UNIVERSAL SEMANTIC REPRESENTATION GUIDELINE VERSION 4.2

DEPENDENCY RELATION

In this row we mark the relation between head and dependent in following way-

Index of the head: the relation of dependent with the head
Here, the relation means "what the dependent is to the head". So, if we get a relation as 2:k2, this means '2' is the index of head and 'karma' or 'k2' is the name of the relation of the dependent with the head or dependent is k2 of head.
Two types of head-dependency relations are captured in this row. They are
- **kāraka relation** between verbs and its dependent nouns
- **kāraketara** (Other than kāraka) relations between
  - verb and its other non-kāraka dependents
  - Noun and its modifiers

Notes

- The tags for kāraka relations start with 'k'
- and head will get **0:main**
- The relation between the *viśeṣya* or head and its dependents are specified in this row as the index **of the head : relation tag** in the column of the dependent.
- The convention followed in this document is to mark the **dependen**t in **bold** and underline the head.
- If the concept is a component of a complex concept, we are not annotating any dependency relation for those concepts in the dependency row. Instead, the dependency relation of those concepts are annotated in the construction row.

kāraka relations

- All kāraka relations start with 'k' and are followed by a numerical

A list of six main kāraka relations given below

kāraka	Tag	Definition	Example
kartā	k1	most independent participant of an action	**rāma** āma khātā hai 'Ram eats mango.'
karma	k2	locus of the result of the action	mōhana nē **āma** kharīde 'Mohana bought mangoes.'
karaṇa	k3	The instrument required for the performance of the action	ratanā ne āma **cākū se** kāte 'Ratna cut the mangoes with a knife.'

saṃpradāna	k4	recipient/beneficiary	**billī ko** dūdha do 'Give milk to the cat.'
apādāna	k5	Source	**peḍa se** eka pattā <u>girā</u> 'A leaf fell from the tree.'
Viṣayaa dhikaraṇa	k7	Location elsewhere	ve **rājanīti para** carcā kara rahe the 'They were discussing politics.' maiṃ **rāma ke bāre meṃ** nahīṃ jānatā 'I do not know about Ram.'
kāladhikaraṇa	k7t	Time of the event	rāma **cāra baje** <u>āyegā</u> 'Ram will come at 4 o'clock.'
deśadhikaraṇa	k7p	Locus of the event	**meja** para kitāba <u>hai</u> 'The book is on the table.'

Table 1. six main kāraka

Note - Although, karta/ karma of Complex Predicate gets a genitive relation, but the dependency relation is k1/k2. See Complex Predicate for details

exemplifyOther kāraka relations

Relation Name	Tag	Definition	Example
anubhava-kartā	k4a	Experiencer	**rāma ko** āma <u>pasamda hai</u> 'Ram loves mango.'
gauṇa karma	k2g	Secondary object	rāma ne mohana ko **ek bāte** <u>kahī.</u> 'Ram has told Mohana something.'
destination	k2p	Destination or goal	rāma **ghara** <u>gayā</u> 'Ram went home.'
prakṛti apādāna	k5prk	Source material	jūte **camaḍe se** <u>banate haim</u> 'Shoes are made of leather.'
prayojaka kartā	pk1	causer	**māṁ ne** bacce ko khānā <u>khilāyā</u> Mother fed the babies.<u>'</u>
prayojya kartā	jk1	causee	māṁ ne āyā se **bacce ko** khānā <u>khilavāyā</u> 'Mother made the maid to feed the babies.'
madhyastha-kartā	mk1	mediator causer	māṁ ne **āyā se** bacce ko khānā <u>khilāvāyā</u> 'Mother made the maid to feed the babies.'
	k7a	according to someone/ something	**rāma ke anusāra** sītā ghara para nahīṃ <u>hai</u> 'According to Ram Sita is not at home.'

