

Proposed Leibniz additions for Unicode 18.0

Debbie Anderson, Peter Constable
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0. Introduction

On 15 January 2026, a small group of Leibniz experts and Unicode experts¹ met to discuss various proposals for potential Leibnizian character additions.

In our opinion, the following proposals are mature enough for UTC action:

- Uwe Mayer, et al, Proposal to encode historic alchemical symbols ([WG2/N5332R](#), author ref. L-2532)
- Uwe Mayer, et al, Proposal to encode 12 cossic characters ([WG2/N5333R2](#), author ref. L-2533)
- Uwe Mayer, et al, Proposal to encode historical mathematical relations ([WG2/N5334R2](#), author ref. L-2603)

These are discussed in the following sections. As the Leibniz proposals have been in discussion for the past 18+ months and UTC has already acted on some of the proposals and approved characters for Unicode 18.0, we recommend characters from these proposals to also be approved for Unicode 18.0.

1. Alchemical Symbols (WG2/N5332R)²

The original version of this proposal ([L2/25-131](#), author ref. L-2432) had proposed seven new characters. In review meetings between Leibniz and Unicode experts, three were found to be represented by an existing character or character sequences. This final version proposes three new characters, plus one standardized variation sequence.

The Alchemical Symbols block is completely full, so we recommend the three characters be placed in the Miscellaneous Symbols Supplement block.

¹ From Unicode: Debbie Anderson, Peter Constable, Asmus Freytag, Robin Leroy; from the Philiumm research group: Siegmund Probst, Elisabeth Rinner, Andreas Stötzner, Achim Trunk.

² SEW issue 539

The variation sequence is proposed to represent a glyph variant of the RETORT character which appears with a crossbar. The glyph shown in the proposal document has a wavy top-right stroke. During this meeting, it was clarified that the wavy stroke is not an essential feature of the glyph variant; only the crossbar is essential.

The document also proposes annotations for some existing characters, which we find to be appropriate.

Based on our review, we recommend the following UTC actions:

[186-C??] Consensus: UTC accepts 3 alchemical symbols 1CED2 ALCHEMICAL SYMBOL FOR OIL INVERTED, 1CED3 ALCHEMICAL SYMBOL FOR MOON-JUPITER, and 1CED4 ALCHEMICAL SYMBOL FOR TARTAR-SALT, for Unicode 18.0, based on WG2 N5332R and section 1 of L2/26-054R2.

[186-C??] Consensus: UTC accepts the variation sequence 1F76D FE00 “with crossbar” for base character 1F76D ALCHEMICAL SYMBOL FOR RETORT, as described in WG2 N5332R, for Unicode Version 18.0. [Ref. section 1 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, RMG: Update the Pipeline to include three alchemical symbols at 1CED2..1CED4 approved for Unicode 18.0. [Ref. 186-C??, WG2 N5332R, and section 1 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, RMG: Update the Pipeline to include one variation sequence, 1F76D FE00, approved for Unicode 18.0. [Ref. 186-C??, WG2 N5332R, and section 1 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, PAG: Add the variation sequence 1F76D FE00 to StandardizedVariants.txt, for Unicode Version 18.0. [Ref. 186-C??, WG2 N5332R, and section 1 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, EDC: Consider annotation changes for 231B, 29D6, and 1F77E as suggested in WG2 N5332R. [Ref. section 1 of L2/26-054R2]

[186-A??] Action Item for Debbie Anderson, SAH: Work with Andreas Stötzner to submit a font for three alchemical symbols 1CED2.. 1CED4 to Unicode. [Ref. section 1 in L2/26-XXX]

2. Cossic characters (WG2/N5333R2)³

“Coss” (‘historic’) is a German term for treatises about Algebra. The original version of this proposal (author ref. L-2438) proposed 11 characters. In subsequent review, it was determined that one should be represented using a variation sequence. It was also determined that one of the originally proposed characters inappropriately conflated a Latin character plus a *mathematical italic* character, and that one additional character should be added to the proposal. Hence, this final version proposes 11 characters plus one variation sequence.

Several of the Cossic characters have a right loop feature. During this meeting, potential relationship of that loop feature to U+A76D LATIN SMALL LETTER IS was considered. (That character was used in medieval traditions to write an abbreviated Latin suffix—see [L2/06-027](#).) The question was whether some of the proposed Cossic characters should be represented as sequences with A76D. It was agreed that, while the characters might have derived historically from earlier medieval practice using the abbreviation character, the usage in mathematical writings of the 15th and 16th centuries gave rise to distinct, atomic characters. We recommend that text be added to the Core Spec in the section on Latin Extended-G regarding the atomic representation of these Cossic characters (instead of sequences).

