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2017107 6

NLP Assignment 6

I am using hindi for the assignment as I am reasonably comfortable in it.

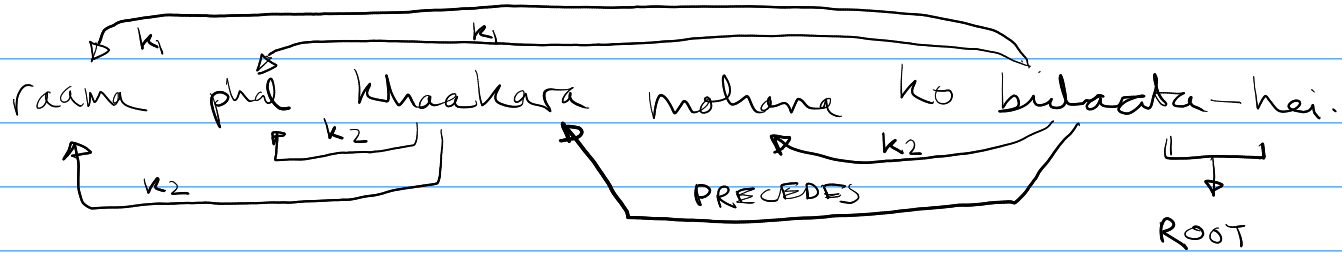
1a. raama phal khaakara mohana ko bulaata hai.

Ans) Kaaraka charts for verbs:

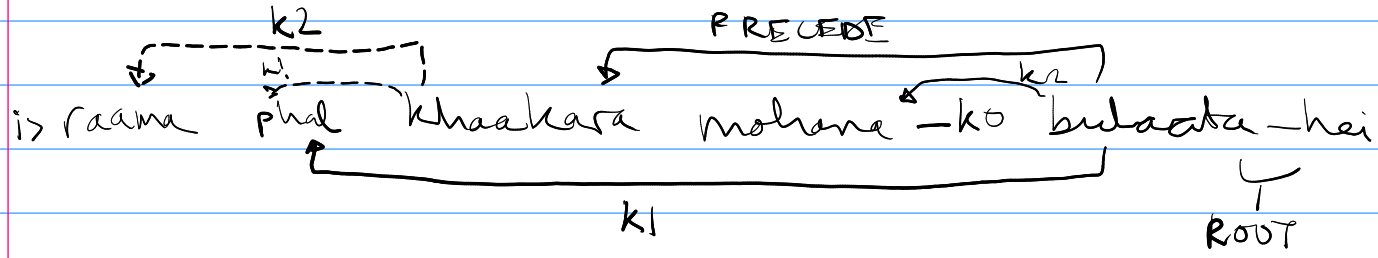
khaa :	$k_1 = \phi$	$k_2 = \phi, k_0$
bulaa :	$k_1 = \phi$	$k_2 = k_0$

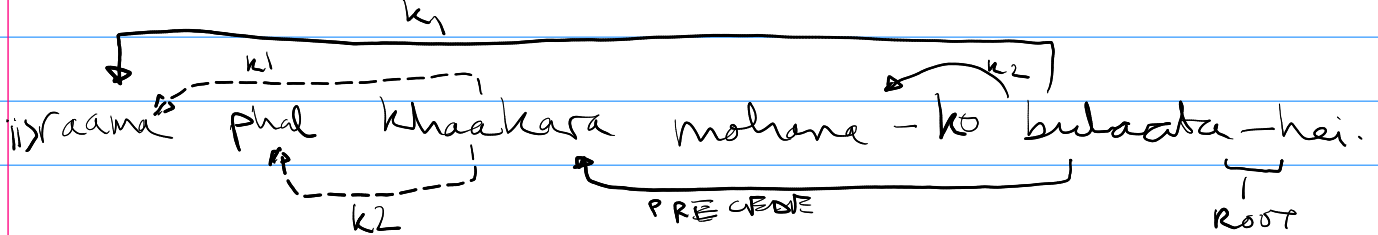
Transformation charts for the verbs:

khaa ⟶ khaakara: k_1 is dropped.



As we can see, there are two possible graphs, where raama and phala are k_1, k_2 and $k_2 k_1$ respectively.