Table 2. Other kāraka relations

Relations associated with kāraka

saha-kāraka	rask1	*associate of kartā*	**rāma ke sātha** mohana bājāra gayā. 'Mohana along with Ram went to the market.'
	rask2	*associate of karma*	rāma ne **dūdha ke sātha** kelā khāyā. 'Ram ate bananas with milk.'
	rask3	*associate of karaṇa*	vaha **cammaca ke sātha** kāṁṭe se sabjī khā rahā hai 'He is eating vegetables with a fork along with a spoon.'
	rask4	*associate of saṃpradāna*	vaha **guru jī ke sātha** śiṣyoṃ ko dakṣiṇā detā hai 'Along with the honorable Guru, he gives donations to the disciples.'
	rask5	*associate of apādāna*	**bālakanī ke sātha** khiḍakiyoṃ se bhī dhūla ā rahī thī 'The dust came from the windows along with the balcony.'
	rask7	*associate of adhikaraṇa*	unhoṃne **rājanītika muddoṃ sahita** anya viṣayoṃ para kitābeṃ likhī haiṃ 'He has written books on other topics including political issues.'
kartā samanadhikarana	k1s	kartā and its viśeṣaṇa resides in the same locus, when the verb is copulative	rāma **buddhimāna** hai 'Ram is intelligent.'
karma samanadhikarana	k2s	karma and its viśeṣaṇa resides in the same locus	rāma mohana ko **buddhimāna** samajhatā hai 'Ram considers Mohan to be intelligent.'
	k*as	This relation is used when one entity is related or associated with the other entity and either both entities participate directly in the event/ state of being or both fulfill the desire of the verb. '**ke sātha/ se saṃbaṃdhita**' comes as a marker here to indicate the relation.	phūla ko **ḍālī ke sātha** phevikāla se jodo 'Fix the flower with the branch with fevicol.'

Table 3.Relations associated with kāraka

kāraketara relation

Apart from karaka relations, the head of the sentence can have some non-kāraka relations with its dependents. They are further divided into different categories according to the specification of the relations as discussed below-

samānādhikaraṇa

Relation Name	Tag	Definition	Example
samānādhikaraṇa / viśeṣaṇa	mod	Modifier or the head and its modifier share the same locus	**moṭī** billī meja para sotī hai ''The fat cat sleeps on the table'
bhūtakālika samānādhikaraṇa	rbks	equal locus of the action and the dependent action denoted by non-finite verb) in past tense	maiṃne mohana ke dvārā **likhī huī** kitāba paḍhī 'I read the book written by Mohana.'
vartamānakālika samānādhikaraṇa	rvks	equal locus of the action and the dependent action denoted by non-finite verb) in present tense	maine jangal meṃ eka **bhāgate hue** śera ko dekhā 'I saw a running lion in the jungle.'

Table 4. samānādhikaraṇa

bhāvalakṣaṇa:

The nominal form of the dependent verb (VN) plays the role of a referent with respect to which the time of the main event (VM) is specified.

Relation Name	Tag	Definition	Example
bhāvalakṣaṇa samānakālika	rblsk	Temporal overlapping or co-temporality between VN and VM	rāma ke vana **jāne ke samaya** sītā unakā anusarana karatī hai 'Sita followed Ram while he was going to the forest.'
bhāvalakṣaṇa pūrvakālika	rblak	VN precedes VM	sūrya **ugane ke bāda** khānā khāo 'Eat after the sun rises.'
bhāvalakṣaṇa anantarakālika	rblpk	VN follows VM	sūrya **ugane se pahale** nahāo 'Bathe before the sun sets.'

Table 5. bhāvalakṣaṇa

kālavācī

Relation Name	Tag	Definition	Example
pūrvakālika	rpk	One event occurs after the previous event is done and the kartā is shared	rāma ne khānā **khākara** pānī <u>piyā</u> 'Ram drank water after eating a meal.'
samānakālika	rsk	Two events occur simultaneously and the kartā is shared.	rāma **sote hue** <u>kharrāte bharatā hai</u> 'Ram snores while sleeping.'

