L2/06-125

ISO / IEC JTC 1 / SC 2 / WG 2 N3086

PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646[1]

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from http://www.dkuug.dk/JTC1/SC2/WG2/docs/principles.html **for guidelines and details before filling this form.**

Please ensure you are using the latest Form from http://www.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html**.**

See also http://www.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html **for latest *Roadmaps*.**

A. Administrative

1. **Title:** *Diverse Arabic Mathematical Symbols*
2. Requester's name: *Azzeddine LAZREK*
3. Requester type (Member body/Liaison/Individual contribution): *Member body*
   Cadi Ayyad University Marrakech-Morocco
4. Submission date: *2006-03-30*
5. Requester's reference (if applicable): *lazrek@ucam.ac.ma*
6. Choose one of the following:
   This is a complete proposal: http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/amdsl.pdf
   (or) More information will be provided later:

B. Technical – General

1. Choose one of the following:
   a. This proposal is for a new script (set of characters):
      Proposed name of script:
   b. The proposal is for addition of character(s) to an existing block: *addition of characters to existing blocks*
      Name of the existing block: *Arrows, Mathematical Operators, Supplemental Arrows-A, Supplemental Arrows-B and Letterlike symbols*
2. Number of characters in proposal: *27*
3. Proposed category (select one from below - see section 2.2 of P&P document):

A-Contemporary	X	B.1-Specialized (small collection)		B.2-Specialized (large collection)	
C-Major extinct		D-Attested extinct		E-Minor extinct	
F-Archaic Hieroglyphic or Ideographic				G-Obscure or questionable usage symbols	

4. Proposed Level of Implementation (1, 2 or 3) (see Annex K in P&P document): *1*
   Is a rationale provided for the choice? *Yes*
   If Yes, reference:
5. Is a repertoire including character names provided? *Yes*
   a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? *Yes*
   b. Are the character shapes attached in a legible form suitable for review? *Yes*
6. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard? *True Type and LaTeX package*
   If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:
   http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/ramzarab.ttf
   http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/arrows.ttf
   http://www.ucam.ac.ma/fssm/rydarab/system/zip/ramzarab.zip
   http://www.ucam.ac.ma/fssm/rydarab/system/zip/arrows.zip
   http://www.ucam.ac.ma/fssm/rydarab/system/zip/antisym.zip
7. References:
   a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? *Yes*
   b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? *Yes*
8. Special encoding issues:
   Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)? *Yes*

9. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts,

[1] Form number: N3002-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10)

Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at http://www.unicode.org for such information on other scripts. Also see http://www.unicode.org/Public/UNIDATA/UCD.html and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? *No*
   If YES explain
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? *Yes*
   If YES, with whom? *W3C Math Interest Group – IUC 27 – Kingdom of Saudi Arabia*
   If YES, available relevant documents: http://www.w3.org/TR/arabic-math/ http://www.ucam.ac.ma/fssm/rydarab/doc/communic/unicodem.pdf *Fayez Alhargan, King Abdulaziz City for Science and Technology,* alhargan@kacst.edu.sa *and AbdulMalik Al-Salman, King Saud University,* salman@ccis.ksu.edu.sa
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? *About 500 million of people*
   Reference: *Arabic alphabet based scripts as Arabic, Persian, …*
4. The context of use for the proposed characters (type of use; common or rare) *common*
   Reference:
5. Are the proposed characters in current use by the user community? *Yes*
   If YES, where? Reference: *In mathematical handbooks at Arabic countries*
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? *Yes*
   If YES, is a rationale provided? *Yes*
   If YES, reference:
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? No
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? *No*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? *No*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? *No*
    If YES, is a rationale for its inclusion provided?
    If YES, reference:
11. Does the proposal include use of combining characters and/or use of composite sequences? *No*
    If YES, is a rationale for such use provided?
    If YES, reference:
    Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?
    If YES, reference:
12. Does the proposal contain characters with any special properties such as control function or similar semantics? *Yes*
    If YES, describe in detail (include attachment if necessary)
    http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/amdsl.pdf
13. Does the proposal contain any Ideographic compatibility character(s)? *No*
    If YES, is the equivalent corresponding unified ideographic character(s) identified?
    If YES, reference:

Diverse Mathematical Symbols for Arabic,

Additional characters proposed to Unicode

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Abstract

Here are some symbols used in Arabic mathematical presentation [3] [4] but are not yet in Unicode Standard [5].

Contents

1 Overview

The **RamzArab** font available, includes some of these characters. It's in OpenType format [6] and converted in METAFONT as a LaTeX package [7].