<i> has crossing edges. <ii> does not have crossing edges.

⇒ <ii> is the solution graph.

Now on the solution graph we apply the karaka sharing rule.

1b. raama ne phala kaaTakara khaaya.

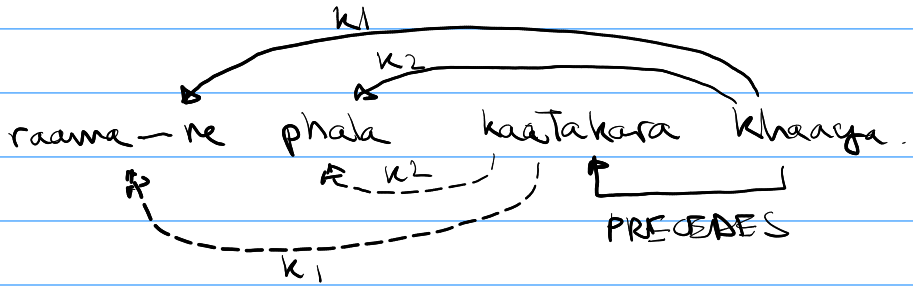
Ans. kaaraka charts for verbs.

kaaTa :	k1 – ϕ	k2 – ϕ, k0
khaa :	k1 – ϕ	k2 – ϕ, k0

transformation chart for verbs.

kaaTa → kaaTakara : k1 is dropped.

khaa → khaaya : k1 += 'ne'



This sentence does not contain any ambiguity. The transformation chart and rules give us only 1 possibility. This is the solution graph. Apply karaka sharing rules.

1c. phala kaaTane ke liye usane caahe liyaa.

Ans: karaka chart for verbs:

