02A2B \minusfdots	$\ddagger$
"02A06 \bigsqcup	$\sqcup$	"02A2C \minusrdots	$\ddagger$
"02A07 \conjquant	$\wedge$	"02A2D \opluslhrim	$\oplus$
"02A08 \disjquant	$\vee$	"02A2E \oplusrhrim	$\oplus$
"02A09 \bigtimes	$\times$	"02A2F \vectimes	$\times$
"02A0A \modtwosum	$\Sigma$	"02A30 \dottimes	$\times$
"02A0B \sumint	$\int$	"02A31 \timesbar	$\times$
"02A0C \iiint	$\iiint$	"02A32 \btimes	$\times$
"02A0D \intbar	$\int$	"02A33 \smashtimes	$\ast$
"02A0E \intBar	$\int$	"02A34 \otimeslhrim	$\otimes$
"02A0F \fint	$\int$	"02A35 \otimesrhrim	$\otimes$
"02A10 \cirfnint	$\oint$	"02A36 \otimeseshat	$\otimes$
"02A11 \awint	$\int$	"02A37 \otimes	$\otimes$
"02A12 \rppolint	$\int$	"02A38 \odiv	$\oplus$
"02A13 \scpolint	$\int$	"02A39 \triangleplus	$\triangle$
"02A14 \npolint	$\int$	"02A3A \triangleminus	$\triangle$
"02A15 \pointint	$\oint$	"02A3B \triangletimes	$\triangle$
"02A16 \sqint	$\int$	"02A3C \intprod	$\int$
"02A17 \intlarhk	$\int$	"02A3D \intprodr	$\int$
"02A18 \intx	$\int$	"02A3E \fcup	$\int$
"02A19 \intcap	$\int$	"02A3F \amalg	$\amalg$
"02A1A \intcup	$\int$	"02A40 \capdot	$\cap$
"02A1B \upint	$\int$	"02A41 \uminus	$\cup$
"02A1C \lowint	$\int$	"02A42 \bar{c}up	$\bar{c}$
"02A1D \Join	$\bowtie$	"02A43 \bar{c}ap	$\bar{c}$
"02A1E \bigtriangleleft	$\triangleleft$	"02A44 \capwedge	$\cap$
"02A1F \zcmp	$\int$	"02A45 \cupvee	$\cup$
"02A20 \zpipe	$\gg$	"02A46 \cupovercap	$\cup$
"02A21 \zproject	$\uparrow$	"02A47 \cupovercup	$\cup$
"02A22 \ringplus	$\dagger$	"02A48 \cupbarcap	$\cup$
"02A23 \plushat	$\dagger$	"02A49 \cupbarcup	$\cup$
"02A24 \simplus	$\dagger$	"02A4A \twocups	$\omega$
"02A25 \plusdot	$\dagger$	"02A4B \twocaps	$\omega$
"02A26 \plussim	$\dagger$	"02A4C \closedvarcup	$\sqcup$
"02A27 \plussubtwo	$\ddagger$	"02A4D \closedvarcap	$\sqcap$

"02A4E \Sqcap $\sqcap$	"02A74 \Coloneq $::=$
"02A4F \Sqcup $\sqcup$	"02A75 \eqeq $==$
"02A50 \closedvarcupsmashprod $\sqcup$	"02A76 \eqeqeq $===$
"02A51 \wedgeodot $\wedge$	"02A77 \ddotseq $\doteq$
"02A52 \veeodot $\vee$	"02A78 \equivDD $\equiv$
"02A53 \Wedge $\wedge$	"02A79 \ltcir $\triangleleft$
"02A54 \Vee $\vee$	"02A7A \gtcir $\triangleright$
"02A55 \wedgonwedge $\wedge$	"02A7B \ltquest $\triangleleft$
"02A56 \veeonvee $\vee$	"02A7C \gtquest $\triangleright$
"02A57 \bigslopedvee $\vee$	"02A7D \leqslant $\leq$
"02A58 \bigslopedwedge $\wedge$	"02A7E \geqslant $\geq$
"02A59 \veeonwedge $\wedge$	"02A7F \lesdot $\leqdot$
"02A5A \wedgemidvert $\wedge$	"02A80 \gesdot $\geqdot$
"02A5B \veemidvert $\vee$	"02A81 \lesdoto $\leqdot$
"02A5C \midbarwedge $\wedge$	"02A82 \gesdoto $\geqdot$
"02A5D \midbarvee $\vee$	"02A83 \lesdotor $\leqdot$
"02A5E \doublebarwedge $\overline{\wedge}$	"02A84 \gesdoto1 $\geqdot$
"02A5F \wedgear $\triangle$	"02A85 \lessapprox $\approx$
"02A60 \wedgedoublebar $\underline{\triangle}$	"02A86 \gtrapprox $\gtrapprox$
"02A61 \varveebar $\veebar$	"02A87 \lneq $\leq$
"02A62 \doublebarvee $\overline{\vee}$	"02A88 \gneq $\geq$
"02A63 \veedoublebar $\underline{\vee}$	"02A89 \lnapprox $\approx$
"02A64 \dsub $\triangleleft$	"02A8A \gnapprox $\gtrapprox$
"02A65 \rsub $\triangleright$	"02A8B \lesseqqgtr $\lesseqqgtr$
"02A66 \eqdot $\doteq$	"02A8C \gtreqqless $\gtreqqless$
"02A67 \dotequiv $\doteq$	"02A8D \lsime $\lesssim$
"02A68 \equivVert $\equiv$	"02A8E \gsime $\gtrsim$
"02A69 \equivVvert $\equiv$	"02A8F \lsimg $\lesssim$
"02A6A \dotsim $\sim$	"02A90 \gsiml $\gtrsim$
"02A6B \simrdots $\sim$	"02A91 \lgE $\cong$
"02A6C \simminussim $\cong$	"02A92 \glE $\cong$
"02A6D \congdot $\cong$	"02A93 \lesges $\lesssim$
"02A6E \asteq $\doteq$	"02A94 \gesles $\gtrsim$
"02A6F \hatapprox $\hat{\approx}$	"02A95 \eqslantless $\leqslant$
"02A70 \approxeq $\approx$	"02A96 \eqslantgtr $\gtrsim$
"02A71 \eqqplus $\doteq$	"02A97 \elsdot $\leqdot$
"02A72 \pluseqq $\doteq$	"02A98 \egsdot $\geqdot$
"02A73 \eqqsim $\doteq$	"02A99 \eqqless $\leq$

"02A9A \eqqgtr $\approx$	"02AC0 \supsetplus $\supsetplus$
"02A9B \eqqslantless $\approx$	"02AC1 \submult $\submult$
"02A9C \eqqslantgtr $\approx$	"02AC2 \supmult $\supmult$
"02A9D \simless $\simless$	"02AC3 \subedot $\subedot$
"02A9E \simgtr $\simgtr$	"02AC4 \supedot $\supedot$
"02A9F \simLE $\simLE$	"02AC5 \subseteqq $\subseteqq$
"02AA0 \simGE $\simGE$	"02AC6 \supseteqq $\supseteqq$
"02AA1 \Lt $\ll$	"02AC7 \subsim $\subsim$
"02AA2 \Gt $\gg$	"02AC8 \supsim $\supsim$
"02AA3 \partialmeetcontraction $\partialmeetcontraction$	"02AC9 \subsetapprox $\subsetapprox$
"02AA4 \glj $\glj$	"02ACA \supsetapprox $\supsetapprox$
"02AA5 \gla $\gla$	"02ACB \subsetneqq $\subsetneqq$
"02AA6 \ltcc $\ltcc$	"02ACC \supsetneqq $\supsetneqq$
"02AA7 \gtcc $\gtcc$	"02ACD \lsqhook $\sqsubset$
"02AA8 \lescc $\lescc$	"02ACE \rsqhook $\sqsupset$
"02AA9 \gescc $\gescc$	"02ACF \csub $\subset$
"02AAA \smt $\ll$	"02AD0 \csup $\supset$
"02AAB \lat $\gg$	"02AD1 \csube $\supseteq$
"02AAC \smte $\leq$	"02AD2 \csupe $\supseteq$
"02AAD \late $\geq$	"02AD3 \subsup $\supseteq$
"02AAE \bumpeq $\bumpeq$	"02AD4 \supsub $\supseteq$
"02AAF \preceq $\preceq$	"02AD5 \subsub $\supseteq$
"02AB0 \succeq $\succeq$	"02AD6 \supsup $\supseteq$
"02AB1 \precneq $\precneq$	"02AD7 \suphsub $\supseteq$
"02AB2 \succneq $\succneq$	"02AD8 \supdsub $\supseteq$
"02AB3 \preceqq $\preceqq$	"02AD9 \forkv $\forkv$
"02AB4 \succeqq $\succeqq$	"02ADA \topfork $\topfork$
"02AB5 \precneqq $\precneqq$	"02ADB \mlcp $\mlcp$
"02AB6 \succneqq $\succneqq$	"02ADC \forks $\forks$
"02AB7 \precapprox $\precapprox$	"02ADD \forksnot $\forksnot$
"02AB8 \succapprox $\succapprox$	"02ADE \shortlefttack $\shortlefttack$
"02AB9 \precnapprox $\precnapprox$	"02ADF \shortdowntack $\shortdowntack$
"02ABA \succnapprox $\succnapprox$	"02AE0 \shortuptack $\shortuptack$
"02ABB \Prec $\ll$	"02AE1 \perps $\perps$
"02ABC \Succ $\gg$	"02AE2 \vDdash $\vDash$
"02ABD \subsetdot $\subsetdot$	"02AE3 \dashV $\dashV$
"02ABE \supsetdot $\supsetdot$	"02AE4 \Dashv $\Dashv$
"02ABF \subsetplus $\subsetplus$	"02AE5 \DashV $\DashV$

