ISO/IEC JTC 1/SC 2/WG 2
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://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*.**

A. Administrative

1. **Title:** *Proposal to Encode Ranjana Script in ISO/IEC 10646*
2. Requester's name: *Dev Dass Manandhar, Samir Karmacharya and Bishnu Chitrakar*
3. Requester type (Member body/Liaison/Individual contribution): *Individual contribution*
4. Submission date: *2013/12/31*
5. Requester's reference (if applicable): *Annex-I*
6. Choose one of the following:
   This is a complete proposal: *Yes*
   (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): *77*
      Proposed name of script: *RANJANA*
   b. The proposal is for addition of character(s) to an existing block:
      Name of the existing block:
2. Number of characters in proposal: *77*
3. Proposed category (select one from below - see section 2.2 of P&P document):
   A-Contemporary *A* 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. 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*
5. Fonts related:
   a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard?
   Samir Karmacharya
   b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.):
   Samir Karmacharya, Kalimati, Kathmandu, Nepal, saneer@gmail.com and saneer@hotmail.co.uk
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 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*
   Collation order,Rendering the Ranjana script and Building characters from UCS

8. 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 Unicode Character Database (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.

[1] Form number: N4102-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)

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? *Buddhist communities, Archeological departmet Government of Nepal, Raja Shakya(former script lecturer Tribhuwan University. and librarian , Asha Saphu Kuthi)*
   If YES, available relevant documents: *NO*
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? *YES*
   Reference: *Annex-II* Ranjana script on display
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: *Books, Magazine, Letterheads, Signboards Annex-II*
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, or could be confused with, 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? *NO*
    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:

Proposal to Encode Ranjana Script in ISO/IEC 10646
Authors Dev DassManandhar, Samir Karmacharya and Bishnu Chitrakar
December 31st, 2013

Please add the attached document to the document registry.

1 Introduction

Ranjana script (a holy script) is in fact one of the beautiful scripts written with a tilted nib. It is believed that the script was created and used by native people(Newaa: community) of Nepal. It is about a millennium old and derived from Brahmi(Dhamalipi, as named by Emperor Ashok) script. Its evolution can be seen from the documents preserved in the department of Archeology, Ministry of Culture in Kathmandu, Nepal.

Many Mahaayaana Buddhist Mantras and philosophical ritual book like Pragynaapaaramitaa (also written in golden and silver ink), were written and rewritten for daily recitation on palmleaf and later in printing papers. All over the world, the mantras of Buddhism were also written on the walls and ceilings of Buddhist monasteries in this script.

Newaa: community (1,321,933, Census 2011) is the major users of this script in the past and at the present. Beside its uses in Buddhist Mantras, the community uses the script in daily life like in books, sign boards, letter heads, names etc. Every day, the Pragynapaaramitaa is recited by Bajrayaani Buddhist monks in the golden temple of Yala/Hiranyavarna Mahawihar Monastry (Golden Temple, Patan)/.

A monthly magazine named Lu̍aakha: has been in publication for the past few years with the help of the transliteration software /RANJANA THAHITY, devised by the authors Dev Dass Manandhar and Samir Karmacharya/.

This proposal is based on the native monosyllabic language of the Newaa: community, Nepaalabhaasaa. Classical Nepaalabhaasaa uses six vowels, thirty consonants and two semivowels.

Each vowel is used in four different forms of pronunciation to represent independent words. For example, the four different forms of a vowel /𑐎A/ are: Normal sound/𑐎/, Long sound/𑐎𑐵/, Nasalized sound/𑐎𑐀/ and Long nasalized sound/𑐎𑐵𑐀/. Thus the proposal contains twenty-four vowels that includes all the four forms of six vowels.

Consonant as independent character, does not exist in the native writing system. Characters are understood as alphasyllabic with a vowel /𑐎A/ at the end. Thirty-two characters with a vowel /𑐎A/ is known as /Baa-aakha:/ in Nepaalabhaasaa that includes two semivowels.

The thirty characters with a vowel /𑐎A/ are:

𑐏KA, 𑐐KHA, 𑐑GA, 𑐒GHA, 𑐓NGA, 𑐔NGHA, 𑐕CA, 𑐖CHA, 𑐗JA, 𑐘JHA, 𑐙NJA, 𑐚NJHA, 𑐛TA, 𑐜THA, 𑐝DA, 𑐞DHA, 𑐟NA, 𑐠NHA, 𑐡PA, 𑐢PHA, 𑐣BA, 𑐤BHA, 𑐥MA, 𑐦MHA, 𑐧RA, 𑐨RHA, 𑐩LA, 𑐪LHA, 𑐫SA and 𑐬HA.

Two semivowel characters with a vowel /𑐎A/ are: 𑐯YA(EA) and 𑐰WA(OA).

The modern Nepaalabhaasaa uses seven allographs to represent different pronunciations for borrowed/foreign, loan/ words. The seven allograph characters with a vowel /A/ are:

TTA allograph of TA, TTHA allograph of THA, DDA allograph of DA, DDHA allograph of DHA, NNA allograph of NA, SHA and SSA allograph of SA.