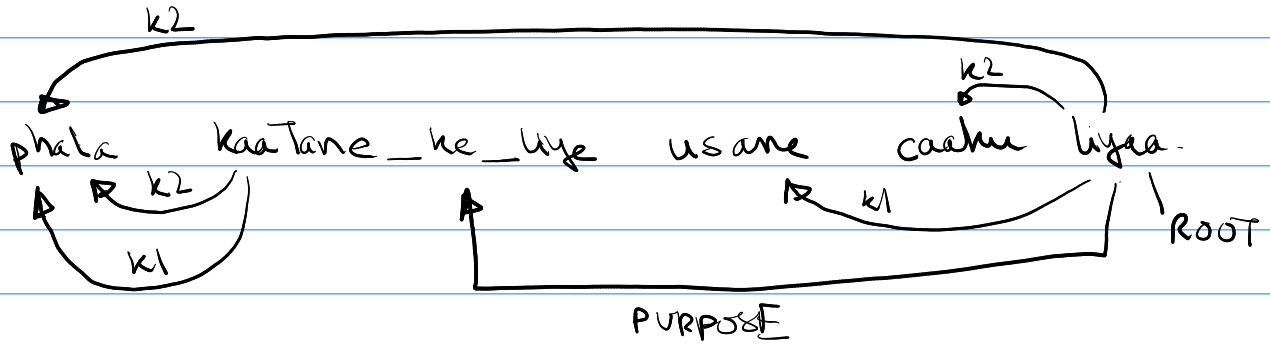
kaaTe : $k_1 - \phi$ $k_2 = \phi$, k_0

le : $k_1 - \phi$ $k_2 = \phi$, k_0

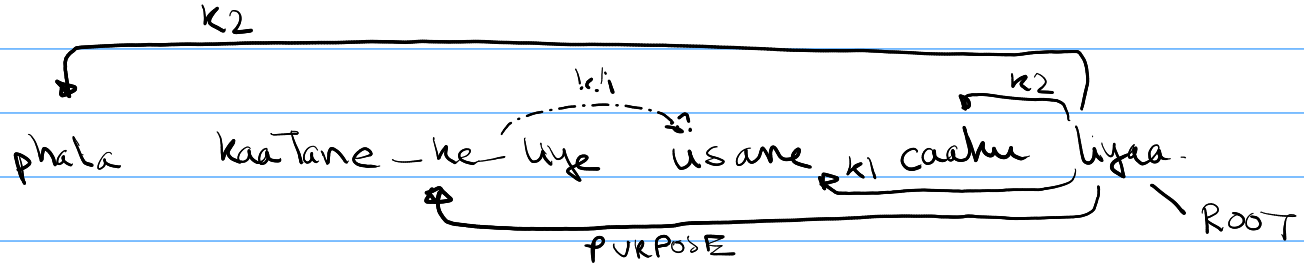
transformation chart for verbs

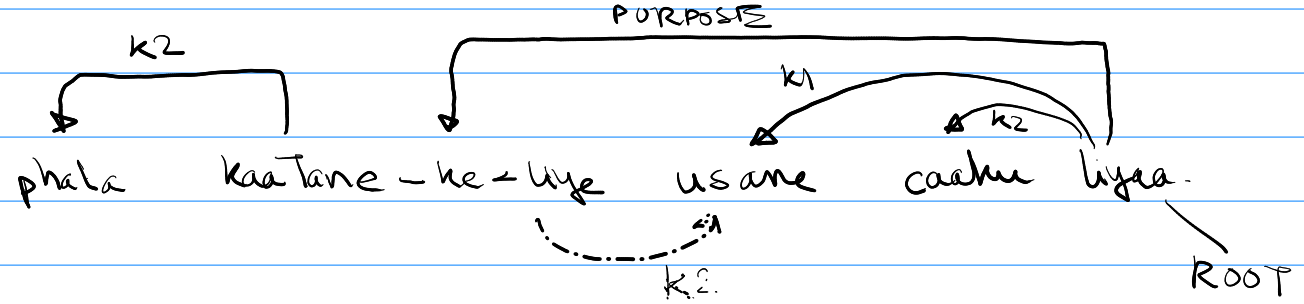
kaate → kaaTane – 'ke'

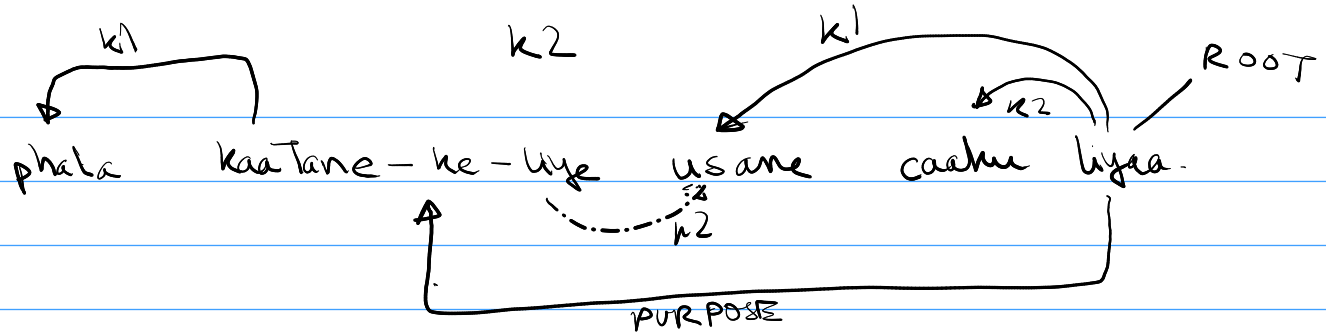
le → liye – k1 + 'ne'



Ambiguity exists, there are three graphs.







The first one is not possible : verbs can have only a single argument of each type.

In 2, 3 : k1 k2 are both possible for the intermediate verb, so both are possible. Apply karaka sharing. Semantic cues give the second as a solution.

→×—

2a. shikaari ne bhaagate hue shera ko dekha.

Ans. Karaka chart for verbs:

