

Proposal for a Oriya Script Root Zone Label Generation Rule-set [LGR]

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1. General Information/ Overview/ Abstract

The purpose of this document is to give an overview of Level Generation Rules for the proposed Oriya language. The XML format is under construction. It includes a discussion of relevant features of the script, the communities or languages using it, the process and methodology used and information on the contributors. The formal specification of the LGR can be found in the accompanying XML document:

“Proposed-LGR-Oriya-20180221.xml” (under progress)

Labels for testing can be found in the accompanying text document:

Labels-orya-version-20180221.txt” (Not included yet)

2. Script for which the LGR is proposed

ISO 15924 Code: Orya

ISO 15924 Key N°: 327

ISO 15924 English Name: Oriya (Odia)

Latin transliteration of native script name: oḍiā

Native name of the script: ଓଡ଼ିଆ

Maximal Starting Repertoire (MSR) version: MSR-2

3. Background on Script and Principal Languages Using It

Odia is an Eastern Indo-Aryan language spoken by about 40 million people mainly in the Indian state of Odisha, and also in parts of West Bengal, Jharkhand, Chhattisgarh and Andhra Pradesh. It is thought to be directly descended from a OdraMagadhi Prakrit similar to Ardha Magadhi, which was spoken in eastern India over 1,500 years ago.

Odia is one of the many official languages of India. It is the official language of Odisha, and the second official language of Jharkhand. It is also designated as a Classical Language in India as it has a long literary history. Odia is closely related to [Bengali](#) and Assamese.

Odia is also known as Oriya, and Odisha as Orissa, however Odia and Odisha are now the preferred names officially in English as they are closer to their native names: ଓଡ଼ିଆ (oḍiā) [ɔd̪iːaː] and ଓଡ଼ିଶା (oḍiśā) [ɔd̪iːʂaː].

With reference to [Wikipedia](#) Odia literature is also used by minority populations of the neighboring states of Jharkhand, West Bengal, Chhattisgarh and Andhra Pradesh. The region has been known at different stages of history as Kalinga, Udra, Utkala or Koshala. Odisha was a vast empire in ancient and medieval times, extending from the Ganges in the north to the Godavari in the south. During British rule, however, Odisha lost its political identity and formed parts of the Bengal and Madras Presidencies. The present state of Odisha was formed in 1936. The modern Odia language is formed

mostly from Pali words with significant Sanskrit influence. About 28% of modern Odia words have Adivasi origins, and about 2% have Hindustani (Hindi/Urdu), Persian, or Arabic origins. The earliest written texts in the language are about thousand years old. The first Odia newspaper was Utkala Deepika first published on 4 August 1866.

Odia is the only Indo-European language of India other than Sanskrit and the sixth Indian language that has been conferred classical language status and forms the basis of Odissi dance and Odissi music.

The Evolution of the Script

Oriya is a variant of Devanāgarī, the main difference being the absence of the shirorekha or the line above the character and also more rounded shapes. Since initially it was used for commercial ends, it has been referred to as śarāphi (banker's) or mahājani (trader's) script. The diagram below shows the major stages in the evolution of Oriya attesting its late divergence from Devanāgarī.

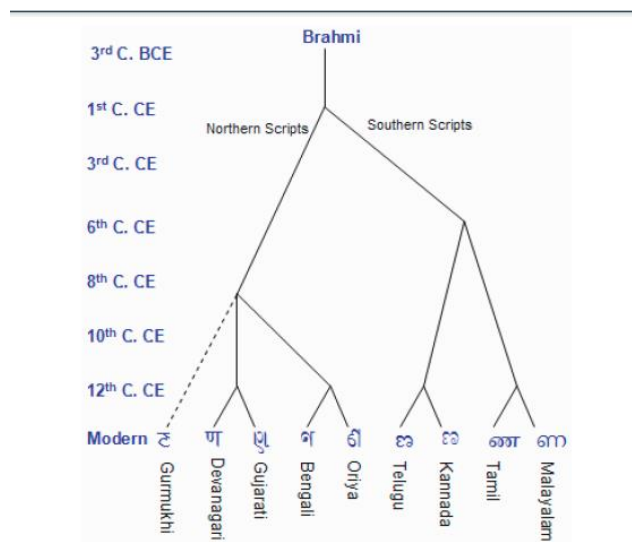


Figure 1: Pictorial depiction of Evolution of Oriya

Odia language literature (Odia: ଓଡ଼ିଆ ସାହିତ୍ୟ) is the predominant literature of the state of Odisha in India.