The thirty-nine alphasyllabic characters/Baa-aakha:/ are the basic characters pronounced with a vowel /A/. Their shape, size and look are different when used with different vowels as alphasyllabic characters.

For example, character /KA/ with a vowel other than /A/ are different. Different shapes of the base character // as alphasyllabic are listed in the Table T-1.

Table-1 Different shapes and looks of Alphasyllabic character//.

Character /K/	with a vowel	With a long vowel	With a nasalized vowel	With a long nasalized vowel
Vowel /A/				
Vowel /AA/				
Vowel / I/				
Vowel /U/				
Vowel /E/				
Vowel / O/				

From the Table-1, it is clear that the alphasyllabic characters have different looks with different vowels. Most of the alphasyllabic characters are independently used.

On the the basis of thirty-nine alphasyllabic characters from the Ranjana script, characters without a vowel /A/ are proposed for encoding as atomic characters in UNIVERSAL CHARACTER SET (UCS).

The other required characters are reproduced by the combination of proposed UCS characters.

Many characters used in this script are excluded because of their non-atomic nature. They are reproduced by the combination of proposed atomic characters.

For example, from the proposed vowel /A/, ligatures like /AI/ is re-constructed with a vowel /I/ and /AU/ with a vowel /U/.

For example from the proposed character /K /, other required characters such as clusters/KK(K and K)/, a ligatures/(K and SS)/ and alphasyllabic characters/,…,…, / are re-constructed by the proposed rendering process for the Ranjana script.

Characters can be stacked from top to bottom to make a cluster /K, KK/. Multiple stacked characters as a cluster is known as /KUTAAKSSARA/. The famous /KUTAAKSARA/ of seven characters /H,X,M,L,W,R and YM/ is presented in Picture-1.

The multiple stacking of characters is limited due to vertical spacing. Therefore KUTAAKSARA is avoided in UCS. Many symbols are used along with other characters in this script. HAKSSAMALAWARAYA is included in atomic form as a base symbol to reproduce other symbols.

Picture-1 HAKSSAMALAWARAYA embosed on a brass double triangle flag in Hiranyawarna mahaawihaara monastery.

(Two symbols /:/ and / ̊ / are used to represent long sound and nasalized sound respectively.)

2 Universal Character Set (UCS)

The presented code chart is different from the popular Indic script format. The current proposal is based on the users' requirements. The code presented in this proposal contains seventy six characters which includes Vowels(24), Consonants(37), Semi-vowels(2), Punctuation marks(3), Numerals(10) and Symbol(1).

2.1 Vowels

The user community has six prime vowels. They are 𑨀A, 𑨁 AA ,𑨂 I ,𑨃U ,𑨄E and 𑨅O.

Each vowel has three more formats. They are long, nasalized and long nasalized vowels.
These are the following:

Long Vowels : 𑨀𑨺 A:, 𑨁𑨺 AA:, 𑨂𑨺I: , 𑨃𑨺U: , 𑨄𑨺 E: and 𑨅𑨺 O:.

Nasalized Vowels : 𑨀𑨹 Aँ, 𑨁𑨹 AAँ , 𑨂𑨹 Iँ , 𑨃𑨹 Uँ , 𑨄𑨹 Eँ and 𑨅𑨹 Oँ.

Nasalized Long Vowels : 𑨀𑨹𑨺 Aँ: , 𑨁𑨹𑨺 AAँ: , 𑨂𑨹𑨺 Iँ: ,𑨃𑨹𑨺 Uँ: ,𑨄𑨹𑨺 Eँ: and 𑨅𑨹𑨺 Oँ:.

Code Point	Character	Character name
XX00	𑨀	RANJANA LETTER A
XX01	𑨀𑨺	RANJANA LETTER LONG A
XX02	𑨀𑨹	RANJANA LETTER NASAL A
XX03	𑨀𑨹𑨺	RANJANA LETTER LONG NASAL A
XX04	𑨁	RANJANA LETTER AA
XX05	𑨁𑨺	RANJANA LETTER LONG AA
XX06	𑨁𑨹	RANJANA LETTER NASAL AA
XX07	𑨁𑨹𑨺	RANJANA LETTER LONG NASAL AA
XX08	𑨂	RANJANA LETTER I
XX09	𑨂𑨺	RANJANA LETTER LONG I
XX0A	𑨂𑨹	RANJANA LETTER NASAL I
XX0B	𑨂𑨹𑨺	RANJANA LETTER LONG NASAL I
XX0C	𑨃	RANJANA LETTER U

XX0D	𑨳	RANJANA LETTER LONG U
XX0E	𑨴	RANJANA LETTER NASAL U
XX0F	𑨵	RANJANA LETTER LONG NASAL U
XX10	𑨶	RANJANA LETTER E
XX11	𑨶𑨹	RANJANA LETTER LONG E
XX12	𑨶𑨺	RANJANA LETTER NASAL E
XX13	𑨶𑨻	RANJANA LETTER LONG NASAL E
XX14	𑨷	RANJANA LETTER O
XX15	𑨷𑨹	RANJANA LETTER LONG O
XX16	𑨷𑨺	RANJANA LETTER NASAL O
XX17	𑨷𑨻	RANJANA LETTER LONG NASAL O

2.2 Consonants

Characters represented in the UCS chart are the characters without a vowel /𑨦A/.Thirty-seven characters of Ranjana script presented in this proposal as consonants, each has a unique sound with a unique meaning.