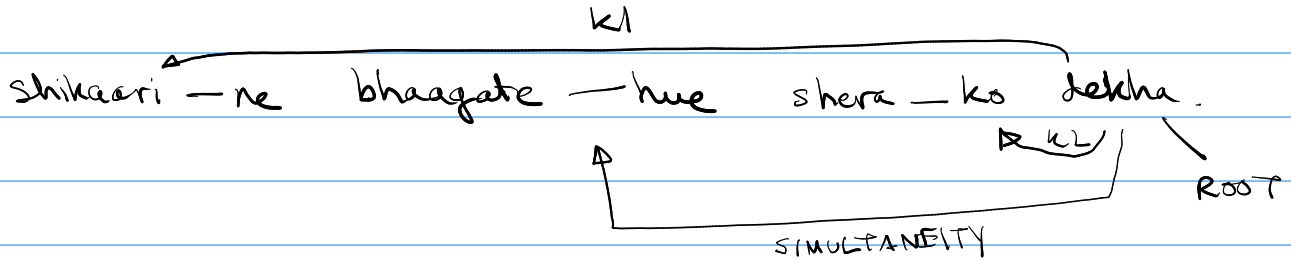
bhaaga : $k_1 - \phi$

dekh : $k_1 - \phi$ $k_2 = \phi$, ko

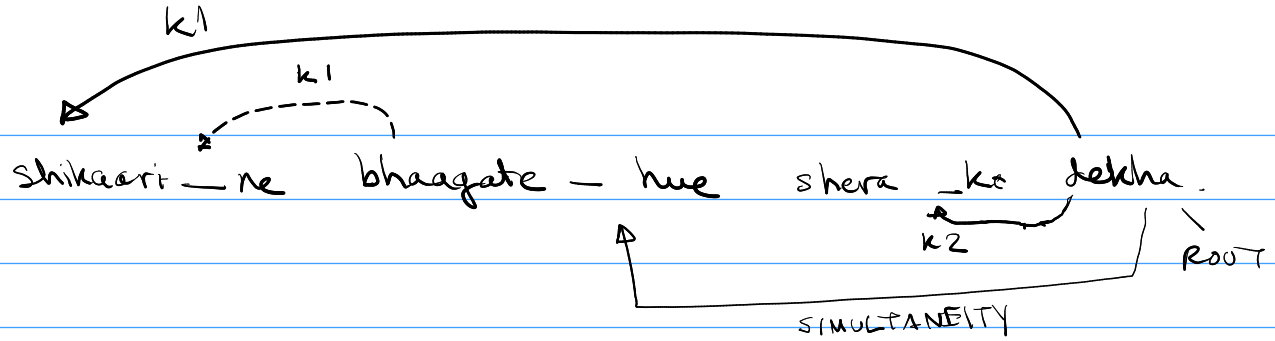
transformation chart for verbs

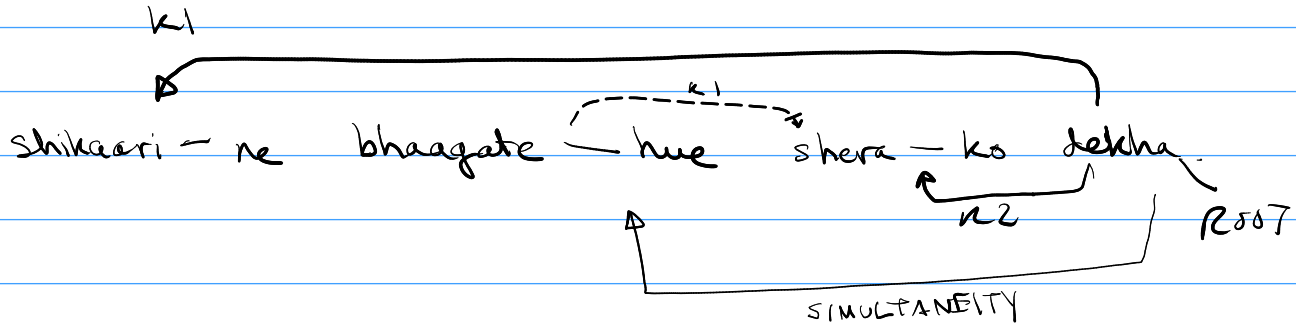
bhaaga → bhaagte-hue _

dekh → dekha _ k1 += 'ne'



No ambiguity exists. We get a single graph according to the transformation chart. Karaka sharing rule or intermediate, we get 2 possible solution graphs.