Table 6. kālavācī

Spatio-temporal Information

Relation Name	Tag	Definition	Example
deśalakṣaṇa	rdl	A space is referent of another locus	**peḍa ke** <u>ūpara</u> cāṁda hai 'The moon is above the tree.'
kālalakṣaṇa	rkl	A time is referent of actual temporal information of the event	**7 se** <u>pahale</u> rāma ghara āyā 'Ram came home before 7 o'clock.'

Table 7. Spatio-temporal information

Intra-sentential sangati

Relation Name	Tag	Definition	Example
tādarthya	rt	Purpose of the event	**mohana ke lie** seva <u>lāo</u> Bring apples for Mohan.'
kāraṇa or *hetu*	rh	Reason of an action	**mohana ke kāraṇa** mujhe dera <u>ho gayī</u> 'I became late because of Mohan.'
udāharaṇam	re	Elaboration or example of an expression	kucha <u>vastuom</u> kā nirmāṇa prakṛti ne kiyā hai jaise **parvata nadiyāṁ prāṇī** 'Some things are made by nature like rivers, trees and animals.'
samānādhikaraṇa	rs	When one entity equates with the other entity	#pṛthvī kī āntarika paratoṃ kā vargīkaraṇa aura unakī moṭāiyoṃ ko **citra saṃkhyā** <u>2.1</u> meṃ darśāyā gayā hai |

Table 8. Intra-sentential sangati

Genitive or Possessive relation between two entities

Relation Name	Tag	Definition	Example
saṣṭhī	r6	Genitive	**rāma kā** <u>kitāba</u> Ram's book.
sthāyī svāmī	rsm	Possessor of some entity	**rāma ke** pāsa <u>kitāba</u> hai**.** 'Ram has the book.'
asthāyī svāmī	rsma	Temporary possessor of some entity	**rāma ke pāsa** sītā kī <u>kitāba</u> hai.

			'Ram has Sita's book.'
Human to human	rhh	Relation between two human beings when there is a stative verb.	**rāma ke** do <u>bete</u> haiṃ 'Ram has two sons.'

<div align="center">Table 9. Genitive or Possessive relation between two entities</div>

Sādrisya, vibhājana and nirdhāraṇa

Relation Name	Tag	Definition	Example
sādrisya	ru	When there is comparison between two entities based on the resemblance or similarity	**gulāba jaise** <u>phūla</u> pānī meṃ nahīṃ ugate haiṃ 'Rose-like flowers do not bloom in water.'
vibhājana	rv	When two entities are compared and there are inequalities observed between them	<u>rādhā</u> **mīrā kī tulanā meṃ** adhika suṃdara hai 'Radha is more beautiful than Mira.'
nirdhāraṇa	rn	'nirdhāraṇam or specification is made by separating one from the many by reason of its genus, quality and action'.	**gāyoṃ meṃ** kālī <u>gāi</u> sabase jyādā dūdha detī he. 'Among cows, black cows give the most milk.'

<div align="center">Table 10. Sādrisya, vibhājana and nirdhāraṇa</div>

Other kārakatera relation

Relation Name	Tag	Definition	Example
Direction	rd	Direction towards a goal	sītā **gāṃva kī ora** <u>jā rahī thī</u> 'Sita is going towards the village.'
kriyā viśeṣaṇa	krvn	Manner adverb	rāma **bhāgakara** <u>āyā</u> 'Ram came running.' rāma **dhīre** <u>chalatā hai</u> 'Ram <u>walks</u> **slowly**.'
Negation	neg	Negation	rāma **nahīṃ** <u>āyā hai</u> 'Ram has not come.'
vakya viśeṣaṇa	vkvn	Sentential adverb	rāma **sāyada** nahīṃ <u>āyā hai</u> 'Ram probably has not come.'
frequency	freq	A temporal and manner information of an event which reoccurs over a period of time	vaha **roja** yahāṃ <u>ātā hai</u> 'He comes here everyday.'
Negation in Associatives	rasneg	When there is absence of some participant	**jala ke binā** koī bhī jīva jīvita nahīṃ <u>raha sakatā</u>| 'No animal can be alive without water.'
Relation path	rp	for "through" or "via" which indicates a path of movement.	karka rekhā isa **mahādvīpa se hokara** <u>gujaratī hai</u>	