Historians have divided the history of the Odia language literature into five main stages: Old Odia (8th century to 1300), Early Middle Odia (1300 to 1500), Middle Odia (1500 to 1700), Late Middle Odia (1700 to 1850) and Modern Odia (1850 to present). Further subdivisions, as seen below, can more accurately chart the language's development.

Middle Oriya Literature (1500 to 1700) The next era is more commonly called the Jagannatha Dasa Period and stretches till the year 1700. The period began with the writings of Shri Chaitanya, whose Vaishnava influence brought in a new evolution in Oriya literature. Balarama Dasa, Jagannatha Dasa, Yasovanta, Ananta and Acyutananda were the main exponents in religious works in Oriya. The composers of this period mainly translated, adapted or imitated Sanskrit literature. A few prominent works of this period include the Usabhilasa of Sisu Sankara Dasa, the Rahasya-manjari of Deva-durlabha Dasa and the Rukmini-bibha of Kartikka Dasa. A new form of novels in verse also evolved during the beginning of the 17th century, when Ramachandra Pattanayaka wrote Haravali. Other poets, like Madhusudana, Bhima, Dhivara, Sadasiva and Sisu Isvara-dasa, composed another form of poems called Kavyas (long poems based on themes from Puranas). The language used by them was plain and simple Oriya.

Late Middle Oriya Literature (1700 to 1850) From the turn of the 18th century, verbally tricky Oriya became the order of the day. Verbal jugglery, obscenity and eroticism became the trend of the period, the most notable poet being Upendra Bhanja.

Many other poets tried to imitate him, but none could fit into his shoes, with the exception of Bhima-Bhoi and Arakshita Dasa. Family chronicles in prose and literature related to religious festivals and rituals also covered a large portion of this period. The first Oriya printing typeset was cast in 1836, by the Christian missionaries. The actual Oriya script closely resembled Bengali and Assamese scripts, but the one adopted for the printed typesets was completely different, leaning more towards the Tamil script.

Modern Oriya Literature (1850 till present day) In this period, three great poets and prose writers, Rai Bahadur Radhanatha Ray, Madhusudana Rao and Phakiramohana Senapati, settled in Orissa and made Oriya their own. They brought in a modern outlook and spirit into Oriya literature. Around the same time, the modern drama took birth in the works of Rama Sankara Ray, beginning with Kanci-Kaveri. 20th century writers in Oriya include Nanda-kisora Bal, Gangadhara Mehera, Chintamani Mahanti and Kuntala-Kumari Sabat Utkala-bharati, besides Niladri Dasa and Gopabandhu Dasa. The most notable novelists till date are Umesa Sarakara, Divyasimha Panigrahi, Gopala Praharaja and Kalindi Charana Panigrahi. Sachi Kanta Rauta Ray is the great introducer of the ultra-modern style in modern Oriya poetry. Others who took up this form were Godavarisa Mahapatra, Dr Mayadhara Manasimha, Nityananda Mahapatra and Kunjabihari Dasa. Prabhasa Chandra Satpati is known for his translations of some western classics, apart from Udayanatha Shadangi, Sunanda Kara and Surendranatha Dwivedi. Criticism, Essays and History Criticism, essays and history also became major lines of writing in the Oriya language. The renowned writers in this field were Professor Girija Shankar Ray, Pandit Vinayaka Misra, Professor Gauri Kumara Brahma, Jagabandhu Simha and Hare Krushna Mahatab. Oriya literature mirrors the industrious,

peaceful and artistic image of the Oriya people, who have offered and gifted much to the Indian civilization, in the field of art and literature.

According to [wikipedia](#), the Odia diaspora constitute a sizeable number in several countries around the world, totaling the number of Odia speakers on a global scale to 55 million. It has a significant presence in eastern countries such as Bangladesh, Indonesia, mainly carried by the sadhaba, ancient traders from Odisha who carried the language along with the culture during the old-day trading, and in western countries such as the United States, Canada, Australia and England as well. The language has also spread to Burma, Malaysia, Fiji, Sri Lanka and Middle East countries.

There are different ways of speaking and meaning of words in local Oriya Language. However the script remained the same. Extracted from [wikipedia](#).