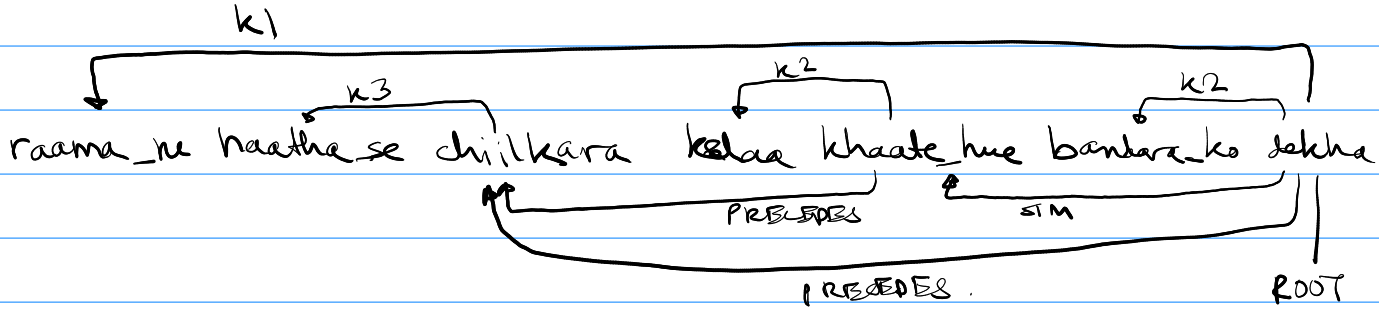
2 b. raama ne haathe se chiilkara kelaa khaate hue bandara ko dekha

karaka chart for verbs:

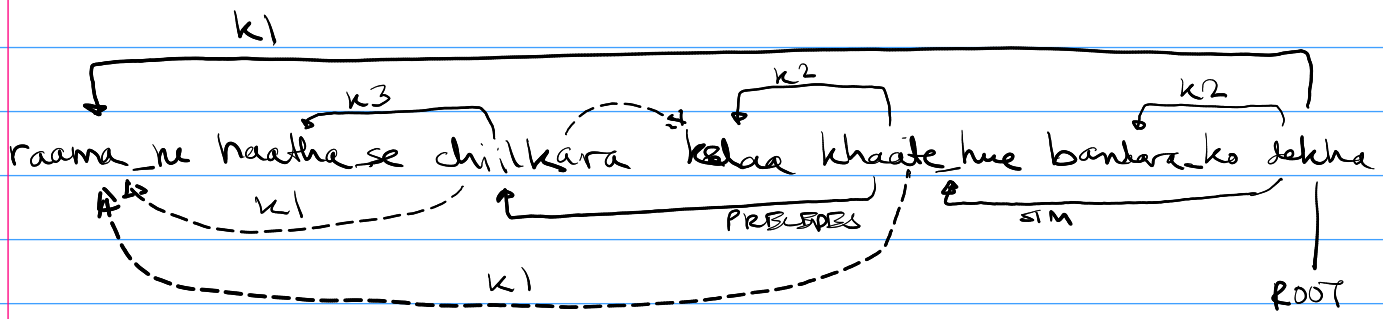
chiil	:	k1 — ϕ	k2 — ϕ, ko
khaa	:	k1 — ϕ	k2 — ϕ, ko
dekh	:	k2 — ϕ	k2 — ϕ, ko