"02AE6 \varVdash $\vDash$	"02B1E \vysmwhtsquare $\square$
"02AE7 \Barv $\bar{v}$	"02B1F \pentagonblack $\blacksquare$
"02AE8 \vBar $\bar{v}$	"02B20 \pentagon $\square$
"02AE9 \vBarv $\bar{v}$	"02B21 \varhexagon $\square$
"02AEA \barV $\bar{V}$	"02B22 \varhexagonblack $\blacksquare$
"02AEB \Vbar $\bar{V}$	"02B23 \hexagonblack $\blacksquare$
"02AEC \Not $\neq$	"02B24 \lgblkcircle $\square$
"02AED \bNot $\neq$	"02B25 \mdblkdiamond $\square$
"02AEE \revnmid $\nmid$	"02B26 \mdwhtdiamond $\square$
"02AEF \circirid $\circ$	"02B27 \mdblklozenge $\square$
"02AF0 \midcir $\circ$	"02B28 \mdwhtlozenge $\square$
"02AF1 \topcir $\circ$	"02B29 \smbldiamond $\square$
"02AF2 \nhpar $\#$	"02B2A \smbklozenge $\square$
"02AF3 \parsim $\#$	"02B2B \smwhtlozenge $\square$
"02AF4 \interleave $\equiv$	"02B2C \blkhorzoval $\square$
"02AF5 \nhVvert $\equiv$	"02B2D \whthorzoval $\square$
"02AF6 \threedotcolon $:$	"02B2E \blkvertoval $\square$
"02AF7 \lllnest $\lll$	"02B2F \whtvertoval $\square$
"02AF8 \gggnest $\ggg$	"02B30 \circleleftarrow $\leftarrow$
"02AF9 \leqqslant $\leqq$	"02B31 \leftthreearrows $\Leftarrow$
"02AFA \geqqslant $\geqq$	"02B32 \leftarrowonoplus $\oplus$
"02AFB \trslash $\///$	"02B33 \longleftsquigarrow $\lll$
"02AFC \biginterleave $\equiv$	"02B34 \nvtwoheadleftarrow $\leftarrow$
"02AFD \sslash $\//$	"02B35 \nVtwoheadleftarrow $\Leftarrow$
"02AFE \talloblong $\square$	"02B36 \twoheadmapsfrom $\leftarrow$
"02AFF \bigtalloblong $\square$	"02B37 \twoheadleftdbkarrow $\leftarrow$
"02B12 \squaretopblack $\square$	"02B38 \leftdotarrow $\leftarrow$
"02B13 \squarebotblack $\square$	"02B39 \nvleftarrowtail $\leftarrow$
"02B14 \squareurblack $\square$	"02B3A \nVleftarrowtail $\Leftarrow$
"02B15 \squareellblack $\square$	"02B3B \twoheadleftarrowtail $\leftarrow$
"02B16 \diamondleftblack $\square$	"02B3C \nvtwoheadleftarrowtail $\Leftarrow$
"02B17 \diamondrightblack $\square$	"02B3D \nVtwoheadleftarrowtail $\Leftarrow$
"02B18 \diamondtopblack $\square$	"02B3E \leftarrowx $\leftarrow$
"02B19 \diamondbotblack $\square$	"02B3F \leftcurvedarrow $\leftarrow$
"02B1A \dottedsquare $\square$	"02B40 \equalleftarrow $\Leftarrow$
"02B1B \lgblksquare $\blacksquare$	"02B41 \bsimilarleftarrow $\leftarrow$
"02B1C \lgwhtsquare $\square$	"02B42 \leftarrowbackapprox $\leftarrow$
"02B1D \vysmbksquare $\square$	"02B43 \rightarrowgtr $\rightarrow$

"02B44 \rightrightarrowsupset $\Rightarrow$	"1D412 \mbfS <b>S</b>
"02B45 \Lleftarrow $\Leftarrow$	"1D413 \mbfT <b>T</b>
"02B46 \RRrightarrow $\Rrightarrow$	"1D414 \mbfU <b>U</b>
"02B47 \bsimilarrrightarrow $\Rightarrow$	"1D415 \mbfV <b>V</b>
"02B48 \rightrightarrowbackapprox $\Rightarrow$	"1D416 \mbfW <b>W</b>
"02B49 \similarleftarrow $\Leftarrow$	"1D417 \mbfX <b>X</b>
"02B4A \leftarrowapprox $\Leftarrow$	"1D418 \mbfY <b>Y</b>
"02B4B \leftarrowbsimilar $\Leftarrow$	"1D419 \mbfZ <b>Z</b>
"02B4C \rightarrowbsimilar $\Rightarrow$	"1D41A \mbfa <b>a</b>
"02B50 \medwhitestar $\star$	"1D41B \mbfb <b>b</b>
"02B51 \medblackstar $\blacksquare$	"1D41C \mbfc <b>c</b>
"02B52 \smwhitestar $\star$	"1D41D \mbfd <b>d</b>
"02B53 \rightpentagonblack $\blacksquare$	"1D41E \mbfe <b>e</b>
"02B54 \rightpentagon $\square$	"1D41F \mbff <b>f</b>
"03012 \postalmark $\square$	"1D420 \mbfg <b>g</b>
"03014 \lbrbrak {	"1D421 \mbfh <b>h</b>
"03015 \rbrbrak }	"1D422 \mbfi <b>i</b>
"03018 \Lbrbrak {	"1D423 \mbfj <b>j</b>
"03019 \Rbrbrak }	"1D424 \mbfk <b>k</b>
"03030 \hzigzag $\square$	"1D425 \mbfl <b>l</b>
"1D400 \mbfA <b>A</b>	"1D426 \mbfm <b>m</b>
"1D401 \mbfB <b>B</b>	"1D427 \mbfn <b>n</b>
"1D402 \mbfC <b>C</b>	"1D428 \mbfo <b>o</b>
"1D403 \mbfD <b>D</b>	"1D429 \mbfp <b>p</b>
"1D404 \mbfE <b>E</b>	"1D42A \mbfq <b>q</b>
"1D405 \mbfF <b>F</b>	"1D42B \mbfr <b>r</b>
"1D406 \mbfG <b>G</b>	"1D42C \mbfs <b>s</b>
"1D407 \mbfH <b>H</b>	"1D42D \mbft <b>t</b>
"1D408 \mbfI <b>I</b>	"1D42E \mbfu <b>u</b>
"1D409 \mbfJ <b>J</b>	"1D42F \mbfv <b>v</b>
"1D40A \mbfK <b>K</b>	"1D430 \mbfw <b>w</b>
"1D40B \mbfL <b>L</b>	"1D431 \mbfx <b>x</b>
"1D40C \mbfM <b>M</b>	"1D432 \mbfy <b>y</b>
"1D40D \mbfN <b>N</b>	"1D433 \mbfz <b>z</b>
"1D40E \mbfO <b>O</b>	"1D434 \mitA <b>A</b>
"1D40F \mbfP <b>P</b>	"1D435 \mitB <b>B</b>
"1D410 \mbfQ <b>Q</b>	"1D436 \mitC <b>C</b>
"1D411 \mbfR <b>R</b>	"1D437 \mitD <b>D</b>