Standard Odia

Kataki Odia or *The Odia of Mughalbandi region* is considered as Standard Odia due to literary traditions. It is spoken mainly in the eastern half of the state of Odisha, in districts like [Khurdha](#), [Puri](#), [Cuttack](#), [Jajpur](#), [Jagatsinghpur](#), [Kendrapada](#), [Dhenkanal](#), [Angul](#) and [Nayagarh](#) district with little variation.^[23]

Major forms or dialects^[edit]

- **Midnapori Odia:** Spoken in the undivided [Midnapore](#) District of West Bengal.
- **Singhbhumi Odia:** Spoken in [East Singhbhum](#), [West Singhbhum](#) and [Saraikela-Kharsawan](#) district of [Jharkhand](#)
- **Baleswari Odia:** Spoken in [Baleswar](#), [Bhadrak](#) and [Mayurbhanj](#) district of Odisha.
- **Ganjami Odia:** Spoken in [Ganjam](#) and [Gajapati](#) districts of Odisha and [Srikakulam](#) district of [Andhra Pradesh](#).
- **Sambalpuri Odia:** Spoken in [Bargarh](#), [Bolangir](#), [Boudh](#), [Debagarh](#), [Jharsuguda](#), [Kalahandi](#), [Nuapada](#), [Sambalpur](#) and [Subarnapur](#) districts of Odisha and by some people in [Raigarh](#), [Mahasamund](#), [Raipur](#) districts of [Chhattisgarh](#) state.
- **Desiya Odia:** Spoken in [Koraput](#), [Rayagada](#), [Nowrangpur](#) and [Malkangiri](#) Districts of Odisha and in the hilly regions of [Vishakhapatnam](#), [Vizianagaram](#) District of [Andhra Pradesh](#).
- **Bhatri:** Spoken in South-western Odisha and eastern-south Chhattisgarh.

- **Halbi**: Spoken in undivided Bastar district of [Chhattisgarh](#). Halbi is a mixture of Odia and Marathi with influence of Chatishgarhi tribal languages.
- **Phulbani Odia**: spoken in [Phulbani](#), [Phulbani Town](#), Khajuripada block of [Kandhamal](#), and in nearby areas bordering [Boudh district](#). This language gained momentum during the amalgamation of [kandhamal\(Phulbani\)](#), and [Boudh](#), region into a single district [Phulabani](#),

Minor non literary and tribal forms or dialects^[24][\[edit\]](#)

- **Sundargadi Odia** : Variation of Odia Spoken in Sundargarh district of [Odisha](#) and in adjoining pockets of [Jharkhand](#) and [Chhattisgarh](#).
- **Kalahandia Odia** : Variation of Odia spoken in undivided [Kalahandi District](#) and neighboring districts of [Chhattisgarh](#).
- **Kurmi**: Spoken in Northern Odisha and South west Bengal.
- **Sounti**: Spoken in Northern Odisha and South west Bengal.
- **Bathudi**: Spoken in Northern Odisha and South west Bengal.
- **Kondhan**: A tribal dialect spoken in Western Odisha..
- **Laria**: Spoken in bordering areas of Chatishgarh and Western Odisha.
- **Aghria**: Spoken mostly by the ingenious people of Aghria caste in Western Odisha.
- **Bhulia**: Tribal form spoken in Western Odisha.
- **Sadri**: A mixture of Odia and Hindi language with major regional tribal influence.
- **Bodo Parja / Jharia**: Tribal dialect of Odia spoken mostly in Koraput district of Southern Odisha .
- **Matia**: Tribal dialect of Odia spoken in Southern Odisha.
- **Bhuyan**: Tribal dialect of Odia spoken in Southern Odisha.
- **Reli**: Spoken in Southern Odisha and bordering areas of Andhra Pradesh.
- **Kupia**: Spoken by [Valmiki](#) caste people in the Indian state of [Telangana](#) and [Andhra Pradesh](#), mostly in [Hyderabad](#), [Mahabubnagar](#), [Srikakulam](#), [Vizianagaram](#), [East Godavari](#) and [Visakhapatnam](#) districts.

Written Odia

The Odia script developed from the Kalinga script, one of the many descendents of the [Brahmi](#) script of ancient India. The earliest known inscription in the Odia language, in the Kalinga script, dates from 1051.

The curved appearance of the Odia script is a result of the practice of writing on palm leaves, which have a tendency to tear if you use too many straight lines.