They are :

𑨏K, 𑨐KH, 𑨑G, 𑨒GH, 𑨓NG, 𑨔NGH,;

𑨕C, 𑨖CH, 𑨗J, 𑨘JH, 𑨙NJ, 𑨚 NJH,;

𑨛T, 𑨜TT, 𑨝TH, 𑨞TTH, 𑨟D, 𑨠DD, 𑨡DH, 𑨢DDH, 𑨣N, 𑨤NN, 𑨥NH,;

𑨦P, 𑨧PH, 𑨨B, 𑨩BH , 𑨪M, 𑨫MH,;

𑨬R, 𑨭RH, 𑨮L, 𑨯LH,;

𑨰S, 𑨱SH, 𑨲SS, 𑨳H.

Code Point	Character	Character name
XX18	𑨏	RANJANA LETTER K
XX19	𑨐	RANJANA LETTER KH
XX1A	𑨑	RANJANA LETTER G

XX1B		RANJANA LETTER GH
XX1C		RANJANA LETTER NG
XX1D		RANJANA LETTER NGH
XX1E		RANJANA LETTER C
XX1F		RANJANA LETTER CH
XX20		RANJANA LETTER J
XX21		RANJANA LETTER JH
XX22		RANJANA LETTER NJ
XX23		RANJANA LETTER NJH
XX24		RANJANA LETTER T
XX25		RANJANA LETTER TT
XX26		RANJANA LETTER TH
XX27		RANJANA LETTER TTH
XX28		RANJANA LETTER D
XX29		RANJANA LETTER DD
XX2A		RANJANA LETTER DH
XX2B		RANJANA LETTER DDH
XX2C		RANJANA LETTER N
XX2D		RANJANA LETTER NN
XX2E		RANJANA LETTER NH
XX2F		RANJANA LETTER P
XX30		RANJANA LETTER PH
XX31		RANJANA LETTER B

XX32	𑨦	RANJANA LETTER BH
XX33	𑨧	RANJANA LETTER M
XX34	𑨨	RANJANA LETTER MH
XX36	𑨩	RANJANA LETTER R
XX37	𑨪	RANJANA LETTER RH
XX38	𑨫	RANJANA LETTER L
XX39	𑨬	RANJANA LETTER LH
XX3B	𑨭	RANJANA LETTER S
XX3C	𑨮	RANJANA LETTER SH
XX3D	𑨯	RANJANA LETTER SS
XX3E	𑨰	RANJANA LETTER H

2.3 Semivowels

Semivowels 𑨱Y and 𑨲W in the UCS chart are the characters without a vowel /𑨪A/. All consonants are combined with semivowels to form monosyllabic characters.

Consonant /𑨐K/ with a semivowel /𑨱Y/ is a monosyllabic character represented by a cluster /𑨐𑩇KY(grind)/. Consonant /𑨑KH/ with a semivowel /𑨲W/ is a monosyllabic character represented by a cluster / 𑨑𑩈KHW(cry)/.

Code Point	Character	Character name
XX35	𑨱	RANJANA LETTER Y
XX3A	𑨲	RANJANA LETTER W

2.4 Punctuation Marks

Line breaking symbols, /◌ TWAATHALAA/ and end of a sentence are marked by a broken vertical line and a single vertical line respectively. The mark is / ।/. The multiple use of the same character is very common in Ranjana script. Double marks /॥/ represents a stop. The interpretation is different as per their use. For example a word written in between double characters /॥/ like / ॥ওॐ॥/ is interpreted as the end of 5th verse. The interpretation varies depending on the users.

The punctuation mark / ◌ / is known as TUTISALAA in Newaa community. The traditional use of the character is to place it in-between characters as a word separator (क◌K ख◌KH).

The character has found two more ways of its uses. First use is to change a character into a consonant and second is to turn a character into a vowel.

The following characters (क◌K, ख◌KH, ग◌G, घ◌GH, ङ◌NG, ङ्ह◌NGH, च◌C, छ◌CH, ज◌J, झ◌JH, ञ◌NJ, ञ्ह◌ NJH,;

ट◌T, ठ◌TT, ड◌TH, ढ◌TTH, द◌D, ध◌DD, ध्ह◌DH, ढ◌DDH, न◌N, ण◌NN, न्ह◌NH,;प◌P, फ◌PH, ब◌B, भ◌BH , म◌M, म्ह◌MH,;

र◌R,र्ह◌ RH, ल◌L, ल्ह◌LH, श◌S, ष◌SH, स◌SS, ह◌H) are changed into consonants when the mark / ◌ / is placed .