The document proposes the name LATIN LETTER SMALL C WITH DESCENDER for one of the characters. The use of “WITH DESCENDER” was discussed. In particular, one SEW reviewer had noted that “WITH DESCENDER” has been used in character names for a common feature found in Soviet-era Latin and Cyrillic characters, but the descending feature in the Cossic character is quite distinct. It was agreed, therefore, to revise this name to LATIN LETTER SMALL C WITH DESCENDING LOOP.

After the meeting concluded, some SEW experts suggest other alternate names, including LATIN LETTER SMALL C WITH LOOP CEDILLA or LATIN LETTER SMALL C WITH CEDILLA LOOP. The name for this character might need to be revisited after the Unicode 18.0 alpha review, but there has been no question for well over a year that the proposed character warrants encoding. Thus, we do not think approval of the character for encoding needs to be delayed further.

The one proposed variation sequence is to represent a *Kurrentschrift* glyph variant of the math alphanumeric character U+1D4CF MATHEMATICAL SCRIPT SMALL Z. The proposed variant sequence employs U+FE02, which had been recommended in the October 2025

³ SEW issue 545

Script Encoding WG recommendations ([L2/25-232R](#)), in order to represent the Kurrent form of mathematical letters. While only one variation sequence is proposed at this time, it is known that an entire a-z Kurrentschrift alphabet has been used in mathematical notation, and so it is anticipated that additional sequences will be proposed in the future.

Based on our discussion, we recommend the following UTC actions:

[186-C??] Consensus: UTC accepts the following 11 Cossic characters for encoding in Unicode 18.0, based on WG2 N5333R2 and section 2 of L2/26-054R2:

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1DF90 LATIN LETTER SMALL C WITH SMALL SLASH
1DF91 LATIN LETTER SMALL C WITH DESCENDING LOOP
1DF92 LATIN LETTER SMALL C WITH RIGHT LOOP
1DF93 LATIN LETTER SMALL D ROTUNDA WITH CROSSING LOOP
1DF94 LATIN LETTER SMALL R ROTUNDA WITH LOOP
1DF95 LATIN SMALL LIGATURE LONG S WITH DESCENDER S
1DF96 LATIN LETTER SMALL LONG S WITH TOP LOOP
1CEDD SQUARE ROOT OF SQUARE ROOT
1CEDE SQUARE ROOT OF SQUARE ROOT OF SQUARE ROOT
1CEDF SQUARE ROOT OF SQUARE ROOT OF SQUARE ROOT OF SQUARE ROOT
1D6A6 MATHEMATICAL ITALIC LIGATURE LONG S WITH DESCENDER S
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[186-C??] Consensus: UTC accepts the variation sequence 1D4CF FE02 “kurrent style” for base character 1D4CF MATHEMATICAL SCRIPT SMALL Z, as described in N5333R2, for Unicode Version 18.0. [Ref. section 2 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, RMG: Update the Pipeline to include Cossic characters approved for Unicode 18.0 at 1DF90..1DF96, 1CEDD..1CEDF and 1D6A6. [Ref. 186-C??, WG2 N5332R, and section 2 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, RMG: Update the Pipeline to include one variation sequence, 1D4CF FE02, approved for Unicode 18.0. [Ref. 186-C??, WG2 N5332R, and section 2 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, PAG: Add the variation sequence 1D4CF FE02 to StandardizedVariants.txt, for Unicode Version 18.0. [Ref. 186-C??, WG2 N5332R2, and section 2 of L2/26-054R2]

[186-A??] Action Item for Robin Leroy, EDC: Draft Core Spec text for Latin Extended-G discussing the Cossic characters that are encoded as atomic characters and not as sequences. [Ref. section 2 of L2/26-054R2]

[186-A??] Action Item for Debbie Anderson, SAH: Work with Andreas Stötzner to submit a font to Unicode for eleven Cossic characters plus one variation sequence. [Ref. section 2 of L2/26-054R2]

3. Historical math relations (WG2/N5334R2)⁴

An earlier version of this proposal (WG2 N [5334](#), author ref. L=2519) was discussed at a small meeting with Unicode and Leibniz experts in October 2025. In this revised version of the proposal, twenty-nine characters are proposed as well as nine variation sequences.

Most of the discussion focused on relation of the proposed glyphs to the baseline or to the math axis, specifically as reflected in the figure on page 8. Revision of this figure will provide guidance for the reference glyphs in the code charts and in fonts.

After some discussion offline, we recommend opening a new block, “Miscellaneous Symbols and Arrows Extended”, that extends from U+1DB00..U+1DBFF. This entire row could include a mixture of future arrows, geometric symbols and math operators.

