

Proposal to Encode an Arabic Zero Symbol

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Date: 2026-06-08

Proposal

Encode the following character:

codepoint	glyph	name
U+1EEEE0		ARABIC ASTRONOMICAL ZERO

Background

This is a proposal to encode a symbol for zero in the Arabic Mathematical Alphabetical Symbols block. The character is part of an *abjad*-based number system used in astronomical and astrological texts and tables. It also represents the zodiac sign Aries. (Further characters needed for the system will be proposed in future proposals.)

The character has a long history, and seems to have been derived from a Greek symbol for sexagesimal zero. For more information on its history, see Georges Ifrah, *The Universal History of Numbers*, 2000, pp. 156–158 and 548–549.

We plan to use this in software projects that present astrological charts, such as the open source Android Persian Calendar project that shows planetary charts of March Equinox moment, mimicking what traditional printed calendar manuscripts have been providing for more than 180 years. The main usage will be in digitizing such historical documents, as well as publishing modern texts on the traditional astronomical and astrological practices known as *هیت* and *زیجات*.

Character properties

```
1EEEE0;ARABIC ASTRONOMICAL ZERO;Lo;0;AL;;;;;N;;;;;
```

The character only appears in isolated form, and does not change shape contextually. Because of that, there is no proposed data for ArabicShaping.txt (similar to other characters in the same block).

Confusables

The character looks similar to one of the forms the sequence ها (<heh, alef>) is written in Persian Nastaliq. We assume a similar shape also exists in South Asian Nastaliq for با (<heh goal, alef>). There is also some resemblance to some forms of U+061D ARABIC END OF TEXT MARK (see [L2/20-245](#)).

Samples

صفر را در کتب هیئت و نجوم و زیجات بدین صورت می نویسند «ا». پس
در بیان بروج: «ا» یعنی برج حمل؛ و «ا» یعنی برج ثور؛ و «ب» یعنی برج
جوزاء؛ و «ح» یعنی برج سرطان؛ و هکذا تا آخر که «با» برج حوت می شود.

Figure 1. Source: دروس هیئت و دیگر رشته‌های ریاضی، صفحه ۴۳

2009 modern publication

(The first sentence says zero is written in this way in astronomical and astrological books.)

بعد از هر برج، برج ششم را نظیر آن برج گویند مثلاً میزان نظیر حمل، و
عقرب نظیر ثور است.

نام برجها	حمل	ثور	جوزاء	سرطان	اسد	منبلة
نشان برجها	<u>ا</u>	ا	ب	ج	د	ه
نام برجها	میزان	عقرب	قوس	جدی	دلو	حوت
نشان برجها	و	ر	ح	ط	ی	با

آنکه خواجه سرزن: با الف بماهی داد، یعنی ی را با الف که یا می شود به
حوت داده است.

Figure 2. Source: دروس هیئت و دیگر رشته‌های ریاضی، صفحه ۴۵ و ۱۷۹

2009 modern publication

ی	۱
۲	۱
۳	۲
۴	۳
۵	۴

Figure 3. Source: زیج بهادرخانی، صفحه ۴۰،
1885 manuscript

۱۰	الشمس	الشهور	الجزء
۹	۹	۹	۹
۸	۸	۸	۸
۷	۷	۷	۷
۶	۶	۶	۶
۵	۵	۵	۵
۴	۴	۴	۴
۳	۳	۳	۳
۲	۲	۲	۲
۱	۱	۱	۱

Figure 4. https://www.qdl.qa/en/archive/81055/vdc_100044547972.0x000001
https://commons.wikimedia.org/wiki/File:مکاشفات_علوم_غریبه_مقصد_الطالب_نجوم.pdf

1752 manuscript

The Arabs wrote an expression such as $0^{\circ} 20' 35''$ as follows (reading from right to left):