The **Antisym** font available, includes some of these characters witch glyphs are drawing by hand, in METAFONT as a LaTeX package [10].

The **Arrows** font available, includes all these arrows characters. It's in OpenType format [8] and converted in METAFONT as a LaTeX package [9].

The shapes of the reference glyphs used are not frozen. They are continually being improved in *Multilingual scientific e-document processing* Project at Al-khawarizmi Atelier.

2 Radix symbols with Arabic-Indic digits

The radix symbols with Arabic-Indic digits from Table 1 are used in Arabic mathematical presentation. They are not mirrored [2], but are always written right-to-left. While mathematical layout software can use markup to create radix symbols of any order, these two are common enough in general usage that explicit code points should be assigned. Consequently they are proposed for encoding here.

These characters should have general category Sm, neutral right-to-left directionality and should not mirror.

0606	٣√	ARABIC-INDIC CUBE ROOT
		→ 221B ∛
0607	٤√	ARABIC-INDIC FOURTH ROOT
		→ 221C ∜

Table 1: Mathematical symbols with no appropriate mirroring

3 Letter-like symbol

A Letter-like symbol (see Table 2) for ray in Arabic is proposed for encoding here.

This character should have general category Sm, strong right-to-left directionality and should not mirror.

0608	؏	ARABIC RAY

Table 2: Letter-like symbol

4 General punctuation

Two signs (see Table 3) for per mille and per ten thousand with the Arabic-Indic digit zero are proposed for encoding here.

These characters should have general category Sm, neutral right-to-left directionality and should not mirror.

0609	٪	ARABIC-INDIC PER MILLE SIGN → 2030 ‰ per mille sign
060A	٪	ARABIC-INDIC PER TEN THOUSAND SIGN → 2031 ‱ per ten thousand sign

Table 3: General punctuation

5 Stars, asterisks and snowflakes

An outline white star (see Figure 1 and Table 4) is proposed for encoding here.

This character should have general category So and have neutral directionality.

269D	☆	OUTLINED WHITE STAR • Morocco sign

Table 4: Star

6 Mathematical arrows

The majority of symbols used in Latin mathematical presentation are the mirrored corresponding used in Arabic presentation. In the Unicode Standard, there is the mirrored propriety for some characters [2]. However, arrows don't have this property. Some arrows listed in Unicode and used in mathematics [2] don't include symmetrical signs. In particular, signs for all symbols from Table 5 are proposed with the specification LEFTWARDS, in contrast to RIGHTWARDS, or the reverse.

The arrows listed in Table 5 are the mirrored of the ones with code: 21F4,21F6, 27F4, 27FF, 2900, 2901, 2905, 2910, 2911, 2914, 2915, 2916, 2917, 2918, 2933, 2947, 2971, 2972 , 2975, 2977, and 297A respectively.

2B14	⬰	LEFT ARROW WITH SMALL CIRCLE
2B15	⬱	TREE LEFTWARDS ARROWS
2B16	⬲	LEFT ARROW WITH CIRCLED PLUS
2B17	⬳	LONG LEFTWARDS SQUIGGLE ARROW
		→ 21DC ⇜ leftwards squiggle arrow
2B18	⬴	LEFTWARDS TWO-HEADED ARROW WITH VERTICAL STROKE
2B19	⬵	LEFTWARDS TWO-HEADED ARROW WITH DOUBLE VERTICAL STROKE
2B1A	⬶	LEFTWARDS TWO-HEADED ARROW FROM BAR
2B1B	⬷	LEFTWARDS TWO-HEADED TRIPLE DASH ARROW
2B1C	⬸	LEFTWARDS ARROW WITH DOTTED STEM
2B1D	⬹	LEFTWARDS ARROW WITH TAIL WITH VERTICAL STROKE
2B1E	⬺	LEFTWARDS ARROW WITH TAIL WITH DOUBLE VERTICAL STROKE
2B1F	⬻	LEFTWARDS TWO-HEADED ARROW WITH TAIL
2B21	⬼	LEFTWARDS TWO-HEADED ARROW WITH TAIL WITH VERTICAL STROKE
2B22	⬽	LEFTWARDS TWO-HEADED ARROW WITH TAIL WITH DOUBLE VERTICAL STROKE
2B23	⬾	LEFTWARDS ARROW THROUGH X
2B24	⬿	WAVE ARROW POINTING DIRECTLY LEFT
		→ 219C ↜ leftwards wave arrow
2B25	⭀	EQUALS SIGN ABOVE LEFTWARDS ARROW
2B26	⭁	TILDE OPERATOR ABOVE LEFTWARDS ARROW
2B27	⭂	LEFTWARDS ARROW ABOVE ALMOST EQUAL TO
2B28	⭃	RIGHTWARDS ARROW THROUGH LESS-THAN
2B29	⭄	RIGHTWARDS ARROW THROUGH SUBSET

Table 5: Mathematical arrows

References

[1] Unicode Technical Report ♯25, *Unicode Support for Mathematics*, http://www.unicode.org/reports/tr25/.