"1D438 \mitE	<i>E</i>	"1D45F \mitr	<i>r</i>
"1D439 \mitF	<i>F</i>	"1D460 \mits	<i>s</i>
"1D43A \mitG	<i>G</i>	"1D461 \mitt	<i>t</i>
"1D43B \mitH	<i>H</i>	"1D462 \mitu	<i>u</i>
"1D43C \mitI	<i>I</i>	"1D463 \mitv	<i>v</i>
"1D43D \mitJ	<i>J</i>	"1D464 \mitw	<i>w</i>
"1D43E \mitK	<i>K</i>	"1D465 \mitx	<i>x</i>
"1D43F \mitL	<i>L</i>	"1D466 \mity	<i>y</i>
"1D440 \mitM	<i>M</i>	"1D467 \mitz	<i>z</i>
"1D441 \mitN	<i>N</i>	"1D468 \mbfitA	<i>A</i>
"1D442 \mitO	<i>O</i>	"1D469 \mbfitB	<i>B</i>
"1D443 \mitP	<i>P</i>	"1D46A \mbfitC	<i>C</i>
"1D444 \mitQ	<i>Q</i>	"1D46B \mbfitD	<i>D</i>
"1D445 \mitR	<i>R</i>	"1D46C \mbfitE	<i>E</i>
"1D446 \mitS	<i>S</i>	"1D46D \mbfitF	<i>F</i>
"1D447 \mitT	<i>T</i>	"1D46E \mbfitG	<i>G</i>
"1D448 \mitU	<i>U</i>	"1D46F \mbfitH	<i>H</i>
"1D449 \mitV	<i>V</i>	"1D470 \mbfitI	<i>I</i>
"1D44A \mitW	<i>W</i>	"1D471 \mbfitJ	<i>J</i>
"1D44B \mitX	<i>X</i>	"1D472 \mbfitK	<i>K</i>
"1D44C \mitY	<i>Y</i>	"1D473 \mbfitL	<i>L</i>
"1D44D \mitZ	<i>Z</i>	"1D474 \mbfitM	<i>M</i>
"1D44E \mita	<i>a</i>	"1D475 \mbfitN	<i>N</i>
"1D44F \mitb	<i>b</i>	"1D476 \mbfitO	<i>O</i>
"1D450 \mitc	<i>c</i>	"1D477 \mbfitP	<i>P</i>
"1D451 \mitd	<i>d</i>	"1D478 \mbfitQ	<i>Q</i>
"1D452 \mite	<i>e</i>	"1D479 \mbfitR	<i>R</i>
"1D453 \mitf	<i>f</i>	"1D47A \mbfitS	<i>S</i>
"1D454 \mitg	<i>g</i>	"1D47B \mbfitT	<i>T</i>
"1D456 \miti	<i>i</i>	"1D47C \mbfitU	<i>U</i>
"1D457 \mitj	<i>j</i>	"1D47D \mbfitV	<i>V</i>
"1D458 \mitk	<i>k</i>	"1D47E \mbfitW	<i>W</i>
"1D459 \mitl	<i>l</i>	"1D47F \mbfitX	<i>X</i>
"1D45A \mitm	<i>m</i>	"1D480 \mbfitY	<i>Y</i>
"1D45B \mitn	<i>n</i>	"1D481 \mbfitZ	<i>Z</i>
"1D45C \mito	<i>o</i>	"1D482 \mbfita	<i>a</i>
"1D45D \mitp	<i>p</i>	"1D483 \mbfitb	<i>b</i>
"1D45E \mitq	<i>q</i>	"1D484 \mbfitc	<i>c</i>



"1D485 \mbfitd	<i>d</i>	"1D4B3 \mscrX	<i>X</i>
"1D486 \mbfite	<i>e</i>	"1D4B4 \mscrY	<i>Y</i>
"1D487 \mbfitf	<i>f</i>	"1D4B5 \mscrZ	<i>Z</i>
"1D488 \mbfitg	<i>g</i>	"1D4B6 \mscra	<i>a</i>
"1D489 \mbfith	<i>h</i>	"1D4B7 \mscrb	<i>b</i>
"1D48A \mbfiti	<i>i</i>	"1D4B8 \mscrc	<i>c</i>
"1D48B \mbfitj	<i>j</i>	"1D4B9 \mscrd	<i>d</i>
"1D48C \mbfitk	<i>k</i>	"1D4BB \mscrf	<i>f</i>
"1D48D \mbfitl	<i>l</i>	"1D4BD \mscrh	<i>h</i>
"1D48E \mbfitm	<i>m</i>	"1D4BE \mscri	<i>i</i>
"1D48F \mbfitn	<i>n</i>	"1D4BF \mscrj	<i>j</i>
"1D490 \mbfito	<i>o</i>	"1D4C0 \mscrk	<i>k</i>
"1D491 \mbfitp	<i>p</i>	"1D4C1 \mscrl	<i>l</i>
"1D492 \mbfitq	<i>q</i>	"1D4C2 \mscrm	<i>m</i>
"1D493 \mbfitr	<i>r</i>	"1D4C3 \mscrn	<i>n</i>
"1D494 \mbfits	<i>s</i>	"1D4C5 \mscrp	<i>p</i>
"1D495 \mbfitt	<i>t</i>	"1D4C6 \mscrq	<i>q</i>
"1D496 \mbfitu	<i>u</i>	"1D4C7 \mscrr	<i>r</i>
"1D497 \mbfitv	<i>v</i>	"1D4C8 \mscrs	<i>s</i>
"1D498 \mbfitw	<i>w</i>	"1D4C9 \mscrt	<i>t</i>
"1D499 \mbfitx	<i>x</i>	"1D4CA \mscru	<i>u</i>
"1D49A \mbfity	<i>y</i>	"1D4CB \mscrv	<i>v</i>
"1D49B \mbfitz	<i>z</i>	"1D4CC \mscrw	<i>w</i>
"1D49C \mscrA	<i>A</i>	"1D4CD \mscrx	<i>x</i>
"1D49E \mscrC	<i>C</i>	"1D4CE \mscry	<i>y</i>
"1D49F \mscrD	<i>D</i>	"1D4CF \mscrz	<i>z</i>
"1D4A2 \mscrG	<i>G</i>	"1D4D0 \mbfscrA	<i>A</i>
"1D4A5 \mscrJ	<i>J</i>	"1D4D1 \mbfscrB	<i>B</i>
"1D4A6 \mscrK	<i>K</i>	"1D4D2 \mbfscrC	<i>C</i>
"1D4A9 \mscrN	<i>N</i>	"1D4D3 \mbfscrD	<i>D</i>
"1D4AA \mscrO	<i>O</i>	"1D4D4 \mbfscrE	<i>E</i>
"1D4AB \mscrP	<i>P</i>	"1D4D5 \mbfscrF	<i>F</i>
"1D4AC \mscrQ	<i>Q</i>	"1D4D6 \mbfscrG	<i>G</i>
"1D4AE \mscrS	<i>S</i>	"1D4D7 \mbfscrH	<i>H</i>
"1D4AF \mscrT	<i>T</i>	"1D4D8 \mbfscrI	<i>I</i>
"1D4B0 \mscrU	<i>U</i>	"1D4D9 \mbfscrJ	<i>J</i>
"1D4B1 \mscrV	<i>V</i>	"1D4DA \mbfscrK	<i>K</i>
"1D4B2 \mscrW	<i>W</i>	"1D4DB \mbfscrL	<i>L</i>

"1D4DC \mbfscrM	<i>M</i>	"1D502 \mbfscry	<i>Y</i>
"1D4DD \mbfscrN	<i>N</i>	"1D503 \mbfscrz	<i>Z</i>
"1D4DE \mbfscrO	<i>O</i>	"1D504 \mfracA	$\mathbb{A}$
"1D4DF \mbfscrP	<i>P</i>	"1D505 \mfracB	$\mathbb{B}$
"1D4E0 \mbfscrQ	<i>Q</i>	"1D507 \mfracD	$\mathbb{D}$
"1D4E1 \mbfscrR	<i>R</i>	"1D508 \mfracE	$\mathbb{E}$
"1D4E2 \mbfscrS	<i>S</i>	"1D509 \mfracF	$\mathbb{F}$
"1D4E3 \mbfscrT	<i>T</i>	"1D50A \mfracG	$\mathbb{G}$
"1D4E4 \mbfscrU	<i>U</i>	"1D50D \mfracJ	$\mathbb{J}$
"1D4E5 \mbfscrV	<i>V</i>	"1D50E \mfracK	$\mathbb{K}$
"1D4E6 \mbfscrW	<i>W</i>	"1D50F \mfracL	$\mathbb{L}$
"1D4E7 \mbfscrX	<i>X</i>	"1D510 \mfracM	$\mathbb{M}$
"1D4E8 \mbfscrY	<i>Y</i>	"1D511 \mfracN	$\mathbb{N}$
"1D4E9 \mbfscrZ	<i>Z</i>	"1D512 \mfracO	$\mathbb{O}$
"1D4EA \mbfscra	<i>a</i>	"1D513 \mfracP	$\mathbb{P}$
"1D4EB \mbfscrb	<i>b</i>	"1D514 \mfracQ	$\mathbb{Q}$
"1D4EC \mbfscrc	<i>c</i>	"1D516 \mfracS	$\mathbb{S}$
"1D4ED \mbfscrd	<i>d</i>	"1D517 \mfracT	$\mathbb{T}$
"1D4EE \mbfscre	<i>e</i>	"1D518 \mfracU	$\mathbb{U}$
"1D4EF \mbfscrF	<i>f</i>	"1D519 \mfracV	$\mathbb{V}$
"1D4F0 \mbfscrg	<i>g</i>	"1D51A \mfracW	$\mathbb{W}$
"1D4F1 \mbfscrh	<i>h</i>	"1D51B \mfracX	$\mathbb{X}$
"1D4F2 \mbfscri	<i>i</i>	"1D51C \mfracY	$\mathbb{Y}$
"1D4F3 \mbfscrj	<i>j</i>	"1D51E \mfraka	<i>a</i>
"1D4F4 \mbfscrk	<i>k</i>	"1D51F \mfracb	<i>b</i>
"1D4F5 \mbfscrL	<i>l</i>	"1D520 \mfracc	<i>c</i>
"1D4F6 \mbfscrm	<i>m</i>	"1D521 \mfracd	<i>d</i>
"1D4F7 \mbfscrn	<i>n</i>	"1D522 \mfrace	<i>e</i>
"1D4F8 \mbfscro	<i>o</i>	"1D523 \mfracf	<i>f</i>
"1D4F9 \mbfscrp	<i>p</i>	"1D524 \mfracg	<i>g</i>
"1D4FA \mbfscrq	<i>q</i>	"1D525 \mfrach	<i>h</i>
"1D4FB \mbfscrR	<i>r</i>	"1D526 \mfraci	<i>i</i>
"1D4FC \mbfscrs	<i>s</i>	"1D527 \mfracj	<i>j</i>
"1D4FD \mbfscrt	<i>t</i>	"1D528 \mfrack	<i>k</i>
"1D4FE \mbfscru	<i>u</i>	"1D529 \mfracl	<i>l</i>
"1D4FF \mbfscrV	<i>v</i>	"1D52A \mfracm	<i>m</i>
"1D500 \mbfscrW	<i>w</i>	"1D52B \mfracn	<i>n</i>
"1D501 \mbfscrX	<i>x</i>	"1D52C \mfraco	<i>o</i>