			'The Tropic of Cancer passes through this continent.'
Construction Part	cxnpart	When element/s of a construction shows the relation with other element/s and not defined as a dependency relation due to non- compositionality	rāma do bāra hara **12 ghaṃṭe meṃ** khātā hai 'Ram eats twice in every 12 hours.'
Relation address	rad	When there is an address by some name	nāraka! mere īśvara, lepacāoṃ kī duniyā meṃ āpa saṃgīta ke janaka haiṃ ‗Naraka, my lord, you are the father of songs in the world of Lepchas.'

Table 11. Other kārakatera relation

Note

In the context of the relation path, the term "relation path tag" will be used there to signify "via,"or "through" or in other words, "से होकर" in Hindi. The sentence is constructed in a manner that conveys this meaning. Here, "से होकर" is taken as a post position. It is important to note that, in this usage, "से होकर," which is typically a verb, is employed in particular semantics as a post position.

Modifier and modified relations

Relations	Tag	Definition	Example
Demonstrative	dem	Point to a specific entity	**yaha** kitāba lāla hai. 'This book is red.'
Cardinal number	card	Cardinal numbers or counting numbers	rāma roja **do** seba khātā hai. 'Ram eats two apples everyday.'
Ordinal number	ord	Number which represents the position or rank	rāma daśaratha ke **prathama** putra haiṃ 'Ram is the first son of Dasaratha.'
Quantifier	quant	A limiting noun modifier express quantity	**saba** ladake āeṃge 'Every boy will come.'
Intensifier	intf	Intensifying quality or quantity of an entity	**bahuta** moṭī billī dīvāra para so rahī hai 'The very fat cat is sleeping.'
Quantity more than a certain number	quantmore	when quantity is mentioned not as a specific number but as more than a certain number, then we will not use cardinal relation but quantmore relation	#pṛthvī para **tīna hajāra se adhi**ka vibhinna khanija haiṃ। There are over three thousand different minerals on this earth.

| Quantity less than a certain number | quantless | when quantity is mentioned not as a specific number but as less than a certain number, then we will not use cardinal relation but quantless relation | pṛthvī para **tīna hajāra se kama** vibhinna khanija haiṃ
There are less than three thousand different minerals on this earth. |

Table 12. Modifier and modified relations

Different Measurement relations

Relations	Tag	Definition	Example
Duration	**dur**	Measuring the time span, during which something continues	rāma **10 ghaṃṭe** calā 'Ram walked for ten hours.'
Extent	**extent**	Measuring the area covered by someone/ something	rāma **10 kimi** calā 'Ram walked ten km.'
Quantity	**quant**	Measuring the amount or number of some material	rāma ne **10 kilo** ālū kharīdā 'Ram bought ten kilo potatoes.'
frequency	**vIpsA**	Measuring the frequency of occurrences of something	rāma hara 12 ghaṃṭe meṃ **do bāra** khātā hai 'Ram eats twice in every 12 hours.'

Table 13. Different Measurement Relations

Relative Clause relation

Relations	Tag	Definition	Example
relative clause elaboration	**rcelab**	When the relative clause elaborates the head noun, the main verb of relative clause get this tag	himda mahāsāgara jo yuropīya deśom aurā eṣiyāī deśom ko **milātā hai**, bhārata ko kendrīya sthiti pradāna karatā hai|
relative clause delimitation	**rcdelim**	When the relative clause delimits the head noun, the main verb of relative clause get this tag	ye aisā phaṣsala hai jisakā kāma varṣā aura ucā tapamāna kī **avaśyakatā hotī hai**|

relative clause cotemporal	**rcsamA nakAla**	when the temporal modifier of the subordinated event acts as the temporal modifier of the main clause event as well	jaba rāma ghara **jā rahā thā** taba <u>bāriśa ho rahī thī</u>
Relative clause colocation	**rcloc**	when the locational/spatial modifier of the subordinated event acts as the locational/ spatial modifier of the main clause event as well.	mora <u>vahāṁ</u> nāca rahā thā jahāṁ **bāriśa ho rahī thī**