For example, a character /क◌K/ with the mark / ◌ / is /क◌K/ (interpreted as a consonant).

The mark / ◌ / is used to turn a character /य◌Y/ into a vowel /ये◌E/.

For example, a character /य◌Y/ with the mark / ◌ / is /य◌Y/ (recognized as a vowel /ये◌E/).

Code Point	Character	Character name
XX3F	◌	RANJANA LETTER MARK TUTISALAA
XX4A	◌	RANJANA LETTER TWAATHALAA
XX4B	◌	RANJANA LETTER DIPU

2.5 Numerals

Ranjana script has its own numeric characters from zero to nine.

The numerals are: 𑙐Zero, 𑙑One, 𑙒Two, 𑙓Three, 𑙔Four, 𑙕Five, 𑙖Six, 𑙗Seven, 𑙘Eight and 𑙙Nine.

Code Point	Character	Character name
XX40	𑙐	RANJANA DIGIT 0
XX41	𑙑	RANJANA DIGIT 1
XX42	𑙒	RANJANA DIGIT 2
XX43	𑙓	RANJANA DIGIT 3
XX44	𑙔	RANJANA DIGIT 4
XX45	𑙕	RANJANA DIGIT 5
XX46	𑙖	RANJANA DIGIT 6
XX47	𑙗	RANJANA DIGIT 7
XX48	𑙘	RANJANA DIGIT 8
XX49	𑙙	RANJANA DIGIT 9

2.6 Symbol

The Symbol XX4C is introduced to form other symbols. With the combination of characters, other different symbols will be reproduced as glyphs.

Code Point	Character	Character name
XX4C		RANJANA LETTER SYMBOL HAKSSAMALAWARAYA

2.7 Collation order

The collation order is arranged as per the modern requirement of the user community.
The precedence order of characters are as presented in the UCS chart. The prime order of characters is :

𑙄A<𑙄𑙀A:<𑙅A<𑙅𑙀A:<𑙆AA<𑙆𑙀AA:<𑙅𑙆AA<𑙅𑙆𑙀AA:<𑙇I<𑙇𑙀I:<𑙈I<𑙈𑙀I:<𑙉U<𑙉𑙀U:<𑙊U<𑙊𑙀U:;

<𑙋E<𑙋𑙀E:<𑙌E<𑙌𑙀E:<𑙍O<𑙍𑙀O:<𑙎O<𑙎𑙀O:;

<𑙏K<𑙏𑙐KH<𑙑G<𑙑𑙐GH<𑙒NG<𑙒𑙐NGH<𑙓C<𑙓𑙐CH<𑙔J<𑙔𑙐JH<𑙕NJ<𑙕𑙐NJH;

<𑙖T<𑙖𑙐TT<𑙗TH<𑙗𑙐TTH<𑙘D<𑙘𑙐DD<𑙙DH<𑙙𑙐DDH<𑙚N<𑙛NN<𑙛𑙐NH;

<𑙜P<𑙜𑙐PH<𑙝B<𑙞BH <𑙟M<𑙟𑙐MH<𑙠Y<𑙡R<𑙢 RH<𑙣L<𑙣𑙐LH<𑙤W<𑙥S<𑙦SH<𑙧SS<𑙨H.

3 Rendering the Ranjana Script

The atomic characters presented in Universal Character Set(UCS) are indispensable for the representation of the Ranjana script. With the help of Ranjana-Non-Space-Joiner(RNSJ) and Ranjan-Space-Joiner(RSJ), the atomic characters are rendered to construct the required characters known as glyphs. RNSJ and RSJ are also used to represent symbols.

It should be noted that clusters are the characters vertically stacked. The vertical space provided by a font is limited. Therefore the representation of multiple characters as a glyph is limited. The possibility of number of characters used for stacking together are limited by a font. Two to three characters are presented as a cluster and characters not supported are presented as they are.

Ranjana- Non-Space-Joiner(RNSJ) joins two characters in between. The character so formed is represented by a glyph. A Ranjana-Space-Joiner(RSJ) is used where multiple representation of combined characters are possible.
For example:

The combination of characters /R/ and /I/ are represented by two different glyphs. They are separated by the use of RNSJ and RSJ.

/R/+RNSJ+/I/=/RI/

/R/+RSJ +/I/=/RI/

Rendering Ranjana script with Ranjana-Non-Space-Joiner(RNSJ) and Ranjana-Space-Joiner(RSJ)
The rules are :
Rule number one :
3.1 If a* Ranjana-*Non-Space-Joiner or a* Ranjana-*Space-Joiner is placed in between characters then the characters are represented by a single glyph.

Ranjana-Non-Space-Joiner is used for representation of consonant clusters and ligatures. Ranjana-Space-Joiner is used in special cases where dual representation is possible.