"1D52D \mfrakp	p	"1D55A \Bbbi	i
"1D52E \mfrakq	q	"1D55B \Bbbj	j
"1D52F \mfrakr	r	"1D55C \Bbbk	k
"1D530 \mfraks	s	"1D55D \Bbb l	l
"1D531 \mfrakt	t	"1D55E \Bbbm	m
"1D532 \mfraku	u	"1D55F \Bbbn	n
"1D533 \mfrakv	v	"1D560 \Bbbo	o
"1D534 \mfrakw	w	"1D561 \Bbbp	p
"1D535 \mfrakx	x	"1D562 \Bbbq	q
"1D536 \mfraky	y	"1D563 \Bbbr	r
"1D537 \mfrakz	z	"1D564 \Bbbs	s
"1D538 \BbbA	A	"1D565 \Bbbt	t
"1D539 \BbbB	B	"1D566 \Bbbu	u
"1D53B \BbbD	D	"1D567 \Bbbv	v
"1D53C \BbbE	E	"1D568 \Bbbw	w
"1D53D \BbbF	F	"1D569 \Bbbx	x
"1D53E \BbbG	G	"1D56A \Bbby	y
"1D540 \BbbI	I	"1D56B \Bbbz	z
"1D541 \BbbJ	J	"1D56C \mbffrakA	Ⓐ
"1D542 \BbbK	K	"1D56D \mbffrakB	Ⓑ
"1D543 \BbbL	L	"1D56E \mbffrakC	Ⓒ
"1D544 \BbbM	M	"1D56F \mbffrakD	Ⓓ
"1D546 \BbbO	O	"1D570 \mbffrakE	Ⓔ
"1D54A \BbbS	S	"1D571 \mbffrakF	Ⓕ
"1D54B \BbbT	T	"1D572 \mbffrakG	Ⓖ
"1D54C \BbbU	U	"1D573 \mbffrakH	Ⓗ
"1D54D \BbbV	V	"1D574 \mbffrakI	Ⓘ
"1D54E \BbbW	W	"1D575 \mbffrakJ	Ⓝ
"1D54F \BbbX	X	"1D576 \mbffrakK	Ⓚ
"1D550 \BbbY	Y	"1D577 \mbffrakL	Ⓛ
"1D552 \Bbba	a	"1D578 \mbffrakM	Ⓜ
"1D553 \Bbbb	b	"1D579 \mbffrakN	Ⓝ
"1D554 \Bbbc	c	"1D57A \mbffrakO	Ⓞ
"1D555 \Bbbd	d	"1D57B \mbffrakP	Ⓟ
"1D556 \Bbbe	e	"1D57C \mbffrakQ	Ⓠ
"1D557 \Bbbf	f	"1D57D \mbffrakR	Ⓡ
"1D558 \Bbbg	g	"1D57E \mbffrakS	Ⓢ
"1D559 \Bbbh	h	"1D57F \mbffrakT	Ⓣ

"1D580 \mbffrakU	U	"1D5A6 \msansG	G
"1D581 \mbffrakV	V	"1D5A7 \msansH	H
"1D582 \mbffrakW	W	"1D5A8 \msansI	I
"1D583 \mbffrakX	X	"1D5A9 \msansJ	J
"1D584 \mbffrakY	Y	"1D5AA \msansK	K
"1D585 \mbffrakZ	Z	"1D5AB \msansL	L
"1D586 \mbffraka	a	"1D5AC \msansM	M
"1D587 \mbffrakb	b	"1D5AD \msansN	N
"1D588 \mbffrakc	c	"1D5AE \msansO	O
"1D589 \mbffrakd	d	"1D5AF \msansP	P
"1D58A \mbffrake	e	"1D5B0 \msansQ	Q
"1D58B \mbffrakf	f	"1D5B1 \msansR	R
"1D58C \mbffrakg	g	"1D5B2 \msansS	S
"1D58D \mbffrakh	h	"1D5B3 \msansT	T
"1D58E \mbffraki	i	"1D5B4 \msansU	U
"1D58F \mbffrakj	j	"1D5B5 \msansV	V
"1D590 \mbffrakk	k	"1D5B6 \msansW	W
"1D591 \mbffrakl	l	"1D5B7 \msansX	X
"1D592 \mbffrakm	m	"1D5B8 \msansY	Y
"1D593 \mbffrakn	n	"1D5B9 \msansZ	Z
"1D594 \mbffrako	o	"1D5BA \msansa	a
"1D595 \mbffrakp	p	"1D5BB \msansb	b
"1D596 \mbffrakq	q	"1D5BC \msansc	c
"1D597 \mbffrakr	r	"1D5BD \msansd	d
"1D598 \mbffraks	s	"1D5BE \msanse	e
"1D599 \mbffrakt	t	"1D5BF \msansf	f
"1D59A \mbffraku	u	"1D5C0 \msansg	g
"1D59B \mbffrakv	v	"1D5C1 \msansh	h
"1D59C \mbffrakw	w	"1D5C2 \msansi	i
"1D59D \mbffrakx	x	"1D5C3 \msansj	j
"1D59E \mbffraky	y	"1D5C4 \msansk	k
"1D59F \mbffrakz	z	"1D5C5 \msansl	l
"1D5A0 \msansA	A	"1D5C6 \msansm	m
"1D5A1 \msansB	B	"1D5C7 \msansn	n
"1D5A2 \msansC	C	"1D5C8 \msanso	o
"1D5A3 \msansD	D	"1D5C9 \msansp	p
"1D5A4 \msansE	E	"1D5CA \msansq	q
"1D5A5 \msansF	F	"1D5CB \msansr	r

"1D5CC \msanss	s	"1D5F2 \mbfsanse	e
"1D5CD \msanst	t	"1D5F3 \mbfsansf	f
"1D5CE \msansu	u	"1D5F4 \mbfsansg	g
"1D5CF \msansv	v	"1D5F5 \mbfsansh	h
"1D5D0 \msansw	w	"1D5F6 \mbfsansi	i
"1D5D1 \msansx	x	"1D5F7 \mbfsansj	j
"1D5D2 \msansy	y	"1D5F8 \mbfsansk	k
"1D5D3 \msansz	z	"1D5F9 \mbfsansl	l
"1D5D4 \mbfsansA	<b>A</b>	"1D5FA \mbfsansm	<b>m</b>
"1D5D5 \mbfsansB	<b>B</b>	"1D5FB \mbfsansn	<b>n</b>
"1D5D6 \mbfsansC	<b>C</b>	"1D5FC \mbfsanso	<b>o</b>
"1D5D7 \mbfsansD	<b>D</b>	"1D5FD \mbfsansp	<b>p</b>
"1D5D8 \mbfsansE	<b>E</b>	"1D5FE \mbfsansq	<b>q</b>
"1D5D9 \mbfsansF	<b>F</b>	"1D5FF \mbfsansr	<b>r</b>
"1D5DA \mbfsansG	<b>G</b>	"1D600 \mbfsanss	<b>s</b>
"1D5DB \mbfsansH	<b>H</b>	"1D601 \mbfsanst	<b>t</b>
"1D5DC \mbfsansI	<b>I</b>	"1D602 \mbfsansu	<b>u</b>
"1D5DD \mbfsansJ	<b>J</b>	"1D603 \mbfsansv	<b>v</b>
"1D5DE \mbfsansK	<b>K</b>	"1D604 \mbfsansw	<b>w</b>
"1D5DF \mbfsansL	<b>L</b>	"1D605 \mbfsansx	<b>x</b>
"1D5E0 \mbfsansM	<b>M</b>	"1D606 \mbfsansy	<b>y</b>
"1D5E1 \mbfsansN	<b>N</b>	"1D607 \mbfsansz	<b>z</b>
"1D5E2 \mbfsansO	<b>O</b>	"1D608 \mitsansA	<b>A</b>
"1D5E3 \mbfsansP	<b>P</b>	"1D609 \mitsansB	<b>B</b>
"1D5E4 \mbfsansQ	<b>Q</b>	"1D60A \mitsansC	<b>C</b>
"1D5E5 \mbfsansR	<b>R</b>	"1D60B \mitsansD	<b>D</b>
"1D5E6 \mbfsansS	<b>S</b>	"1D60C \mitsansE	<b>E</b>
"1D5E7 \mbfsansT	<b>T</b>	"1D60D \mitsansF	<b>F</b>
"1D5E8 \mbfsansU	<b>U</b>	"1D60E \mitsansG	<b>G</b>
"1D5E9 \mbfsansV	<b>V</b>	"1D60F \mitsansH	<b>H</b>
"1D5EA \mbfsansW	<b>W</b>	"1D610 \mitsansI	<b>I</b>
"1D5EB \mbfsansX	<b>X</b>	"1D611 \mitsansJ	<b>J</b>
"1D5EC \mbfsansY	<b>Y</b>	"1D612 \mitsansK	<b>K</b>
"1D5ED \mbfsansZ	<b>Z</b>	"1D613 \mitsansL	<b>L</b>
"1D5EE \mbfsansa	<b>a</b>	"1D614 \mitsansM	<b>M</b>
"1D5EF \mbfsansb	<b>b</b>	"1D615 \mitsansN	<b>N</b>
"1D5F0 \mbfsansc	<b>c</b>	"1D616 \mitsansO	<b>O</b>
"1D5F1 \mbfsansd	<b>d</b>	"1D617 \mitsansP	<b>P</b>