Table 14. Relative Clause Relation

Appendix

se and **ke sātha** as post-position marker **(k2** and **k2as** relation**)**

k2

When the verb of *dviṣṭhaphalavyāpārātmikā* (dual resultant activities)is used with either **'se'** (with) or **'ke sātha'** (along with), we assign the k2 relation. Such actions which require two people (or conscious beings) to participate to perform the actions and the result is also equally shared by both of the participants are called *dviṣṭhaphalavyāpārātmikā*. Examples of such actions include *marry, fight, argue, converse, debate, trade, mingle* etc.
rāma **hari se/ ke sātha** <u>laḍāī karatā hai</u>|
'Ram fights with Hari.'
In the above example, the action of <u>laḍāī karanā</u> requires two participants to fight, i.e.- one cannot fight alone, for fighting two participants (atleast) are required. Thus, the doer *rāma* is assigned k1, whereas the other participant, *hari* is assigned k2 relation.

k2as

When the result of an action is seen in an object, it is considered a regular object (sāmānya

karma). When a sentence contains an action whose result is visible in another object besides the main object, and that object is desired (ipsita) but not most desired (ipsitatama) by the subject, it is still considered an object. However, to convey an associative meaning from the speaker's perspective, the postposition **ke sātha** (along with) is used. Therefore, for such cases in Universal Semantic Representation (USR), the relation "k2as" is assigned.

tuma phūla ko **ḍālī ke sātha** jodo
'Attach the flower with the bouquet.'
Here, the result of the verb *joḍanā* 'attach' is visible on the flower along with associate object *ḍālī* 'bouquet'. Thus, *ḍālī* is assigned k2as relation here.

Different dependency relation with **meṃ** as postposition marker

- Wherever the postposition *meṃ* (in) is used and it is forming a context (subject), the relation 'k7' should be applied there.

  āja skūla **jāne meṃ** dera ho gayī
  'I got late going to school today.'

- Wherever the postposition *meṃ* (in) is used with the reciprocal pronoun (āpasa, eka dūsare), the relation 'k2' should be applied there.

  kinhīṃ niścita diśāoṃ meṃ eka prakāra kī śaila cakrīya tarīke se **eka-dūsare meṃ** parivartita ho jāte haiṃ
  'Rocks of a certain type cyclically transform into one another in specific directions.'

- Wherever the postposition *meṃ* is used and it is inserted with the nominal part of the complex predicate, it would be considered as Complex Predicate.

  ravi ko yaha **samajha meṃ āyā**
  'Ravi understood this.'

- Wherever the postposition *meṃ* is used and it is indicating the manner of the action, the relation 'krvn' should be applied there.

  āpa nimnalikhita praśnoṃ ke uttara **saṃkṣepa meṃ** dījie
  'Please provide brief answers to the following questions.'

- Wherever the postposition *meṃ* is used and it is indicating the modality of the sentence, the relation 'vkvn' should be applied there.

vāstava meṃ āga kī taraha lāla dravita maigmā hī lāvā <u>hai</u>
'Indeed, lava is the molten magma that is as red as fire.'

Post position marker as discourse element and relation particle

In natural language sentences it has been observed that some such post-position markers occur which does not bring any new karaka relation but adds speaker's vivaksa. In such cases, we have decided to give them karaka relations according to their thematic role with the mukhya visesya and capture the vivaksa expressed by those specific post-positional markers in the speaker's view row.
Some such post-position markers are- **ke sātha sātha**, ke awirikwa, ke alAvA etc.

bhūgola ādhārabhūta **saṃkalpanāoṃ ke sātha-sātha** takanīkī śabdoṃ kī vyākhyā karatā hai|

'Geography explains basic concepts along with technical terms.'

Link to main Guideline