Two glyphs /KSS/and /JNJ/ are commonly used in manuscripts. They are recognized as ligatures. Character /KSS/ is a ligature of /K/ and /SS/, and /JNJ/ is a ligature of two characters /J/ and /NJ/. Both the ligatures have equivalent clusters. The dual representation of two characters are separated by the use of RNSJ and RSJ.

The examples are follows:

1- The case of characters /K/and /SS/

   /K/ +RNSJ+ /SS/= /KSS/ - cluster

   /K/ +RSJ+ /SS/= /KSS/ - a ligature

2- A case of characters /J/ and /NJ/

   //J/ +RNSJ+ /YN/ = / JJYN/(a cluster)

   /J/ +RSJ+ /NJ/ = /JNJ/ - a ligature

The glyph /KSS/ is a part of a goddess nameLAKSSMI.

The ligature /JNJ/ is a part of a word/JNJAAN/ knowledge.

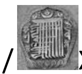
3-A case of two vowels

Diphthong vowels, /AI/and /AU/ are commonly used with consonants. They do not have alternative representations. Therefore they are represented by their respective atomic characters with RNSJ in between the two characters.
For example:

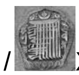
/A/ + RNSJ+ /I/ =/AI/

/A/ +RNSJ+ /U/= /AU/ .

4-The Symbols

Character /  XX4B/ along with other characters and a RNSJ in between is selected for the representation of different symbols.

/  XX4B/ + RNSJ+ /K/ =/ Symbol XX4BM(OM)/.

/  XX4B/ + RNSJ+ /KH/ =/ Symbol XX4BKH/ - a symbol used to represent a long sound with a stop.

3.2 Rule number two :
If a Non-Space-Joiner or Space-Joiner is placed in between a glyph and a character , then the glyph and a character are represented by a new glyph.

Glyph/KW/ is a representation of two atomic characters with NSJ(/K/, NSJ and /W/) in between.

/KW/ +NSJ+/Ȁ/ = / KWȀ /. The new glyph represents a glyph and a character.

Glyph/LHW, Vomit/ is a representation of two atomic characters with NSJ(/LH/, NSJ and /W/) in between.

/LHW,Vomit/+RNSJ+/Ȁ/ = /LHWȀ , Lift/. The new glyph represents a glyph and a character.

/LHW,Vomit/+RNSJ+/Ȁ:/ = / LHWȀ:, fat/. The new glyph represents a glyph and a character.

3.3 Rule number three :
Only predefined glyphs will be represented when Non-SpaceRanjana-Joiner or Ranjana-Space-Joiner are used in between characters.

The glyphs like /NTR, /SSSTRAA/ represent multiple characters. Not all the multiple characters are pre-defined. For example multiple characters of /KKK/ is not required and not supported for making a cluster. Non supported characters are left alone as if RNSJ or RSJ are not used.
For example:
The supported multiple characters like /NTRAA/, / SSTRA/ are in use and supported by regular fonts.

/ N/ +RNSJ+/T/+ RNSJ+/R/= /NTR/

/SS/+ RNSJ+ / T/+ RNSJ+ /R/+RNSJ+/AA/=/SSTR/

The non supported clusters like triple /K/ will be / K/ and /KK/.

/K/+RNSJ+/K/=/KK/
The cluster will be broken into character with a /TUTISALE/ and the last two characters will be joined as a cluster. /KK/+RNSJ+/K/=/KKK/

4 Building characters from UCS

The atomic characters in UCS chart are combined to make a alphasyllabic character, cluster or a ligature depending on the nature of their use. The changes occur in a character after the combination of consonant and vowel are presented in the Table-2. This change occurs with each and every character when joined with another character. Depending on the character's structure, building of a glyph are presented. The combination of characters are divided into three groups, one as CV(consonant-vowel), CC(consonant-consonant) and CCV(consonant-consonant-vowel).

Table-2 presents the possible combination of a consonant and a vowel.
Whenever a character is combined with another character, the characters are represented by a new glyphs.

The pictorial change in the shape of one atomic character /𑨦K/ is presented in Table 1.

A consonant (atomic character) /𑨦K/ with a Ranjana-Non-Space-Joiner and a vowel /𑨪AA/ are represented by a glyph /𑨦𑨪KAA/.

Table 2- An atomic character 𑨦K and with other 24 atomic characters (vowels) as glyphs.