"1D618 \mitsansQ	<i>Q</i>	"1D63E \mbfitsansC	<b>C</b>
"1D619 \mitsansR	<i>R</i>	"1D63F \mbfitsansD	<b>D</b>
"1D61A \mitsansS	<i>S</i>	"1D640 \mbfitsansE	<b>E</b>
"1D61B \mitsansT	<i>T</i>	"1D641 \mbfitsansF	<b>F</b>
"1D61C \mitsansU	<i>U</i>	"1D642 \mbfitsansG	<b>G</b>
"1D61D \mitsansV	<i>V</i>	"1D643 \mbfitsansH	<b>H</b>
"1D61E \mitsansW	<i>W</i>	"1D644 \mbfitsansI	<b>I</b>
"1D61F \mitsansX	<i>X</i>	"1D645 \mbfitsansJ	<b>J</b>
"1D620 \mitsansY	<i>Y</i>	"1D646 \mbfitsansK	<b>K</b>
"1D621 \mitsansZ	<i>Z</i>	"1D647 \mbfitsansL	<b>L</b>
"1D622 \mitsansa	<i>a</i>	"1D648 \mbfitsansM	<b>M</b>
"1D623 \mitsansb	<i>b</i>	"1D649 \mbfitsansN	<b>N</b>
"1D624 \mitsansc	<i>c</i>	"1D64A \mbfitsansO	<b>O</b>
"1D625 \mitsansd	<i>d</i>	"1D64B \mbfitsansP	<b>P</b>
"1D626 \mitsanse	<i>e</i>	"1D64C \mbfitsansQ	<b>Q</b>
"1D627 \mitsansf	<i>f</i>	"1D64D \mbfitsansR	<b>R</b>
"1D628 \mitsansg	<i>g</i>	"1D64E \mbfitsansS	<b>S</b>
"1D629 \mitsansh	<i>h</i>	"1D64F \mbfitsansT	<b>T</b>
"1D62A \mitsansi	<i>i</i>	"1D650 \mbfitsansU	<b>U</b>
"1D62B \mitsansj	<i>j</i>	"1D651 \mbfitsansV	<b>V</b>
"1D62C \mitsansk	<i>k</i>	"1D652 \mbfitsansW	<b>W</b>
"1D62D \mitsansl	<i>l</i>	"1D653 \mbfitsansX	<b>X</b>
"1D62E \mitsansm	<i>m</i>	"1D654 \mbfitsansY	<b>Y</b>
"1D62F \mitsansn	<i>n</i>	"1D655 \mbfitsansZ	<b>Z</b>
"1D630 \mitsanso	<i>o</i>	"1D656 \mbfitsansa	<b>a</b>
"1D631 \mitsansp	<i>p</i>	"1D657 \mbfitsansb	<b>b</b>
"1D632 \mitsansq	<i>q</i>	"1D658 \mbfitsansc	<b>c</b>
"1D633 \mitsansr	<i>r</i>	"1D659 \mbfitsansd	<b>d</b>
"1D634 \mitsanss	<i>s</i>	"1D65A \mbfitsanse	<b>e</b>
"1D635 \mitsanst	<i>t</i>	"1D65B \mbfitsansf	<b>f</b>
"1D636 \mitsansu	<i>u</i>	"1D65C \mbfitsansg	<b>g</b>
"1D637 \mitsansv	<i>v</i>	"1D65D \mbfitsansh	<b>h</b>
"1D638 \mitsansw	<i>w</i>	"1D65E \mbfitsansi	<b>i</b>
"1D639 \mitsansx	<i>x</i>	"1D65F \mbfitsansj	<b>j</b>
"1D63A \mitsansy	<i>y</i>	"1D660 \mbfitsansk	<b>k</b>
"1D63B \mitsansz	<i>z</i>	"1D661 \mbfitsansl	<b>l</b>
"1D63C \mbfitsansA	<b>A</b>	"1D662 \mbfitsansm	<b>m</b>
"1D63D \mbfitsansB	<b>B</b>	"1D663 \mbfitsansn	<b>n</b>

"1D664 \mbfitsanso	<b><i>o</i></b>	"1D68A \mtta	<b>a</b>
"1D665 \mbfitsansp	<b><i>p</i></b>	"1D68B \mttb	<b>b</b>
"1D666 \mbfitsansq	<b><i>q</i></b>	"1D68C \mttc	<b>c</b>
"1D667 \mbfitsansr	<b><i>r</i></b>	"1D68D \mttd	<b>d</b>
"1D668 \mbfitsanss	<b><i>s</i></b>	"1D68E \mtte	<b>e</b>
"1D669 \mbfitsanst	<b><i>t</i></b>	"1D68F \mttf	<b>f</b>
"1D66A \mbfitsansu	<b><i>u</i></b>	"1D690 \mttg	<b>g</b>
"1D66B \mbfitsansv	<b><i>v</i></b>	"1D691 \mtth	<b>h</b>
"1D66C \mbfitsansw	<b><i>w</i></b>	"1D692 \mtti	<b>i</b>
"1D66D \mbfitsansx	<b><i>x</i></b>	"1D693 \mttj	<b>j</b>
"1D66E \mbfitsansy	<b><i>y</i></b>	"1D694 \mttk	<b>k</b>
"1D66F \mbfitsansz	<b><i>z</i></b>	"1D695 \mttl	<b>l</b>
"1D670 \mttA	<b>A</b>	"1D696 \mttm	<b>m</b>
"1D671 \mttB	<b>B</b>	"1D697 \mttn	<b>n</b>
"1D672 \mttC	<b>C</b>	"1D698 \mtto	<b>o</b>
"1D673 \mttD	<b>D</b>	"1D699 \mttp	<b>p</b>
"1D674 \mttE	<b>E</b>	"1D69A \mttq	<b>q</b>
"1D675 \mttF	<b>F</b>	"1D69B \mttr	<b>r</b>
"1D676 \mttG	<b>G</b>	"1D69C \mtts	<b>s</b>
"1D677 \mttH	<b>H</b>	"1D69D \mttt	<b>t</b>
"1D678 \mttI	<b>I</b>	"1D69E \mttu	<b>u</b>
"1D679 \mttJ	<b>J</b>	"1D69F \mttv	<b>v</b>
"1D67A \mttK	<b>K</b>	"1D6A0 \mttw	<b>w</b>
"1D67B \mttL	<b>L</b>	"1D6A1 \mttx	<b>x</b>
"1D67C \mttM	<b>M</b>	"1D6A2 \mtty	<b>y</b>
"1D67D \mttN	<b>N</b>	"1D6A3 \mttz	<b>z</b>
"1D67E \mttO	<b>O</b>	"1D6A4 \imath	<b><math>\iota</math></b>
"1D67F \mttP	<b>P</b>	"1D6A5 \jmath	<b><math>j</math></b>
"1D680 \mttQ	<b>Q</b>	"1D6A8 \mbfAlpha	<b><math>\mathbf{A}</math></b>
"1D681 \mttR	<b>R</b>	"1D6A9 \mbfBeta	<b><math>\mathbf{B}</math></b>
"1D682 \mttS	<b>S</b>	"1D6AA \mbfGamma	<b><math>\mathbf{\Gamma}</math></b>
"1D683 \mttT	<b>T</b>	"1D6AB \mbfDelta	<b><math>\mathbf{\Delta}</math></b>
"1D684 \mttU	<b>U</b>	"1D6AC \mbfEpsilon	<b><math>\mathbf{E}</math></b>
"1D685 \mttV	<b>V</b>	"1D6AD \mbfZeta	<b><math>\mathbf{Z}</math></b>
"1D686 \mttW	<b>W</b>	"1D6AE \mbfEta	<b><math>\mathbf{H}</math></b>
"1D687 \mttX	<b>X</b>	"1D6AF \mbfTheta	<b><math>\mathbf{\Theta}</math></b>
"1D688 \mttY	<b>Y</b>	"1D6B0 \mbfIota	<b><math>\mathbf{I}</math></b>
"1D689 \mttZ	<b>Z</b>	"1D6B1 \mbfKappa	<b><math>\mathbf{K}</math></b>