Notable features

- Type of writing system: syllabic alphabet in which all consonants have an inherent vowel. Diacritics, which can appear above, below, before or after the consonant they belong to, are used to change the inherent vowel.
- When they appear at the beginning of a syllable, vowels are written as independent letters.
- When certain consonants occur together, special conjunct symbols are used which combine the essential parts of each letter.
- Direction of writing: left to right in horizontal lines.
- Used to write: Odiya, and also used a number of the other languages spoken in Odisha, and Sanskrit

The chart shows the way in which the International Phonetic Alphabet (IPA) represents Odia pronunciations in [Wikipedia articles](#) referred from <https://en.wikipedia.org/wiki/Help:IPA/Odia>

See Odia phonology for a more thorough discussion of the sounds of Odia.

Consonants		
<u>IPA</u>	Odia	English approximation
<u>b</u>	ବ	big
<u>b^h</u>	ଭ	abhor
<u>d^[1]</u>	ଦ	that
<u>d^h[1]</u>	ଢ	
<u>d</u>	ଡ	dice
<u>d^h</u>	ଢ	guardhouse
<u>dʒ</u>	ଜ	junior

<u>dʒ^h</u>	ʒ	fridge handle
<u>g</u>	ɣ	go
<u>g^h</u>	ɣ ^h	pigheaded
<u>h</u>	ʰ	head
<u>k</u>	ʁ	skate
<u>k^h</u>	ʁ ^h	Kate, Stockholm
<u>l</u>	ɭ	<u>light (clear L)</u>
<u>l</u>	ɭ	<u>similar to "ld" in old, but with the tongue touching the back of the front teeth</u>
<u>l</u>	ɭ	
<u>m</u>	ɱ	might
<u>n</u>	ɳ	not
<u>n</u>	ɳ	American morning
<u>n</u>	ɳ	sing
<u>p</u>	ɸ	spot
<u>p^h</u>	ɸ ^h	pot
<u>r</u>	ʀ	Scottish three, American ladder
<u>r</u>	ʀ	
<u>r^h</u>	ʀ ^h	
<u>s</u>	ʃ	so
<u>t^[1]</u>	ʈ	
<u>t^{h[1]}</u>	ʈ ^h	thought
<u>t</u>	ʈ	stop
<u>t^h</u>	ʈ ^h	top
<u>tʃ</u>	ʈʃ	latch

<u>tʰ</u>	ଝ	choose, which hand
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Vowels		
<u>IPA</u>	Odia	English approximation
<u>a:</u>	ଌ	woman
<u>e</u>	ଌ	ability
<u>i</u>	ଌ, ଌ	English
<u>o</u>	ଌ	short (UK)
ɔi	ଌ	poise (UK)
<u>u</u>	ଌ, ଌ	guru
<u>u</u>	ଌ, ଌ	guru
~	ଌ	<i>roughly like on (American English), nasalized [ɒ] or [ɑ]. rendez-vous</i>

Semivowels		
<u>IPA</u>	Odia	English approximation
<u>i</u>	ଌ	yet
<u>w</u>	ଌ	wine

Reduced vowels		
<u>IPA</u>	Odia	English approximation
<u>ɨ</u>	ଌ	doctor

Structured consonants

The structured consonants are classified according to where the tongue touches the palate of the mouth and are classified accordingly into five structured groups. These consonants are shown here with their IAST transcriptions.

	voiceless	voiceless aspirate	voiced	voiced aspirate	nasal
Velars	କ (ka)	ଖ (kha)	ଗ (ga)	ଘ (gha)	ଙ (ṅa)
Palatals	ଚ (ca)	ଛ (cha)	ଜ (ja)	ଝ (jha)	ଞ (ña)
Retroflex	ଟ (ṭa)	ଠ (ṭha)	ଡ (ḍa)	ଢ (ḍha)	ଣ (ṇa)
Dentals	ତ (ta)	ଥ (tha)	ଦ (da)	ଧ (dha)	ନ (na)
Labials	ପ (pa)	ଫ (pha)	ବ (ba)	ଭ (bha)	ମ (ma)

Unstructured consonants

The unstructured consonants are consonants that do not fall into any of the above structures:

ଯ (ja), ଯ (ia), ର (ra), ଲ (la), ଳ (ḷa), ଓ (wa), ଶ (sa), ଷ (ṣa), ସ (sa), ହ (ha)

The Implicit Vowel Killer Halanta/Pulli

The character used after a consonant to "strip" it of its inherent vowel. A Halant follows all but the last consonant in every Oriya syllable.

NOTE: A syllable containing halant characters may be shaped with no visible halant signs by using different consonant forms or conjuncts instead.

Halant form of consonants - The form produced by adding the halant (virama) to the nominal shape. The Halant form is used in syllables that have no vowel or as the half form when no distinct shape for the half form exists.

