ISO/IEC JTC 1/SC 2/WG 2 N3087
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646¹


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:** Rumi Numeral System 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/amosl.pdf
   - 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:
   - Name of the existing block: addition of characters to existing blocks

2. Number of characters in proposal: 31

3. Proposed category (select one from below - see section 2.2 of P&P document):
   - A-Contemporary
   - 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):

   - Is a rationale provided for the choice?
   - If Yes, reference:

5. Is a repertoire including character names provided?
   - If YES, are the names in accordance with the “character naming guidelines” in Annex L of P&P document?
   - a. Are the character shapes attached in a legible form suitable for review?

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/rumi.ttf
   - http://www.ucam.ac.ma/fssm/rydarab/system/zip/rumi.zip

7. References:
   - a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?
   - b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?

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)?

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, 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**

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?  

3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?  
   - **About 100 million of people**  
   - Reference: Arabic scripts

4. The context of use for the proposed characters (type of use; common or rare)  
   - **rare**

5. Are the proposed characters in current use by the user community?  
   - **No**  
   - Reference:

6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?  
   - **No**  
   - If **YES**, is a rationale provided?  
   - If **YES**, reference:

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?  
   - **Yes**

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?  
    - **No**  
    - If **YES**, describe in detail (include attachment if necessary)

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:
Rumi Numeral System Symbols,
Additional characters proposed to Unicode

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1 Introduction

A special numeral system rumi\(^1\) has been in use in North Africa since the X\(^{e}\) century. It remained in use until the XVII\(^{e}\) century. This system has been especially used in the administration of the city of Fez in Morocco. It has also been used in Al-Andalusians, Spain, starting from the XII\(^{e}\) century. The forms of the digits are quiet different from the Arabic\(^2\) or the Arabic-Indic\(^2\) digits in use today. The system of numeration was decimal, but not really positional. rumi use some special symbols (see Table 1, Table 2, Table 3 and Table 4). Some examples are available (see Table 5, Table 6 and Table 7).

This system is also known as "zimam letters, Roman, Fez letters" (namely Hrwf al-zmAm, al-rumi, Hrwf fAs or also rasm al-zmam, Qalam al-rumi, Qalam al-fAsy).

2 Description

rumi numeral system has been described by many researchers and there is many studies about it. A deailed bibliography is presented in Figure 1 (see some figures from this bibliography in the end). We have adopted the one

\(^1\)using Transtec Transliteration

\(^2\)the identifier name used by The Unicode Consortium http://www.unicode.org

rumi use some special symbols for digits:

• rumi ones are (see Table 1):

• rumi tens are (see Table 2):

• rumi hundreds are (see Table 3):

Multiples of thousand are represented by adding a slash under the based number:

• rumi thousands are noted by one bar under the number (see Table 5) (ex., ١٠٠٠ for three thousands);

• rumi million are noted by two bars under the number (see Table 6) (ex., ١٠٠٠٠٠ for three million);

• and so on.

Fraction is represented by adding a slash symbol separating the numerator from the denominator:

• rumi fractions are generally noted by (see Table 7):

• Some special fractions are also noted by (see Table 4):

3 proposition

These symbols are proposed to be included in Unicode Standard. There names are described in rumi ones digits (see Table 8), rumi tens digits (see Table 9) rumi hundreds digits (see Table 10) and rumi special fractions (see Table 11).

As many manuscripts in studying use these symbols, we need to encode them. We are working on studying and translating to English the Ibn Al-Banna manuscript Al-YqtDAb mn al-Eml b-al-rwmI fl al-HsAb. A computer
A system for transforming numbers from and to Rumi numeral system is also in development.

The Rumi and AntiSym fonts available, includes all these characters. In Rumi font, used here, the shapes of the reference glyphs are scanned from [1]. It’s in OpenType format [3] and converted in MetaFont as a LaTeX package [4]. In AntiSym font, glyphs are drawing by hand in MetaFont as a LaTeX package [2].

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.

Some boxes are added to some symbols in Figures in order to emphasize them and understand the purpose of the samples.

More information about this presentation is available in [5].