"1D6B2 \mbfLambda $\Lambda$	"1D6D8 \mbfchi $\chi$
"1D6B3 \mbfMu $M$	"1D6D9 \mbfpsi $\psi$
"1D6B4 \mbfNu $N$	"1D6DA \mbfomega $\omega$
"1D6B5 \mbfXi $\Xi$	"1D6DB \mbfpartial $\partial$
"1D6B6 \mbfOmicron $O$	"1D6DC \mbfvarepsilon $\epsilon$
"1D6B7 \mbfPi $\Pi$	"1D6DD \mbfvartheta $\vartheta$
"1D6B8 \mbfRho $P$	"1D6DE \mbfvarkappa $\varkappa$
"1D6B9 \mbfvarTheta $\Theta$	"1D6DF \mbfphi $\phi$
"1D6BA \mbfSigma $\Sigma$	"1D6E0 \mbfvarrho $\rho$
"1D6BB \mbfTau $T$	"1D6E1 \mbfvarpi $\varpi$
"1D6BC \mbfUpsilon $Y$	"1D6E2 \mitAlpha $A$
"1D6BD \mbfPhi $\Phi$	"1D6E3 \mitBeta $B$
"1D6BE \mbfChi $X$	"1D6E4 \mitGamma $\Gamma$
"1D6BF \mbfPsi $\Psi$	"1D6E5 \mitDelta $\Delta$
"1D6C0 \mbfOmega $\Omega$	"1D6E6 \mitEpsilon $E$
"1D6C1 \mbfnabla $V$	"1D6E7 \mitZeta $Z$
"1D6C2 \mbfalpha $\alpha$	"1D6E8 \mitEta $H$
"1D6C3 \mbfbeta $\beta$	"1D6E9 \mitTheta $\Theta$
"1D6C4 \mbfgamma $\gamma$	"1D6EA \mitIota $I$
"1D6C5 \mbfdelta $\delta$	"1D6EB \mitKappa $K$
"1D6C6 \mbfepsilon $\epsilon$	"1D6EC \mitLambda $\Lambda$
"1D6C7 \mbfzeta $\zeta$	"1D6ED \mitMu $M$
"1D6C8 \mbfeta $\eta$	"1D6EE \mitNu $N$
"1D6C9 \mbftheta $\theta$	"1D6EF \mitXi $\Xi$
"1D6CA \mbfiota $\iota$	"1D6F0 \mitOmicron $O$
"1D6CB \mbfkappa $\kappa$	"1D6F1 \mitPi $\Pi$
"1D6CC \mbflambda $\lambda$	"1D6F2 \mitRho $P$
"1D6CD \mbfmu $\mu$	"1D6F3 \mitvarTheta $\Theta$
"1D6CE \mbfnu $\nu$	"1D6F4 \mitSigma $\Sigma$
"1D6CF \mbfxi $\xi$	"1D6F5 \mitTau $T$
"1D6D0 \mbfomicron $o$	"1D6F6 \mitUpsilon $Y$
"1D6D1 \mbfpi $\pi$	"1D6F7 \mitPhi $\Phi$
"1D6D2 \mbfrho $\rho$	"1D6F8 \mitChi $X$
"1D6D3 \mbfvarsigma $\varsigma$	"1D6F9 \mitPsi $\Psi$
"1D6D4 \mbfsigma $\sigma$	"1D6FA \mitOmega $\Omega$
"1D6D5 \mbftau $\tau$	"1D6FB \mitnabla $V$
"1D6D6 \mbfupsilon $\upsilon$	"1D6FC \mitalpha $\alpha$
"1D6D7 \mbfvarphi $\varphi$	"1D6FD \mitbeta $\beta$



"1D6FE \mitgamma $\gamma$	"1D724 \mbfitIota <b>I</b>
"1D6FF \mitdelta $\delta$	"1D725 \mbfitKappa <b>K</b>
"1D700 \mitepsilon $\epsilon$	"1D726 \mbfitLambda <b><math>\Lambda</math></b>
"1D701 \mitzeta $\zeta$	"1D727 \mbfitMu <b>M</b>
"1D702 \miteta $\eta$	"1D728 \mbfitNu <b>N</b>
"1D703 \mittheta $\theta$	"1D729 \mbfitXi <b><math>\Xi</math></b>
"1D704 \mitiota $\iota$	"1D72A \mbfitOmicron <b>O</b>
"1D705 \mitkappa $\kappa$	"1D72B \mbfitPi <b><math>\Pi</math></b>
"1D706 \mitlambda $\lambda$	"1D72C \mbfitRho <b>P</b>
"1D707 \mitmu $\mu$	"1D72D \mbfitvarTheta <b><math>\Theta</math></b>
"1D708 \mitnu $\nu$	"1D72E \mbfitSigma <b><math>\Sigma</math></b>
"1D709 \mitxi $\xi$	"1D72F \mbfitTau <b>T</b>
"1D70A \mitomicron <b>o</b>	"1D730 \mbfitUpsilon <b><math>\Upsilon</math></b>
"1D70B \mitpi $\pi$	"1D731 \mbfitPhi <b><math>\Phi</math></b>
"1D70C \mitrho $\rho$	"1D732 \mbfitChi <b><math>\chi</math></b>
"1D70D \mitvarsigma $\varsigma$	"1D733 \mbfitPsi <b><math>\Psi</math></b>
"1D70E \mitsigma $\sigma$	"1D734 \mbfitOmega <b><math>\Omega</math></b>
"1D70F \mittau $\tau$	"1D735 \mbfitnabla <b>V</b>
"1D710 \mitupsilon $\upsilon$	"1D736 \mbfitalpha <b><math>\alpha</math></b>
"1D711 \mitphi $\phi$	"1D737 \mbfitbeta <b><math>\beta</math></b>
"1D712 \mitchi $\chi$	"1D738 \mbfitgamma $\gamma$
"1D713 \mitpsi $\psi$	"1D739 \mbfitdelta $\delta$
"1D714 \mitomega $\omega$	"1D73A \mbfitepsilon $\epsilon$
"1D715 \mitpartial $\partial$	"1D73B \mbfitzeta $\zeta$
"1D716 \mitvarepsilon $\epsilon$	"1D73C \mbfiteta $\eta$
"1D717 \mitvartheta $\vartheta$	"1D73D \mbfittheta $\theta$
"1D718 \mitvarkappa $\varkappa$	"1D73E \mbfitiota $\iota$
"1D719 \mitvarphi $\phi$	"1D73F \mbfitkappa $\kappa$
"1D71A \mitvarrho $\varrho$	"1D740 \mbfitlambda $\lambda$
"1D71B \mitvarpi $\varpi$	"1D741 \mbfitmu $\mu$
"1D71C \mbfitAlpha <b>A</b>	"1D742 \mbfitnu $\nu$
"1D71D \mbfitBeta <b>B</b>	"1D743 \mbfitxi $\xi$
"1D71E \mbfitGamma <b><math>\Gamma</math></b>	"1D744 \mbfitomicron <b>o</b>
"1D71F \mbfitDelta <b><math>\Delta</math></b>	"1D745 \mbfitpi $\pi$
"1D720 \mbfitEpsilon <b>E</b>	"1D746 \mbfitrho $\rho$
"1D721 \mbfitZeta <b>Z</b>	"1D747 \mbfitvarsigma $\varsigma$
"1D722 \mbfitEta <b>H</b>	"1D748 \mbfitsigma $\sigma$
"1D723 \mbfitTheta <b><math>\Theta</math></b>	"1D749 \mbfittau $\tau$