Half form of consonants (pre-base form) - A variant form of consonants which appear to the left of the base consonant, if they do not participate in a ligature.

Consonants in their half form precede the ones forming the base glyph. Some Indic scripts, like Devanagari have distinctly shaped half forms for most of the consonants. If not distinct shape exists, the full form will display with an explicit Virama (same shape as the halant form).

Matra sign: (Dependent Vowel)

Used to represent a vowel sound that is not inherent to the consonant. Dependent vowels are referred to as "matras" in Sanskrit. They are always depicted in combination with a single consonant, or with a consonant cluster. The greatest variation among different Indian scripts is found in the rules for attaching dependent vowels to base characters.

Following table explains the correlation between Vowel and it's sign (matra).

Corelation between Vowel and it's sign (matra)

Character	Unicode	Name	Character	Unicode	Name
ଅ	U+0B05	Oriya Letter A			
ଆ	U+0B06	Oriya Vowel Letter Aa	ଠା	U+0B3E	Oriya Vowel Sign Aa
ଇ	U+0B07	Oriya Vowel Letter I	ଠି	U+0B3F	Oriya Vowel Sign I
ଈ	U+0B08	Oriya Vowel Letter Ii	ଠିଠି	U+0B40	Oriya Vowel Sign Ii
ଉ	U+0B09	Oriya Vowel Letter U	ଠୁ	U+0B41	Oriya Vowel Sign U
ଊ	U+0B0A	Oriya Vowel Letter Uu	ଠୁଠୁ	U+0B42	Oriya Vowel Sign Uu
ଋ	U+0B0B	Oriya Vowel Letter Vocalic R	ଠୃ	U+0B43	Oriya Vowel Sign Vocalic R
ଏ	U+0B0F	Oriya Vowel Letter E	ଠେ	U+0B47	Oriya Vowel Sign E
ଐ	U+0B10	Oriya Vowel Letter Ai	ଠେଠି	U+0B48	Oriya Vowel Sign Ai
ଓ	U+0B13	Oriya Vowel Letter O	ଠୋ	U+0B4B	Oriya Vowel Sign O
ଔ	U+0B14	Oriya Vowel Letter Au	ଠୋଠି	U+0B4C	Oriya Vowel Sign Au
ଌ	U+0B14	Oriya Vowel Letter Au	ଠିଠିଠି	U+0B57	Oriya Au Length Mark
ଲ	U+0B32	Oriya Vowel Letter La	ଠୃଠୃ	U+0B62	Oriya Vowel Sign Vocalic L
ଲ୍ଲ	U+0B33	Oriya Vowel Letter Lla	ଠୃଠୃଠୃ	U+0B63	Oriya Vowel Sign Vocalic Ll

4. Overall Development Process and Methodology

The Neo-Brahmi Generation Panel (NBGP) has been formed by members having experience in linguistics and computational linguistic. Under the Neo-Brahmi Generation Panel, there are nine scripts belonging to separate Unicode blocks. Each of these scripts will be assigned a separate LGR; however Neo-Brahmi GP will ensure that the fundamental philosophy behind building those LGRs are all in sync with all other Brahmi derived scripts.

NBGP considered all the languages with EGIDS scale 1 to 4 and found that Oriya script is being used in other spoken languages.

5. Repertoire

This section explains about the section of [MSR] applicable to the Oriya script on which oriya code point repertoire is based on.

Section 5.1 details the code-point repertoire that the Neo-Brahmi Generation Panel [NBGP] proposes to be included in the Oriya LGR.