UCS character 𑨦K			
with a prime Vowel-a glyph	with a long Vowel-a glyph	with a nasalized Vowel –a glyph	with a long nasalized Vowel –a glyph
𑨦K 𑨩A-𑨦KA	𑨦K 𑨩𑨴A:-𑨦𑨴KA: (solid from mixture)	𑨦K 𑨩𑨯AF -𑨦𑨯KA̍ (tell !)	𑨦K 𑨩𑨯AF: -𑨦𑨯KA̍: (spike)
𑨦K 𑨪AA-𑨦𑨪KAA (take !)	𑨦K 𑨪AA:-𑨦𑨴KAA: (do take)	𑨦K 𑨪𑨯AAF-𑨦𑨯KAA̍	𑨦K 𑨪𑨯AAF:-𑨦𑨯KAA̍: (blind)
𑨦K 𑨬I-𑨦𑨰KI	𑨦K 𑨬I: -𑨦𑨰KI: (insect, obstacle)	𑨦K 𑨬𑨯IF-𑨦𑨰KI̍	𑨦K 𑨬𑨯IF: -𑨦𑨰KI̍:
𑨦K 𑨮U-𑨦𑨱KU (carrying unit)	𑨦K 𑨮U: -𑨦𑨱KU: (field digger)	𑨦K 𑨮𑨯UF-𑨦𑨯KU̍ (smoke)	𑨦K 𑨮𑨯UF: -𑨦𑨯KU̍: (corner, by smoke)
𑨦K 𑨲E-𑨦KE	𑨦K 𑨲𑨴E:-𑨦𑨴KE:	𑨦K 𑨲𑨯EF-𑨦KE̍ (pulse)	𑨦K 𑨲𑨯EF: -𑨦KE̍: (by the pulse)
𑨦K 𑨪O-𑨦KO	𑨦K 𑨪𑨴O:-𑨦𑨴KO: (crow)	𑨦K 𑨪𑨯OF-𑨦KO̍ (younger)	𑨦K 𑨪𑨯OF: -𑨦KO̍: (from down)

The structure of an atomic character /𑨦K/ change into the following shapes

𑨦 𑨦𑨴 𑨦𑨯 𑨦𑨯 𑨦𑨰 𑨦𑨰 𑨦𑨰 𑨦𑨰 𑨦𑨱 𑨦𑨱 𑨦𑨱 𑨦𑨱 𑨦𑨲 𑨦𑨲𑨴 𑨦𑨲𑨯 𑨦𑨲𑨯 𑨦𑨪 𑨦𑨪𑨴 𑨦𑨪𑨯 𑨦𑨪𑨯

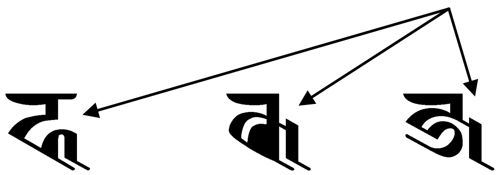
by retaining its basic look in a syllable after the application of different forms of six vowels. This is true with other characters also. Characters are grouped for similar changes by their structural forms.

4.1 Combination of a consonat and a vowel /𑨪AA/:

4.1.1 Consonants with right hand extension in the shape are 𑨦K, 𑨮J and 𑨤H.

The atomic characters are selected in different groups. The groups are made as per the shape of characters.

The first group of characters similar in shape at the right hand part are shown by an arrow. A small half vertical line is added to change the character into a syllable with a vowel /AA/.



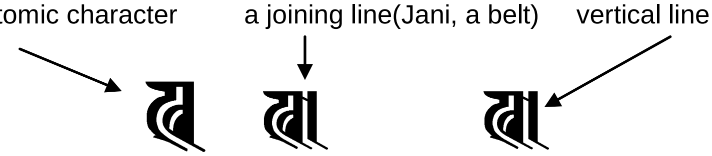
Head stroke is extended to match the right hand part and a vertical line is drawn from top of the character at the right hand part of a character without joining the right hand part.

Atomic character The extended heatstroke Added vertical line

/ KAA/,/ /JAA/, /HAA/ .

4.1.2 The eight characters are categorized under head stroke group. They are changed by the addition of a slanted joining line followed by a vertical line.

Atomic character a joining line(Jani, a belt) vertical line



/ KHAA, GAA, NJAA, THAA, TTHAA, DHAA, NNAA and

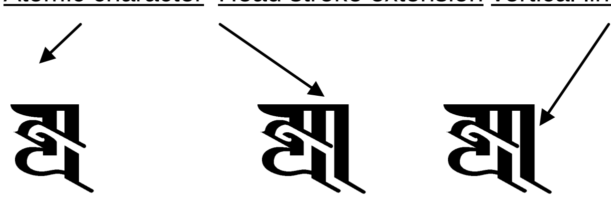
SHAA/.

4.1.3 The remaining characters with a a vowel/ AA/.

All the other consonants with a / AA/ vowel have a head stroke extended line and a vertical line.

For example : Character GH

Atomic character Head stroke extension vertical line



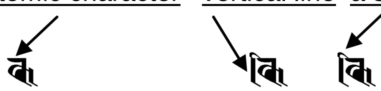
The glyphs of atomic characters with a vowel /AA/ are :

/ AA/,/ AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,
/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/,/AA/

4.2 Combination with a vowel /I/:

Consonants are added with a vertical line in front and a semi curve at the top of a character.
For example:

Atomic character vertical line a semi curve line



The characters with a vowel /I/ are :

/KI/,/ KHI/,/GI/,/ GHI/,/ NGI/,/ NGHI/,/ CI/,/ CHI/,/ JI/,/ JHI/,/ NJI /,/ TI/,/ TTI/,/ THI/,/ THI/,/ DI/,/ DDI/,/ DHI/,/ KI/,/NNI/,/NHI/,/ PI/,/ PHI/,/BI/,/ BHI/,/ MI/,/MHI/,/YI/,/ RI/,/RHI/,/ LI/,/LHI/,/ WI/,/ SI/,/SHI/,/ SSI/ and / HI.