The group recommended further research into wide variants of horizontal parallel lines, the plus sign, the equals sign, and other signs be done, and separately proposed as variation sequences. Such sequences should use VS02, which is recommended for the wide variants.

Based on our discussions, we recommend the following:

[186-C??] Consensus : UTC accepts the following 29 historical mathematical relation characters for Unicode Version 18.0 in a new block, Miscellaneous Symbols and Arrows Extended at 1DB00.. 1DBFF, based on WG2 N5334R2 and section 3 of L2/26-054R2:

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1DB00 LEIBNIZIAN EQUAL
1DB01 LEIBNIZIAN EQUAL WITH DOUBLE VERTICALS
1DB02 LEIBNIZIAN EQUAL WITH SMALL S
1DB03 LEIBNIZIAN GREATER
1DB04 LEIBNIZIAN LESS
1DB05 LEIBNIZIAN GREATER WITH SMALL P
1DB06 LEIBNIZIAN LESS WITH SMALL P
1DB07 LEIBNIZIAN GREATER-LESS
1DB08 INVERTED SQUARE LEFT OPEN BOX OPERATOR
1DB09 INVERTED SQUARE RIGHT OPEN BOX OPERATOR
1DB0A TWO-LINE GREATER
1DB0B TWO-LINE LESS
1DB0C COMMENSURABILITY
1DB0D INCOMMENSURABILITY
1DB0E COMMENSURABILITY IN SQUARE
1DB0F INCOMMENSURABILITY IN SQUARE
1DB10 CARTESIAN EQUAL

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⁴ SEW issue 690.

1DB11 LEIBNIZIAN CONGRUENCE
 1DB12 LEIBNIZIAN CONGRUENCE WITH VERTICAL BAR
 1DB13 LEIBNIZIAN CONGRUENCE-2
 1DB14 LEIBNIZIAN CONGRUENCE-2 INVERTED
 1DB15 LEIBNIZIAN CONGRUENCE-2 WITH HORIZONTAL BAR
 1DB16 LEIBNIZIAN CONGRUENCE-2 WITH HORIZONTAL AND VERTICAL BAR
 1DB17 LEIBNIZIAN COINCIDENCE
 1DB18 INVERTED LAZY S OVER LAZY S
 1DB19 LEIBNIZIAN SIMILARITY
 1DB1A LEIBNIZIAN SIMILARITY-2
 1DB1B LEIBNIZIAN DISSIMILARITY
 1DB1C FACIT SYMBOL

[186-C??] Consensus: UTC accepts the following nine variation sequences for glyph variants of historical mathematical relation characters based on section 5 of WG2 N5334R2, for Unicode Version 18.0. [Ref. section 3 of L2/26-054R2]:

1DB10 FE00; with descender; # CARTESIAN EQUAL
 223D FE00; using lazy S; # REVERSED TILDE
 2243 FE00; using lazy S; # ASYMPTOTICALLY EQUAL TO
 22CD FE00; using lazy S; # REVERSED TILDE EQUALS
 2242 FE00; using lazy S; # MINUS TILDE
 2248 FE00; using lazy S; # ALMOST EQUAL TO
 2A6C FE00; using lazy S; # SIMILAR MINUS SIMILAR
 22DC FE00; with horizontal equal; # EQUAL TO OR LESS-THAN
 22DD FE00; with horizontal equal; # EQUAL TO OR GREATER-THAN

[186-A??] Action Item for Ken Whistler, RMG: Update the Pipeline to include 29 historical mathematical relations at 1DB00..1DB1C, approved for Unicode 18.0. [Ref. 186-C??, WG2 N5332R, and section 3 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, RMG: Update the Pipeline to include nine variation sequences for Unicode 18.0, as described in section 5 of WG2 N5332R. [Ref. 186-C??, and section 3 of L2/26-054R2]

[186-A??] Action Item for Ken Whistler, PAG: Add the nine variation sequences for historical mathematical relations to StandardizedVariants.txt as described in section 5 of WG2 N5334R, for Unicode Version 18.0. [Ref. 186-C??, section 3 of L2/26-XXX]

[186-A??] Action Item for Debbie Anderson, SAH: Work with Andreas Stötzner to submit a font for 29 historical mathematical relation characters to Unicode. [Ref. section 3 of L2/26-054R2]

[186-A??] Action Item for V.S. Umamaheswaran, SAH: Update the Roadmap to add the Miscellaneous Symbols and Arrows Extended block at U+1DB00..U+1DBFF. [Ref: section 3 of L2/26-054R2]