5.1 Oriya section of Maximal Starting Repertoire [MSR] Version 2

	0B0	0B1	0B2	0B3	0B4	0B5	0B6	0B7
0		ଂ	ଠ	ଢ	ଢ଼		ଢ଼଼	✓
	0B01	0B12	0B20	0B30	0B43		0B90	0B78
1	ଠ		ଢ		ଢ଼		ଢ଼଼	ଢ଼଼
	0B01		0B21		0B41		0B91	0B71
2	ଠ		ଢ	ଢ଼	ଢ଼		ଢ଼଼	
	0B02		0B22	0B32	0B42		0B92	0B72
3	ଠ	ଠ	ଠ	ଢ଼	ଢ଼		ଢ଼଼	୩
	0B03	0B13	0B23	0B33	0B43		0B93	0B73
4		ଢ଼	ଢ		ଢ଼			୩
		0B14	0B24		0B44			0B74
5	ଢ	ଢ	ଢ	ଢ				/
	0B06	0B15	0B25	0B35				0B75
6	ଢ	ଠ	ଢ	ଠ		ଠ	ଠ	୩
	0B06	0B16	0B26	0B36		0B56	0B96	0B76
7	ଢ	ଠ	ଢ	ଠ	ଠ	ଠ	ଠ	୩
	0B07	0B17	0B27	0B37	0B47	0B57	0B97	0B77
8	ଢ	ଠ	ଢ	ଠ	ଠ		୩	
	0B08	0B18	0B28	0B38	0B48		0B98	
9	ଢ	ଠ		ଢ			ଠ	
	0B09	0B19		0B39			0B99	
A	ଢ	ଠ	ଢ				ଠ	
	0B0A	0B1A	0B2A				0B9A	
B	ଢ	ଠ	ଢ		ଠ		ଠ	
	0B0B	0B1B	0B2B		0B4B		0B9B	
C	ଢ	ଠ	ଢ	ଠ	ଠ	ଠ	ଠ	
	0B0C	0B1C	0B2C	0B3C	0B4C	0B5C	0B9C	
D		ଠ	ଢ	ଠ	ଠ	ଠ	ଠ	
		0B1D	0B2D	0B3D	0B4D	0B5D	0B9D	
E		ଠ	ଢ	ଠ			ଠ	
		0B1E	0B2E	0B3E			0B9E	
F	ଠ	ଠ	ଢ	ଠ		ଠ	ଠ	
	0B0F	0B1F	0B2F	0B3F		0B5F	0B9F	

Color convention:

All characters that are included in the [MSR]- Yellow background

PVALID in IDNA2008 but excluded from the [MSR]- Pinkish background

Not PVALID in IDNA2008, or are ineligible for the root zone (digits, hyphen) - White background

Oriya Code Page From MSR

5.2 Code Point Repertoire:

For each of the code points, language references have been given in the last column titled "Reference". For the entire coverage of Tamil code points, references of the same have been given. The examples have been chosen for referencing, they together cover all the code-points required for Tamil Language that NBGP has considered.

Sr. No.	Unicode Code Point	Glyph	Character Name	Unicode General Category GC	Language with EGIDS	Indic Syllabic Category	Ref.
1	0B01	◌̣	ORIYA SIGN CANDRABINDU	Mn	Oriya	Matra	[1], [2], [3], [4], [5]
2	0B02	◌̆	ORIYA SIGN ANUSVARA	Mc	Oriya	Matra	[1], [2], [3], [4], [5]
3	0B03	◌̇	ORIYA SIGN VISARGA	Mc	Oriya	Matra	[1], [2], [3], [4], [5]
4	0B05	ଅ	ORIYA LETTER A	Lo	Oriya	Vowel	[1], [2], [3], [4], [5]
5	0B06	ଆ	ORIYA LETTER AA	Lo	Oriya	Vowel	[1], [2], [3], [4], [5]
6	0B07	ଇ	ORIYA LETTER I	Lo	Oriya	Vowel	[1], [2], [3], [4], [5]
7	0B08	ଈ	ORIYA LETTER II	Lo	Oriya	Vowel	[1], [2], [3], [4], [5]

8	0B09	ଉ	ORIYA LETTER U	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
9	0B0A	ଊ	ORIYA LETTER UU	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
10	0B0B	ଋ	ORIYA LETTER VOCALIC R	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
11	0B0C	ୠ	ORIYA LETTER VOCALIC L	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]
12	0B0F	ଏ	ORIYA LETTER E	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
13	0B10	ଐ	ORIYA LETTER AI	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
14	0B13	ଓ	ORIYA LETTER O	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
15	0B14	ଔ	ORIYA LETTER AU	Lo	Oriya	Vowel	[1] , [2] , [3], [4], [5]
16	0B15	କ	ORIYA LETTER KA	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]
17	0B16	ଖ	ORIYA LETTER KHA	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]
18	0B17	ଗ	ORIYA LETTER GA	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]
19	0B18	ଘ	ORIYA LETTER GHA	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]
20	0B19	ଙ	ORIYA LETTER NGA	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]
21	0B1A	ଚ	ORIYA LETTER CA	Lo	Oriya	Consona nt	[1] , [2] , [3], [4], [5]