ل	ك	ز
HL	K	0
<		
35	20	0

Figure 5. *The Universal History of Numbers*, George Ifrah, 2000, Page 549

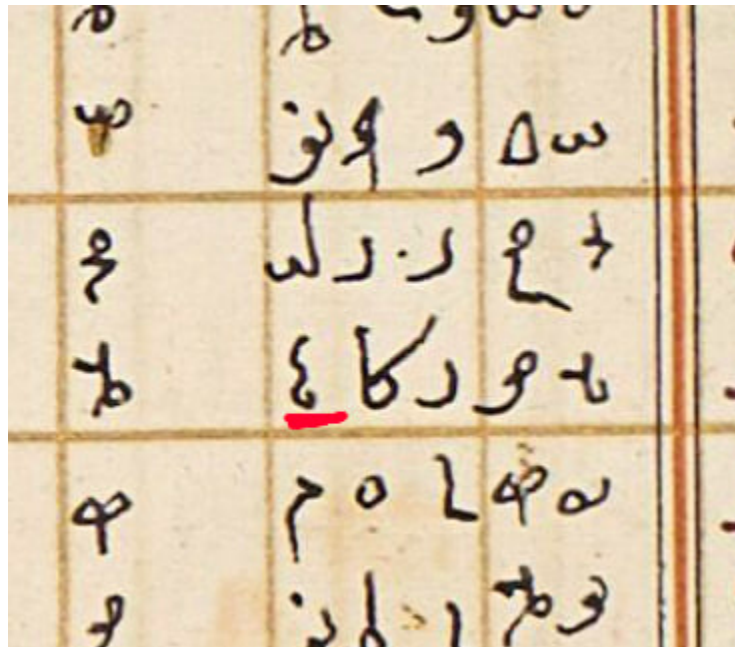


Figure 6.

<https://www.invaluable.com/auction-lot/a-persian-illuminated-calendar-ruznama-manuscript-49-c-79b4eaaa1a>

<https://commons.wikimedia.org/wiki/File:بک تقویم فارسی از دوره قاجار.pdf>

Source: A Persian illuminated calendar ruznama manuscript
19th century manuscript



Figure 7.

<https://www.kewauctions.com/auction/222-antiquities-islamic-asian/lot-83-two-astrological/>

Source: <https://commons.wikimedia.org/wiki/File:بیک تقویم فارسی از سال ۱۲۶۹ شمسی.pdf>

1890 manuscript

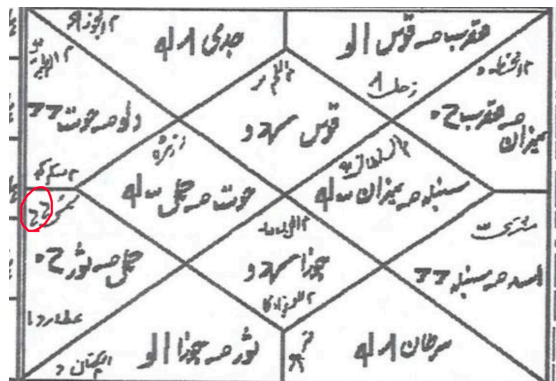


Figure 8. Source: تقویم نجومی ۱۴۰۱ دکتر اسماعیل مصباح، صفحه ۵

Handwritten calendar, 2022

سعه اوائل بسروج			سعه اواسط بسروج		
اول بسروج	سعتها	جهتها	اول بسروج	سعتها	جهتها
حل	خ	ش	حل	خ	ش
ثور	كا	"	ثور	كا	"
جوزاء	الط	"	جوزاء	الط	"
سرطان	الط	"	سرطان	الط	"
اسد	كا	"	اسد	كا	"
سنبله	ح	"	سنبله	ح	"
ميزان	ح	"	ميزان	ح	"
عقرب	كا	"	عقرب	كا	"
قوس	الط	"	قوس	الط	"
جدى	الط	"	جدى	الط	"
دلو	كا	"	دلو	كا	"
حوت	ح	"	حوت	ح	"