References


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Table 1: rumi ones symbols

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Table 2: rumi tens symbols

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Table 3: rumi hundreds symbols

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Table 4: rumi special fractions symbols

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Table 5: rumi thousands examples
Table 6: rumi millions examples

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Table 7: rumi fractions examples

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RUMI DIGIT ONE
≈ 0031 ١ digit one
≈ 0661 ١ Arabic-Indic digit one

RUMI DIGIT TWO
≈ 0032 ٢ digit two
≈ 0662 ٢ Arabic-Indic digit two

RUMI DIGIT THREE
≈ 0033 ٣ digit three
≈ 0663 ٣ Arabic-Indic digit three

RUMI DIGIT FOUR
≈ 0034 ٤ digit four
≈ 0664 ٤ Arabic-Indic digit four

RUMI DIGIT FIVE
≈ 0035 ٥ digit five
≈ 0665 ٥ Arabic-Indic digit five

RUMI DIGIT SIX
≈ 0036 ٦ digit six
≈ 0666 ٦ Arabic-Indic digit six

RUMI DIGIT SEVEN
≈ 0037 ٧ digit seven
≈ 0667 ٧ Arabic-Indic digit seven

RUMI DIGIT EIGHT
≈ 0038 ٨ digit eight
≈ 0668 ٨ Arabic-Indic digit eight

RUMI DIGIT NINE
≈ 0039 ٩ digit nine
≈ 0669 ٩ Arabic-Indic digit nine

Table 8: RUMI ones digits
RUMI DIGIT TEN
• used as a symbol with a numeric value of 10
RUMI DIGIT TWENTY
• used as a symbol with a numeric value of 20
RUMI DIGIT THIRTY
• used as a symbol with a numeric value of 30
RUMI DIGIT FORTY
• used as a symbol with a numeric value of 40
RUMI DIGIT FIFTY
• used as a symbol with a numeric value of 50
RUMI DIGIT SIXTY
• used as a symbol with a numeric value of 60
RUMI DIGIT SEVENTY
• used as a symbol with a numeric value of 70
RUMI DIGIT EIGHTY
• used as a symbol with a numeric value of 80
RUMI DIGIT NINETY
• used as a symbol with a numeric value of 90
RUMI DIGIT HUNDRED
• used as a symbol with a numeric value of 100

Table 9: RUMI tens digits

RUMI DIGIT TWO HUNDRED
• used as a symbol with a numeric value of 200
RUMI DIGIT TREE HUNDRED
• used as a symbol with a numeric value of 300
RUMI DIGIT FOUR HUNDRED
• used as a symbol with a numeric value of 400
RUMI DIGIT FIVE HUNDRED
• used as a symbol with a numeric value of 500
RUMI DIGIT SIX HUNDRED
• used as a symbol with a numeric value of 600
RUMI DIGIT SEVEN HUNDRED
• used as a symbol with a numeric value of 700
RUMI DIGIT EIGHT HUNDRED
• used as a symbol with a numeric value of 800
RUMI DIGIT NINE HUNDRED
• used as a symbol with a numeric value of 900

Table 10: RUMI hundreds digits
RUMI FRACTION ONE HALF
• used as an other symbol with a numeric value of $1/2$
$\approx 00BD$ 1/2 vulgar fraction one half

RUMI FRACTION ONE QUARTER
• used as a symbol with a numeric value of $1/4$
$\approx 00BC$ 1/4 vulgar fraction one quarter

RUMI FRACTION ONE THIRD
• used as a symbol with a numeric value of $1/3$
$\approx 2153$ 1/3 vulgar fraction one third

RUMI FRACTION TWO THIRDS
• used as an other symbol with a numeric value of $2/3$
$\approx 2154$ 2/3 vulgar fraction two thirds

Table 11: RUMI special fractions
Figure 1: rumi numeral system in [1] page 1
Figure 2: rumi numeral system in [1] page 1
لا يوجد نص يمكن قراءته بشكل طبيعي من الصورة المقدمة.
In the name of the God, the most Merciful, the most Compassionate

The God prayed on Mohammed and on his family and accompanied him and peace of delivery

The shortening from the work in the Rumi in the calculation, formation of the participant victims of the magnificent just generous associated complete Abo AlEhs Ahmed Ben Mohammed Ben Othman al-azzy. He was introduced as mason's son numerical Almealshy. The God sanctified went him and his utterance in his blessing and his casual dress and lengthens him.