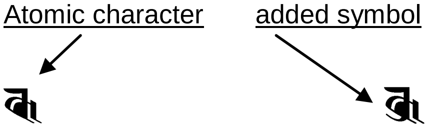
4.3 Combination with a vowel /U/:

Three different symbols are added to atomic characters depending on characters.

Two symbols are in use for vowel /U/. They are the followings: / , /. The third is used with a character /R/.

The small curve line is added at the bottom of a character.

Atomic character added symbol



4.3.1 Consonants like K,G,CH, CHH,T,TH, N,NH,P,PHB,BH,MU,MH,Y,L,W,S,SS,SH have U vowel similar to K. They are :

KU, GU, CHU, GHU, TU, THU, DU, NHU, PU, BU, BHU, MU, MHU, YU, LU, WU, SU, SSU, SHU.

4.3.2 Consonants like KH,NG,J,JH,NJ,TTH,DD,DDH,NN have different type of U vowel mark.

Atomic character added symbol

they are : 𑐢𑑂 KHU,𑐣𑑂 NGU,𑐤𑑂 JU,𑐥𑑂 JHU,𑐦𑑂 NJU, 𑐧𑑂 DHU,𑐨𑑂 TTU,𑐩𑑂 TTHU,𑐪𑑂 DDU,𑐫𑑂 DDHU and 𑐬𑑂 NNU.

The character /𑐮r/ is a newly added character adopted by the Newaa community. Therefore the character /𑐮R/ with a vowel /𑐴u/ is represented by the addition right hand extension.

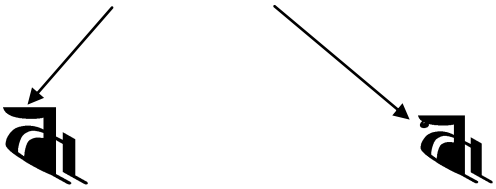
Consonant/ 𑐮R/ with vowel /𑐴u/ is represented by a glyph 𑐮𑑅RU.

4.4 Combination with a vowel /𑐯e/:

A small curve is added in front of a character to represent a syllable.

For example, a small curve mark is added to a character /𑐢K/ to form a glyph / 𑐢𑑅KE/.

Atomic character front curve line



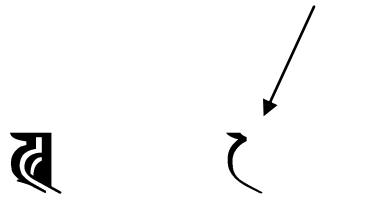
4.4.1 The following Consonants and a vowel /𑐯e/ are represented by a glyphs. And they are:

/𑐢𑑅KE,/𑐣𑑅GHE/,/𑐤𑑅NGE/,/𑐥𑑅NGHE/,/ 𑐦𑑅CE/,/ 𑐧𑑅CHE/,/𑐨𑑅JE/, /𑐩𑑅JHE/,/ 𑐪𑑅NJE/, / 𑐫𑑅NJHE/,/𑐬𑑅TE/,/𑐭𑑅TTE/,/𑐮𑑅DE/,/𑐯𑑅DDE/,/𑐰𑑅NNE/, /𑐱𑑅NE/, /𑐲𑑅E/, /

𑐳𑑅PE/,/𑐴𑑅PHE/, /𑐵𑑅BE/,/𑐶𑑅BHE/, /𑐷𑑅ME/, / 𑐸𑑅MHE/,/𑐹𑑅YE/, /𑐺𑑅RE/, /𑐻𑑅RHE/,

/𑐼𑑅LE/, /𑐽𑑅LHE/, /𑐾𑑅WE/, /𑐿𑑅SE/, /𑑀𑑅SSE/, /𑑁𑑅HE/

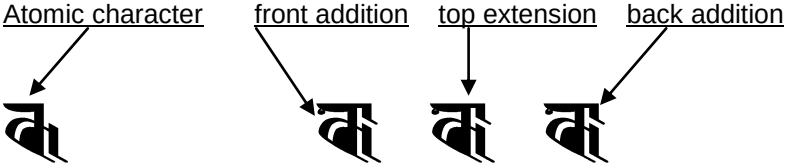
4.4.2 The eight non-head stroke characters are presented as alphasyllabic characters with a vowel /ে e/ will have a long curve line added in front of the atomic character.
For example :
Atomic character front line



The eight characters are:

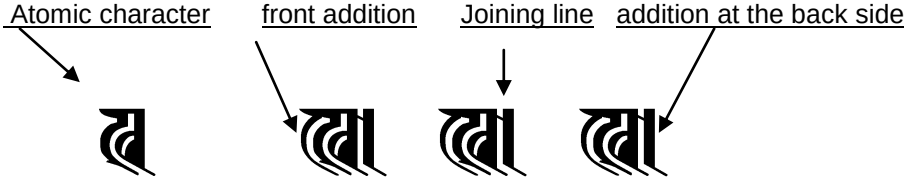
ঽKHE, গGE, ঞNJE, ছTHE, ঠTHE, ঢDHE, ণNNE and শSHE.