Figure 9. Source: ۴۳۷ و ۴۳۲ صفحه ریاضی، دیگر رشته‌های ریاضی،
Handwritten tables from 2009 publication

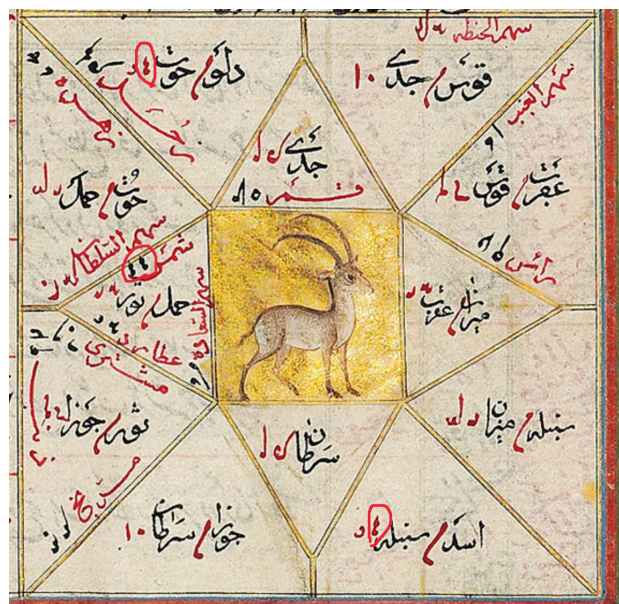


Figure 10. <https://www.christies.com/lot/lot-6133102>
commons.wikimedia.org/wiki/File:یک_تقویم_فارسی_از_سال_۱۲۲۵_شمسی.pdf

Source: An astrological calendar (Ruznameh)
1848 manuscript

ISO/IEC JTC 1/SC 2/WG 2**PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646**

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

Please read Principles and Procedures Document (P & P) from

<http://std.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://std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.

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

Form number: N4502-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, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

A. Administrative

1. Title:

Proposal to Encode an Arabic Zero Symbol

2. Requester's name:

Ebrahim Byagowi and Roozbeh Pournader

3. Requester type (Member body/Liaison/Individual contribution):

Individual contribution

4. Submission date:

2026-06-08

5. Requester's reference (if applicable):

6. Choose one of the following:

This is a complete proposal:

Yes

(or) More information will be provided later:

No

B. Technical - General

1. Choose one of the following:

a. This proposal is for a new script (set of characters):

No

Proposed name of script:

N/A

b. The proposal is for addition of character(s) to an existing block:

Yes

Name of the existing block:

Arabic Mathematical Alphabetical Symbols

2. Number of characters in proposal:

1

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

A-Contemporary

B.1-Specialized (small collection)

X

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. Is a repertoire including character names provided?

Yes

a. If YES, are the names in accordance with the "character naming guidelines"

Yes

b. Are the character shapes attached in a legible form suitable for review?

Yes

5. Fonts related:

a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard?

Ebrahim Byagowi

b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.):

Ebrahim Byagowi

6. 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

7. Special encoding issue

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

See proposal

8. 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 UAX#44: <http://www.unicode.org/reports/tr44/> 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, available relevant documents:

Proposers are members of the community

3. Information on the user community for the proposed characters (for example:

size, demographics, information technology use, or publishing use) is included?

Yes

Reference:

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

Rare

Reference:

5. Are the proposed characters in current use by the user community?

Yes

If YES, where? Reference:

Written calendars and traditional astronomy books

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)?

N/A

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, or could be confused with, an existing character?	Yes
If YES, is a rationale for its inclusion provided?	Yes
If Yes, reference:	See proposal
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 characters?	
	No
If YES, are the equivalent corresponding unified ideographic characters identified?	
If Yes, reference:	

UnicodeData.txt

1 1EEE0;ARABIC ASTRONOMICAL ZERO;Lo;0;AL;;;;;N;;;;;