"1D74A \mbfitupsilon $\upsilon$	"1D770 \mbfsansalpha $\alpha$
"1D74B \mbfitphi $\varphi$	"1D771 \mbfsansbeta $\beta$
"1D74C \mbfitchi $\chi$	"1D772 \mbfsansgamma $\gamma$
"1D74D \mbfitpsi $\psi$	"1D773 \mbfsansdelta $\delta$
"1D74E \mbfitomega $\omega$	"1D774 \mbfsansepsilon $\epsilon$
"1D74F \mbfitpartial $\partial$	"1D775 \mbfsanszeta $\zeta$
"1D750 \mbfitvarepsilon $\epsilon$	"1D776 \mbfsanseta $\eta$
"1D751 \mbfitvartheta $\vartheta$	"1D777 \mbfsanstheta $\theta$
"1D752 \mbfitvarkappa $\varkappa$	"1D778 \mbfsansiota $\iota$
"1D753 \mbfitvarphi $\phi$	"1D779 \mbfsanskappa $\kappa$
"1D754 \mbfitvarrho $\varrho$	"1D77A \mbfsanslambda $\lambda$
"1D755 \mbfitvarpi $\wp$	"1D77B \mbfsansmu $\mu$
"1D756 \mbfsansAlpha <b>A</b>	"1D77C \mbfsansnu $\nu$
"1D757 \mbfsansBeta <b>B</b>	"1D77D \mbfsansxi $\xi$
"1D758 \mbfsansGamma $\Gamma$	"1D77E \mbfsansomicron $\omicron$
"1D759 \mbfsansDelta $\Delta$	"1D77F \mbfsanspi $\pi$
"1D75A \mbfsansEpsilon <b>E</b>	"1D780 \mbfsansrho $\rho$
"1D75B \mbfsansZeta <b>Z</b>	"1D781 \mbfsansvarsigma $\varsigma$
"1D75C \mbfsansEta <b>H</b>	"1D782 \mbfsanssigma $\sigma$
"1D75D \mbfsansTheta $\Theta$	"1D783 \mbfsanstau $\tau$
"1D75E \mbfsansIota <b>I</b>	"1D784 \mbfsansupsilon $\upsilon$
"1D75F \mbfsansKappa <b>K</b>	"1D785 \mbfsansphi $\varphi$
"1D760 \mbfsansLambda $\Lambda$	"1D786 \mbfsanschi $\chi$
"1D761 \mbfsansMu <b>M</b>	"1D787 \mbfsanspsi $\psi$
"1D762 \mbfsansNu <b>N</b>	"1D788 \mbfsansomega $\omega$
"1D763 \mbfsansXi $\Xi$	"1D789 \mbfsanspartial $\partial$
"1D764 \mbfsansOmicron <b>O</b>	"1D78A \mbfsansvarepsilon $\epsilon$
"1D765 \mbfsansPi $\Pi$	"1D78B \mbfsansvartheta $\vartheta$
"1D766 \mbfsansRho <b>P</b>	"1D78C \mbfsansvarkappa $\varkappa$
"1D767 \mbfsansvarTheta $\Theta$	"1D78D \mbfsansvarphi $\phi$
"1D768 \mbfsansSigma $\Sigma$	"1D78E \mbfsansvarrho $\varrho$
"1D769 \mbfsansTau <b>T</b>	"1D78F \mbfsansvarpi $\wp$
"1D76A \mbfsansUpsilon $\Upsilon$	"1D790 \mbfitsansAlpha <b>A</b>
"1D76B \mbfsansPhi $\Phi$	"1D791 \mbfitsansBeta <b>B</b>
"1D76C \mbfsansChi $\Chi$	"1D792 \mbfitsansGamma $\Gamma$
"1D76D \mbfsansPsi $\Psi$	"1D793 \mbfitsansDelta $\Delta$
"1D76E \mbfsansOmega $\Omega$	"1D794 \mbfitsansEpsilon <b>E</b>
"1D76F \mbfsansnabla $\nabla$	"1D795 \mbfitsansZeta <b>Z</b>

"1D796 \mbfitsansEta <b>H</b>	"1D7BC \mbfitsanssigma <b>σ</b>
"1D797 \mbfitsansTheta <b>Θ</b>	"1D7BD \mbfitsanstau <b>τ</b>
"1D798 \mbfitsansIota <b>I</b>	"1D7BE \mbfitsansupsilon <b>υ</b>
"1D799 \mbfitsansKappa <b>K</b>	"1D7BF \mbfitsansphi <b>φ</b>
"1D79A \mbfitsansLambda <b>Λ</b>	"1D7C0 \mbfitsanschi <b>χ</b>
"1D79B \mbfitsansMu <b>M</b>	"1D7C1 \mbfitsanspsi <b>ψ</b>
"1D79C \mbfitsansNu <b>N</b>	"1D7C2 \mbfitsansomega <b>ω</b>
"1D79D \mbfitsansXi <b>Ξ</b>	"1D7C3 \mbfitsanspartial <b>∂</b>
"1D79E \mbfitsansOmicron <b>O</b>	"1D7C4 \mbfitsansvarepsilon <b>ε</b>
"1D79F \mbfitsansPi <b>Π</b>	"1D7C5 \mbfitsansvartheta <b>ϑ</b>
"1D7A0 \mbfitsansRho <b>P</b>	"1D7C6 \mbfitsansvarkappa <b>κ</b>
"1D7A1 \mbfitsansvarTheta <b>Θ</b>	"1D7C7 \mbfitsansvarphi <b>φ</b>
"1D7A2 \mbfitsansSigma <b>Σ</b>	"1D7C8 \mbfitsansvarrho <b>ρ</b>
"1D7A3 \mbfitsansTau <b>T</b>	"1D7C9 \mbfitsansvarpi <b>ω</b>
"1D7A4 \mbfitsansUpsilon <b>Υ</b>	"1D7CA \mbfDigamma <b>F</b>
"1D7A5 \mbfitsansPhi <b>Φ</b>	"1D7CB \mbfdigamma <b>F</b>
"1D7A6 \mbfitsansChi <b>X</b>	"1D7CE \mbfzero <b>0</b>
"1D7A7 \mbfitsansPsi <b>Ψ</b>	"1D7CF \mbfone <b>1</b>
"1D7A8 \mbfitsansOmega <b>Ω</b>	"1D7D0 \mbftwo <b>2</b>
"1D7A9 \mbfitsansnabla <b>∇</b>	"1D7D1 \mbfthree <b>3</b>
"1D7AA \mbfitsansalpha <b>α</b>	"1D7D2 \mbffour <b>4</b>
"1D7AB \mbfitsansbeta <b>β</b>	"1D7D3 \mbffive <b>5</b>
"1D7AC \mbfitsansgamma <b>γ</b>	"1D7D4 \mbfsix <b>6</b>
"1D7AD \mbfitsansdelta <b>δ</b>	"1D7D5 \mbfseven <b>7</b>
"1D7AE \mbfitsansepsilon <b>ε</b>	"1D7D6 \mbfeight <b>8</b>
"1D7AF \mbfitsanszeta <b>ζ</b>	"1D7D7 \mbfnine <b>9</b>
"1D7B0 \mbfitsanseta <b>η</b>	"1D7D8 \Bbbzero <b>0</b>
"1D7B1 \mbfitsanstheta <b>θ</b>	"1D7D9 \Bbbone <b>1</b>
"1D7B2 \mbfitsansiota <b>ι</b>	"1D7DA \Bbbtwo <b>2</b>
"1D7B3 \mbfitsanskappa <b>κ</b>	"1D7DB \Bbbthree <b>3</b>
"1D7B4 \mbfitsanslambda <b>λ</b>	"1D7DC \Bbbfour <b>4</b>
"1D7B5 \mbfitsansmu <b>μ</b>	"1D7DD \Bbbfive <b>5</b>
"1D7B6 \mbfitsansnu <b>ν</b>	"1D7DE \Bbbsix <b>6</b>
"1D7B7 \mbfitsansxi <b>ξ</b>	"1D7DF \Bbbseven <b>7</b>
"1D7B8 \mbfitsansomicron <b>ο</b>	"1D7E0 \Bbbeight <b>8</b>
"1D7B9 \mbfitsanspi <b>π</b>	"1D7E1 \Bbbnine <b>9</b>
"1D7BA \mbfitsansrho <b>ρ</b>	"1D7E2 \msanszero <b>0</b>
"1D7BB \mbfitsansvarsigma <b>ς</b>	"1D7E3 \msansone <b>1</b>

"1D7E4 \msanstwo 2	"1D7F3 \mbfsansseven 7
"1D7E5 \msansthree 3	"1D7F4 \mbfsanseight 8
"1D7E6 \msansfour 4	"1D7F5 \mbfsansnine 9
"1D7E7 \msansfive 5	"1D7F6 \mttzero 0
"1D7E8 \msanssix 6	"1D7F7 \mttone 1
"1D7E9 \msansseven 7	"1D7F8 \mtttwo 2
"1D7EA \msanseight 8	"1D7F9 \mttthree 3
"1D7EB \msansnine 9	"1D7FA \mttfour 4
"1D7EC \mbfsanszero 0	"1D7FB \mttfive 5
"1D7ED \mbfsansone 1	"1D7FC \mttsix 6
"1D7EE \mbfsanstwo 2	"1D7FD \mttseven 7
"1D7EF \mbfsansthree 3	"1D7FE \mtteight 8
"1D7F0 \mbfsansfour 4	"1D7FF \mttnine 9
"1D7F1 \mbfsansfive 5	
"1D7F2 \mbfsanssix 6	