22	0B1B	ଞ	ORIYA LETTER CHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
23	0B1C	ଞ	ORIYA LETTER JA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
24	0B1D	ଞ	ORIYA LETTER JHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
25	0B1E	ଞ	ORIYA LETTER NYA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
26	0B1F	ଞ	ORIYA LETTER TTA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
27	0B20	ଞ	ORIYA LETTER TTHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
28	0B21	ଞ	ORIYA LETTER DDA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
29	0B22	ଞ	ORIYA LETTER DDHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
30	0B23	ଞ	ORIYA LETTER NNA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
31	0B24	ଞ	ORIYA LETTER TA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
32	0B25	ଞ	ORIYA LETTER THA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
33	0B26	ଞ	ORIYA LETTER DA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]

34	0B27	ଧ	ORIYA LETTER DHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
35	0B28	ନ	ORIYA LETTER NA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
36	0B2A	ପ	ORIYA LETTER PA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
37	0B2B	ଫ	ORIYA LETTER PHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
38	0B2C	ବ	ORIYA LETTER BA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
39	0B2D	ଭ	ORIYA LETTER BHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
40	0B2E	ମ	ORIYA LETTER MA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
41	0B2F	ଯ	ORIYA LETTER YA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
42	0B30	ର	ORIYA LETTER RA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
43	0B32	ଲ	ORIYA LETTER LA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
44	0B33	ଳ	ORIYA LETTER LLA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
45	0B35	ୱ	ORIYA LETTER VA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]

46	0B36	ଶି	ORIYA LETTER SHA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
47	0B37	ଷି	ORIYA LETTER SSA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
48	0B38	ସି	ORIYA LETTER SA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
49	0B39	ହି	ORIYA LETTER HA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
50	0B3C	\$	ORIYA SIGN NUKTA	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
51	0B3E	ଠି	ORIYA VOWEL SIGN AA	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
52	0B3F	ଠି	ORIYA VOWEL SIGN I	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
53	0B40	ଠି	ORIYA VOWEL SIGN II	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
54	0B41	ଠି	ORIYA VOWEL SIGN U	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
55	0B42	ଠି	ORIYA VOWEL SIGN UU	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
56	0B43	ଠି	ORIYA VOWEL SIGN VOCALIC R	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
57	0B44	ଠି	ORIYA VOWEL SIGN VOCALIC RR	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
58	0B47	ଠି	ORIYA VOWEL SIGN E	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]

59	0B48	ᱚ̄	ORIYA VOWEL SIGN AI	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
60	0B4B	ᱚᱛ	ORIYA VOWEL SIGN O	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
61	0B4C	ᱚᱠ	ORIYA VOWEL SIGN AU	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
62	0B4D	ᱚ̣	ORIYA SIGN VIRAMA	Mn	Oriya	Matra	[1] , [2] , [3], [4], [5]
63	0B56	ᱚ̄̄	ORIYA AI LENGTH MARK	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
64	0B57	ᱚᱠ̄	ORIYA AU LENGTH MARK	Mc	Oriya	Matra	[1] , [2] , [3], [4], [5]
65	0B5F	ᱚᱠ	ORIYA LETTER YYA	Lo	Oriya	Consonant	[1] , [2] , [3], [4], [5]
66	0B71	ᱚᱠ	ORIYA LETTER WA	Lo	Oriya	Matra	[1] , [2] , [3], [4], [5]

Variables involved

- C → Consonant
M → Matra
V → Vowel
B → Anusvara
H → Halant / Virama
N → Nukta
C1 → {ᱚᱠ, ᱚᱠ̄}

X → Visarga

D → Candrabindu

6. Variants

In Oriya there are no characters/character sequences which can be created by using the characters permitted as per the [MSR] in other indic language or look exactly alike, except few confusing characters mentioned below.

Following characters are visually similar with Gujurati, but not exactly look same. So the NBGP discussed and concluded as visually similar.

Oriya	Gujurati
୦ (0B03)	୦ (0A83)
୧ (0B2A)	୧ (0A98)
୨ (0B25)	୨ (0AA5)

Also, following characters are visually similar with Telugu and Kannada. So the NBGP discussed and concluded as non confusable and not looking the same.

Oriya	Telugu	Kannada
೦ (0B20)	೦ (0C30)	೦ (0CB0)
೦ (0B20)	೦ (0C20)	೦ (0CA0)

7. Whole Label Evaluation Rules (WLE)

This section provides the whole label evaluation rules for text written in Oriya script. The rules have been drafted in such a way that they can be easily translated into the LGR specification.

Below are the symbols used in the WLE rules, for each of the "Indic Syllabic Category" as mentioned in the Table 7: Code point repertoire.