4.5 Consonants with a vowel /ো o/:
Atomic characters are added with lines at front, top and back of their major shape.
Atomic character front addition top extension back addition



4.5.1 The above changes are applicable only to atomic characters /কK/,/ঝ J/,and /হH/. The glyphs are:

4.5.2 The changes in eight characters under head stroke rule after addition of /ো O/ vowel are different from the other characters. They are:
Atomic character front addition Joining line addition at the back side



The above changes are applicable only to the atomic characters ঽKH, গG, ঞNJ,ছTH, ঠTTH, ঢDH, ণNN and শSH when they are represented with /ো o/ vowel. The glyphs are:

ঽো /KHO/,গো/GO/,ঞো/NJO/,ছো/THO/,ঠো/TTHO/,ঢো/DHO/,ণো/NNO/,শো/SHO/

The remaining consonants with a /ো o/ vowel as glyphs are :

ঘো /GHO/ঙো NGO/চো CHO/ঝো CHO/যো JHO/টো TO/ ডো DO/ঢো DO/ঙো NNO/ নো NO/পো PO/ফো PHO/বো BO/ভো VO/ মো MO/যো YO/রো RO/লো LO/বো WO/সো SO/ষো SSO/

4.6 Multiple consonants with a vowel : A glyph

Multiple consonants are merged to form a single character(cluster or ligature). The character will have the properties of upper character if any of the vowels /ि E/ or /ा AA/ or /ो O/ is merged with it
For example with the merged characters:

1-If upper character is a head stroke character/न N/ and lower character is a non-head stroke character /ध DH/ and if both the characters are merged with a vowel /ा AA/,/ि E/ or /ो O/, a single character / ान्धा NDHAA/, / न्धि NDHE/ or /न्धो NDHO/ is formed respectively as a head stroke character.

1-If upper character is a non-head stroke character/ध DH/ and lower character is a head atroke character/व W/ and if both the characters are merged with a vowel /ा AA/,/ि E/ or /ो O/, a single character /ध्वा DHWAA/, /ध्वि DHWE/ or /ध्वो DHWO/ is formed respectively as a non-head stroke character.

5 Acknowledgement

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5 References

1. Chitrakar Bishnu,2013, Nepalabhasa A Monosyllabic Language, Newa: Sikshya Guthi.
2. Shakyavansa Hemaraja, 1993, Nepalese Alphabet, Mandas Lumanti Prakashan.
3. Lipi Thapu Guthi,2000, Ranjana Prachalit and Bhujimol, Lipi Thapu Guthi.

UNIVERSAL CHARACTER SET RANJANA

	XXX0	XXX1	XXX2	XXX3	XXX4	XXX5
0	XXX00	XXX10	XXX20	XXX30	XXX40	
1	XXX01	XXX11	XXX21	XXX31	XXX41	
2	XXX02	XXX12	XXX22	XXX32	XXX42	
3	XXX03	XXX13	XXX23	XXX33	XXX43	
4	XXX04	XXX14	XXX24	XXX34	XXX44	
5	XXX05	XXX15	XXX25	XXX35	XXX45	
6	XXX06	XXX16	XXX26	XXX36	XXX46	
7	XXX07	XXX17	XXX27	XXX37	XXX47	
8	XXX08	XXX18	XXX28	XXX38	XXX48	
9	XXX09	XXX19	XXX29	XXX39	XXX49	
A	XXX0A	XXX1A	XXX2A	XXX3A	XXX4A	
B	XXX0B	XXX1B	XXX2B	XXX3B	XXX4B	
C	XXX0C	XXX1C	XXX2C	XXX3C	XXX4C	
D	XXX0D	XXX1D	XXX2D	XXX3D		
E	XXX0E	XXX1E	XXX2E	XXX3E		
F	XXX0F	XXX1F	XXX2F	XXX3F		

Annex-I Requesters' reference

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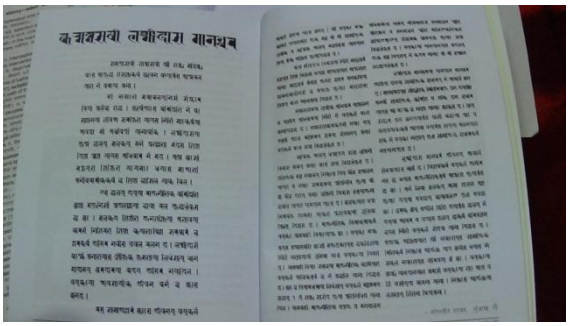
Annex-II Ranjana script on display

Kathmandu Metropolitan City Office

Chwasapasa Building

Books on Display



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