## C Risultato di `otfinfo`

Riportiamo le risposte di `otfinfo` sul font principale di questo documento, che risiede in `/usr/local/texlive/2010/texmf-dist/fonts/opentype/public/xits` ed è contenuto nel file `xits-regular.otf`. Con `>` rappresentiamo l'invito del terminale e sotto il comando presentiamo la risposta del sistema. Tre punti tra parentesi quadre rappresentano informazioni omesse qui per brevità.

```
> otfinfo -i xits-regular.otf
Family:           XITS
Subfamily:        Regular
Full name:         XITS
PostScript name:  XITS
Version:          Version 001.006
Unique ID:         FontForge 2.0 : XITS : 9-8-2010
Description:       Arie de Ruiter, who in 1995 was Head [...]
Designer:          MicroPress Inc., [...]
Designer URL:     http://www.micropress-inc.com
Vendor URL:       http://www.stixfonts.org
Trademark:        STIX Fonts(TM) is a trademark [...]
Copyright:        Copyright (c) 2001-2010 by the STI [...]
License URL:      http://www.stixfonts.org/user_license.html
License Description: As a condition for receiving these fonts [...]
```

```
> otfinfo -s xits-regular.otf
DFLT           Default
```

cyr1	Cyrillic
grek	Greek
latn	Latin
latn.NLD	Latin/Dutch

```
> otffinfo -f xits-regular.otf
frac    Fractions
kern    Kerning
liga    Standard Ligatures
onum    Oldstyle Figures
```

```
> otffinfo -z xits-regular.otf
```

```
> otffinfo -p xits-regular.otf
XITS
```

```
> otffinfo -a xits-regular.otf
XITS
```

Per mostrare come l'opzione -a dia un'informazione fondamentale, ripetiamo la richiesta per gli altri file della famiglia.

```
> otffinfo -a xits-italic.otf
XITS
> otffinfo -a xits-bold.otf
XITS
> otffinfo -a xits-bolditalic.otf
XITS
```

Viceversa, la richiesta per `xits-math.otf` produce

```
> otffinfo -a xits-math.otf
XITS Math
```

ed è questo il nome che va dato come argomento di `\setmathfont` se si adopera `unicode-math`.

Le opzioni -a e -i possono essere date anche per esaminare font nel formato TrueType (estensione `.ttf`).

## D Due esempi

Una pagina composta con il font STIX.

10

ENRICO GREGORIO

We can embed it into a diagram with exact rows and columns

$$\begin{array}{ccccccc}
 & & 0 & & 0 & & 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 0 & \longrightarrow & L_2 & \longrightarrow & M_2 & \longrightarrow & N_2 \longrightarrow 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 0 & \longrightarrow & L_1 & \longrightarrow & M_1 & \longrightarrow & N_1 \longrightarrow 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 0 & \longrightarrow & L & \longrightarrow & M & \longrightarrow & N \longrightarrow 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 & & 0 & & 0 & & 0
 \end{array}$$

where the rows are  $\mathcal{F}_2$ -presentations. We can apply  $G$  to this diagram, recalling that  $G'L$  is the kernel of  $GL_2 \rightarrow GL_1$ , and the same for the others: a standard application of the “snake lemma” (e.g., [22, Corollary 4.11.9]) gives the connecting morphism we are looking for.  $\square$

The next proposition shows the behavior of  $G$  with respect to finitely generated objects. Recall that an object  $M$  in a Grothendieck category  $\mathcal{C}$  is *small* if the functor  $\text{Hom}_{\mathcal{C}}(M, \cdot) : \mathcal{C} \rightarrow \mathbf{Ab}$  commutes with coproducts. Every finitely generated object is small, but the converse is, in general, false.

**3.5. Remark.** The functor  $F$  commutes with coproducts, since both the classes  $\mathcal{F}_1$  and  $\mathcal{F}_2$  are closed under coproducts.

**3.6. Proposition.** *Let  $F : \mathcal{F}_1 \xrightarrow{\sim} \mathcal{F}_2 : G$  be a  $\mathcal{C}_1$ - $\mathcal{C}_2$ -tilting equivalence. Then, for every small object  $N \in \mathcal{C}_2$ ,  $GN$  is small.*

*Proof.* We can use the adjunction between  $F$  and  $G$  and the fact that  $N$  is small. Indeed, let  $(X_\lambda)$  be a family of objects in  $\mathcal{C}_1$ ; then

$$\begin{aligned}
 \text{Hom}\left(GN, \coprod_{\lambda} X_{\lambda}\right) &\cong \text{Hom}\left(N, F\left(\coprod_{\lambda} X_{\lambda}\right)\right) && \text{(adjunction)} \\
 &\cong \text{Hom}\left(N, \coprod_{\lambda} FX_{\lambda}\right) && \text{(Remark 3.5)} \\
 &\cong \coprod_{\lambda} \text{Hom}(N, FX_{\lambda}) && (N \text{ is small}) \\
 &\cong \coprod_{\lambda} \text{Hom}(GN, X_{\lambda}) && \text{(adjunction)}
 \end{aligned}$$

and the thesis follows.  $\square$

We can collect everything we have done in a “Tilting theorem” (notations are as at the beginning of this section).

**3.7. Tilting Theorem.** *Let  $\mathcal{C}_1$  and  $\mathcal{C}_2$  be Grothendieck categories and let  $F : \mathcal{F}_1 \xrightarrow{\sim} \mathcal{F}_2 : G$  be a  $\mathcal{C}_1$ - $\mathcal{C}_2$ -tilting equivalence. Then:*

- (1) *there exists a left derived functor  $G'$  of  $G$  and  $G'$  is left exact;*
- (2)  *$G'$  is a right adjoint to the first right derived functor  $F'$  of  $F$ ;*
- (3) *the right derived functors  $F^{(i)}$  of  $F$  are zero, for  $i \geq 2$ ;*
- (4) *the functors  $F'$  and  $G'$  induce an equivalence between  $\mathcal{F}_1$  and  $\mathcal{F}_2$ ;*
- (5)  *$F'G$  and  $G'F$  are zero functors;*

We can embed it into a diagram with exact rows and columns

$$\begin{array}{ccccccc}
 & & 0 & & 0 & & 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 0 & \longrightarrow & L_2 & \longrightarrow & M_2 & \longrightarrow & N_2 \longrightarrow 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 0 & \longrightarrow & L_1 & \longrightarrow & M_1 & \longrightarrow & N_1 \longrightarrow 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 0 & \longrightarrow & L & \longrightarrow & M & \longrightarrow & N \longrightarrow 0 \\
 & & \downarrow & & \downarrow & & \downarrow \\
 & & 0 & & 0 & & 0
 \end{array}$$

where the rows are  $\mathcal{F}_2$ -presentations. We can apply  $G$  to this diagram, recalling that  $G'L$  is the kernel of  $GL_2 \rightarrow GL_1$ , and the same for the others: a standard application of the “snake lemma” (e.g., [22, Corollary 4.11.9]) gives the connecting morphism we are looking for.  $\square$

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**3.6. Proposition.** Let  $F: \mathcal{F}_1 \xrightarrow{\sim} \mathcal{F}_2: G$  be a  $\mathcal{E}_1$ - $\mathcal{E}_2$ -tilting equivalence. Then, for every small object  $N \in \mathcal{E}_2$ ,  $GN$  is small.

*Proof.* We can use the adjunction between  $F$  and  $G$  and the fact that  $N$  is small. Indeed, let  $(X_\lambda)$  be a family of objects in  $\mathcal{E}_1$ ; then

$$\begin{aligned}
 \text{Hom}\left(GN, \coprod_{\lambda} X_{\lambda}\right) &\cong \text{Hom}\left(N, F\left(\coprod_{\lambda} X_{\lambda}\right)\right) && \text{(adjunction)} \\
 &\cong \text{Hom}\left(N, \coprod_{\lambda} FX_{\lambda}\right) && \text{(Remark 3.5)} \\
 &\cong \prod_{\lambda} \text{Hom}(N, FX_{\lambda}) && (N \text{ is small}) \\
 &\cong \prod_{\lambda} \text{Hom}(GN, X_{\lambda}) && \text{(adjunction)}
 \end{aligned}$$

and the thesis follows.  $\square$

We can collect everything we have done in a “Tilting theorem” (notations are as at the beginning of this section).

**3.7. Tilting Theorem.** Let  $\mathcal{E}_1$  and  $\mathcal{E}_2$  be Grothendieck categories and let  $F: \mathcal{F}_1 \xrightarrow{\sim} \mathcal{F}_2: G$  be a  $\mathcal{E}_1$ - $\mathcal{E}_2$ -tilting equivalence. Then:

- (1) there exists a left derived functor  $G'$  of  $G$  and  $G'$  is left exact;
- (2)  $G'$  is a right adjoint to the first right derived functor  $F'$  of  $F$ ;
- (3) the right derived functors  $F^{(i)}$  of  $F$  are zero, for  $i \geq 2$ ;

*Buon divertimento con X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X*