[2] Unicode, *Bidi Mirroring Glyph Property*, http://www.unicode.org/Public/UNIDATA/BidiMirroring.txt.

[3] W3C Math Interest Group Note, *Arabic Mathematical Notation*, http://www.w3.org/TR/arabic-math/.

[4] Mohamed Jamal Eddine Benatia, Azzeddine Lazrek and Khalid Sami, *Arabic mathematical symbols in Unicode*, Internationalization and Unicode Conference (IUC), IUC 27, Berlin, Germany, April 6-8, 2005, http://www.ucam.ac.ma/fssm/rydarab/doc/communic/unicodem.pdf.

[5] Azzeddine Lazrek, *Arabic mathematical symbols for Unicode*, http://www.ucam.ac.ma/fssm/rydarab/english/unicode.htm.

[6] Arabic mathematical symbols font RamzArab in OpenType, http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/ramzarab.ttf.

[7] Arabic mathematical symbols font RamzArab as package for LaTeX, http://www.ucam.ac.ma/fssm/rydarab/system/zip/ramzarab.zip.

[8] Arrows symbols font Arrows in OpenType, http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/arrows.ttf.

[9] Arrows symbols font Arrows as package for LaTeX, http://www.ucam.ac.ma/fssm/rydarab/system/zip/arrows.zip.

[10] Antic symbols font AntiSym as package for LaTeX, http://www.ucam.ac.ma/fssm/rydarab/system/zip/antisym.zip.

Figure 1: Morocco sign

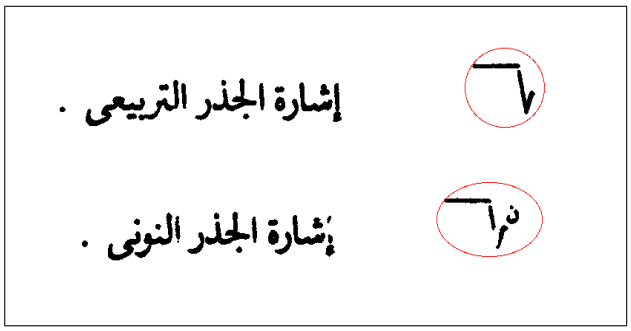

Figure 2: Root symbol in Amman Convention [1.1]

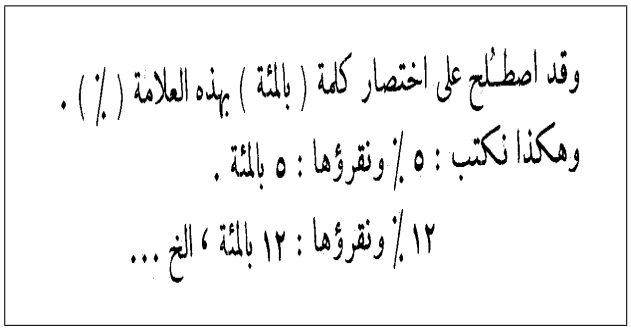

Figure 3: Percent symbol in Handbook [3.6]

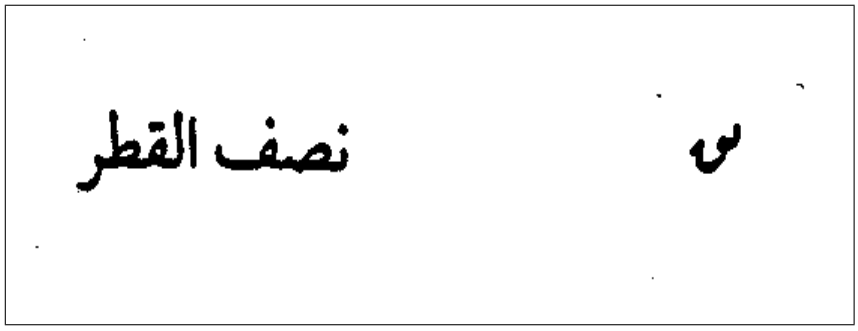

Figure 4: Ray symbol in Amman convention [1.1]