In addition, we have created a few more symbols related to matras and vowels for the explanation of the rules.

C	→	Consonant
M	→	Matra
V	→	Vowel
B	→	Anusvara
H	→	Halant
N	→	Nukta
C1	→	{ॠ0B21, ॡ0B22}
X	→	Visarga
D	→	Candrabindu

Rule1: N: must be preceded only by C1

For example:

ॠ(0B21)+◌(0B3C) = ॠ

ॡ(0B22)+◌(0B3C) = ॡ

Rule2: H: must be preceded by C and followed by C

Rule3: M: must be preceded only by C or N

For example: ॠ0B21+◌0B3C+◌10B40 = ॠ

Rule4: B: must be preceded by C and followed by C

Rule5: V: must be preceded only by C or N

For example: ॐ0B21+ॐ0B3C+ॐ0B3E =ॐ

Rule6: X must be preceded by V, C, N or M

Rule7: D: must be preceded by V, C, N or M

8. Contributors

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Shantaram S. WardeWalawalikar	Konkani
Bal Krishna Bal	Nepali
Ganesh Murmu	Santali

BalaramPrasain	Nepali
Rajib Chakraborty	Bangla (Bengali)
Gurpreet Singh Lehal	Panjabi
SarojaBhate	Sanskrit
Shambhu Kumar Singh	Maithili
SwarnaPrabhaChainary	Bodo
Ghanashyam Nepal	Nepali
KalyanVasudeo Kale	Marathi
Shashi Pathania	Dogri
Santhosh Thottingal	Malayalam, Sourashtra, Tamil
Uma Maheshwar G	Telugu
Girish Chandra Mishra	Odia
K. C. Tikayat ray	Odia
Kuldeep Patnaik	Odia
Debajit Sharma	Assamese
Basanta Kumar Panda	Odia
Arvind Bhandari	Gujarati
Harish Chowdhary	Hindi
Chitrita Chatterjee	Multiple languages represented by members of IMAI
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Hempal Shrestha	Nepali, Newari
Suraj Adhikari	Nepali
Gangadhar Panday	Telugu
Vinay Murarka	Hindi
Mukesh Saini	Hindi

Jay Paudyal	Hindi
PawanChitrakar	Nepali
NirajanParajuli	Nepali
Uttam Shrestha Rana	Nepali
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Shanmugam R	Tamil
Prasad PK	Malayalam
SinnathambiShanmugarajah	Tamil

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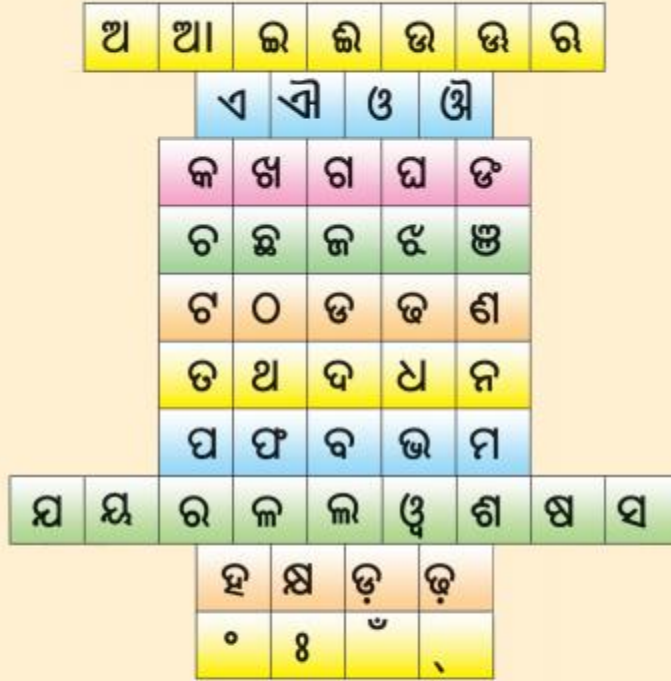
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ମୁଁ କ’ଣ ଶିଖିଲି ?



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10. Appendix A: Variants based on pure visual similarity

There are Only three characters from the two scripts show a certain degree of similarity. As can be seen in section 6 : Cross-script variants, the level of similarity is very less and hence the same are not being proposed as variants.

Gujarati	Odia
ꣳ (0A83)	ଠ (0B03)
୧ U+0A98	୧ U+0B2A
୧ U+0AA5	୧ U+0B25