The God praised neither his break-off for acne nor his end for border and the prayer on Mohammed is discovering and worshipped him and on his family and his peace and honor a lot. After, so the shortening from the work in the Rumi in the account on towards what choice of the heads from the believers fall, and from The God who the good success.

Chapter in names ranks of the numbers and prescription glyphs in Rumi.

Knows that the rank first is the ones nine and the second is the tens nine and the third is the hundreds nine and the fourth is the thousands nine and the fifth is the ten of thousands nine and the sixth is the hundreds of thousands nine and the seventh is the thousands thousands nine and so on until the infinite one.

For each number of the first time numbers ranks a sign which distinguishes it, the first is one and the last is nine hundred. The draws of thousands and its tens and its hundreds are the same as the draws of ones and tens and hundreds and the difference between them is the repetition. The form of the repetition is a bar under the number and these images for all them.

Likewise thousands of thousands and its tens and its hundreds return to glyphs before them and the difference between them the repetition. For each kind what be necessary for him likewise so on until the infinite one.

When the fractions are to be drawn, we write the base number which derives the fraction and draws above him a line called chair and writes above him the parts which derives from him, and as the fraction's fraction. Here are examples of draw: one half \( \frac{1}{2} \), two thirds \( \frac{2}{3} \), tree quarters \( \frac{3}{4} \), four fifths \( \frac{4}{5} \), five sixths \( \frac{5}{6} \), six sevenths \( \frac{6}{7} \), seven eighths \( \frac{7}{8} \), eight ninths \( \frac{8}{9} \), nine tenths \( \frac{9}{10} \). And leads the man working in make up provided that draw the one half in this way \( \frac{1}{2} \), and one quarter in this way \( \frac{1}{4} \) and one third in this way \( \frac{1}{3} \) and the two third in this way \( \frac{2}{3} \). They don't use fractions which these based are more than ten. If they arrive to have some of them they transform them to what you will know in the addition chapter after this one.

The fractions they used stubborn two kinds added and different. So for added fraction, the fraction whose based is great advances and the little about right and little low from him, example five eight and three eighth and third eighth in this way \( \frac{5}{8} \). As for different fraction, parts are under others parts example five eighteens and six sevenths in this way \( \frac{5}{18} \) and six sevenths in this way \( \frac{6}{7} \).
Figure 5: Integer rumi symbols in [1]

Figure 6: Fraction rumi symbols in [1]

Figure 7: Examples in [3]
Figure 8: Examples from [4]
parum dirutus, necesse fuit abscidere folia quae inutilia evas.
rent; haec suspicio confirmatur ex facto, quod folia octogesimo
posteriora morsus vermium majores habent præcipue circa fo-
lium centesimum tertium; et notandum est hos morsus jam
in codice existentes esse cum collatio, saltem secunda fiebat,
nam quidam restaurati fuisse, ut videtur ab antiquo et verba
a vermis plene corroso in margine explicantur: charta anti-
quioris codicis major erat, nam a folio trigesimo nono usque
ad centesimum quintum vestigia antiquioris foliorum nume-
rationis existunts, nam numeratio ex magna parte abscessa fuer:
in foliis secundæ partis nihil hujusmodi numerationis distin-
guitur, et breves notæ marginales, præcipue verbum vel
pluries in margine primæ partis scriptum fere evanuit.

Specimen numerationis foliorum in codice Escurialensi.

Foliorum numeratio. Codex habet foliorum numerationem
modernam, factam postquam codex a librario numerationis ara-
bicae imperito compactus est; a folio enim secundo transliri
necessae fuit ad folium decimum septimum et a folio vigesimo
secundo iterum ad tertium recedere.

Ex foliorum numeratione antiqua codex centum sexaginta.
Figure 10: Examples in [15] pages 50-51 from [4]
Figure 11: Examples in [15] pages 52-53 from [4]