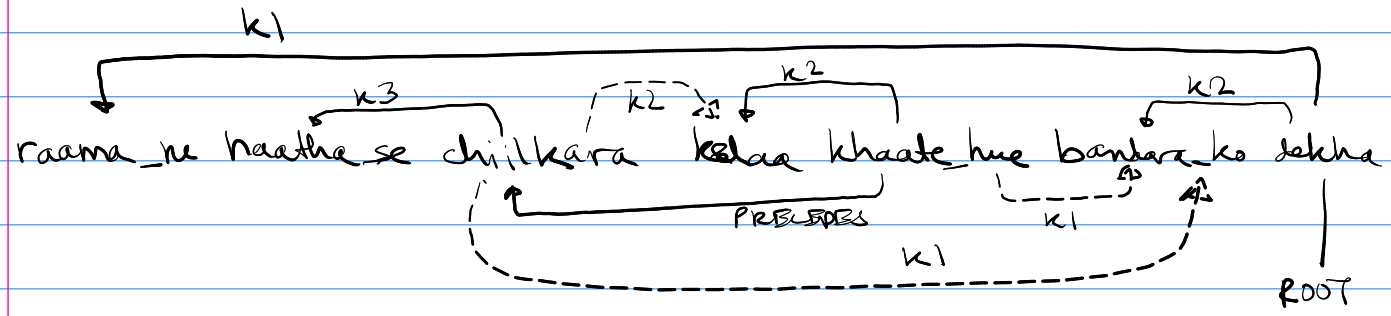
transformation chart for verbs

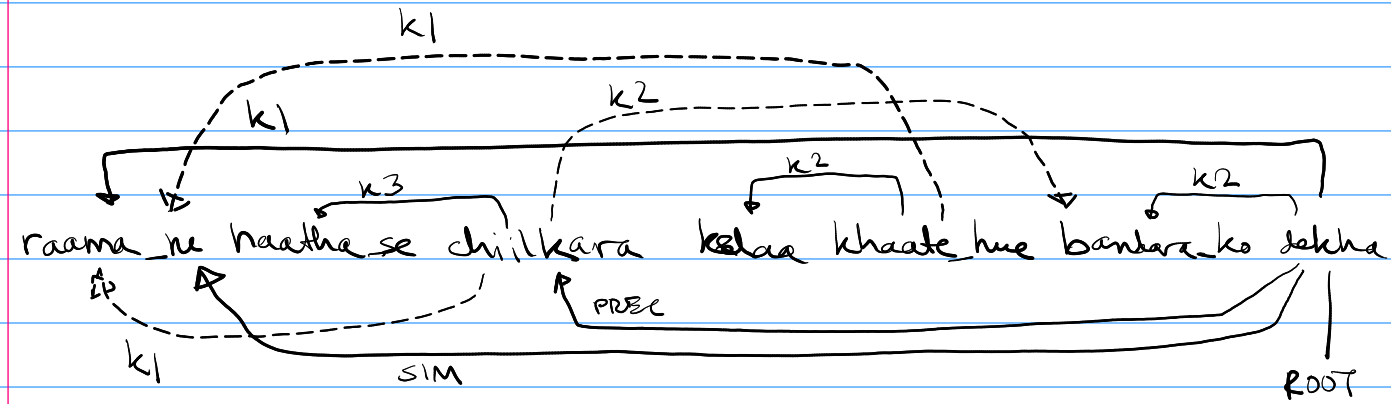
chiil → chiilkara	—	k1 dropped	k2 apt
khaa → khaate-hue	—	k1 apt	k2 apt
dekh → dekhaa	—	k1 (+ 'ne')	

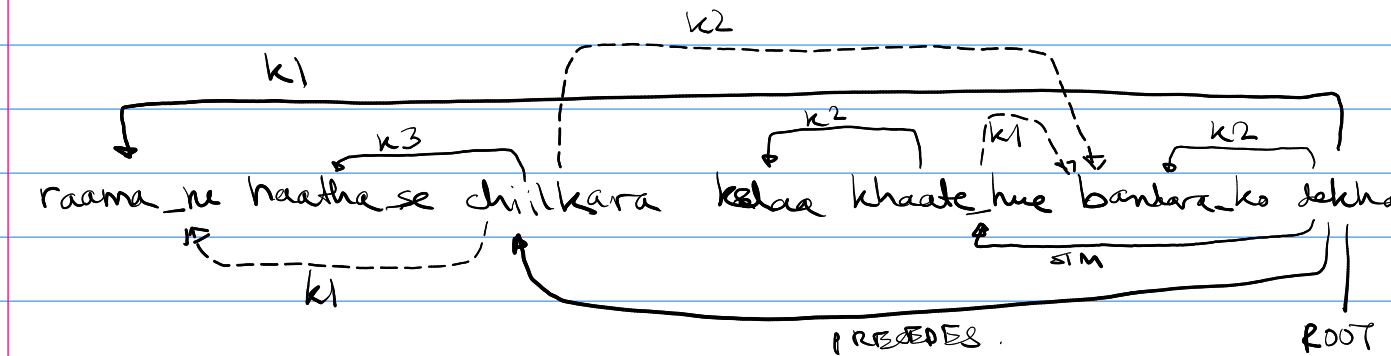


'chiilla' can modify either verb. Apply rules, we get 4 possible graphs.



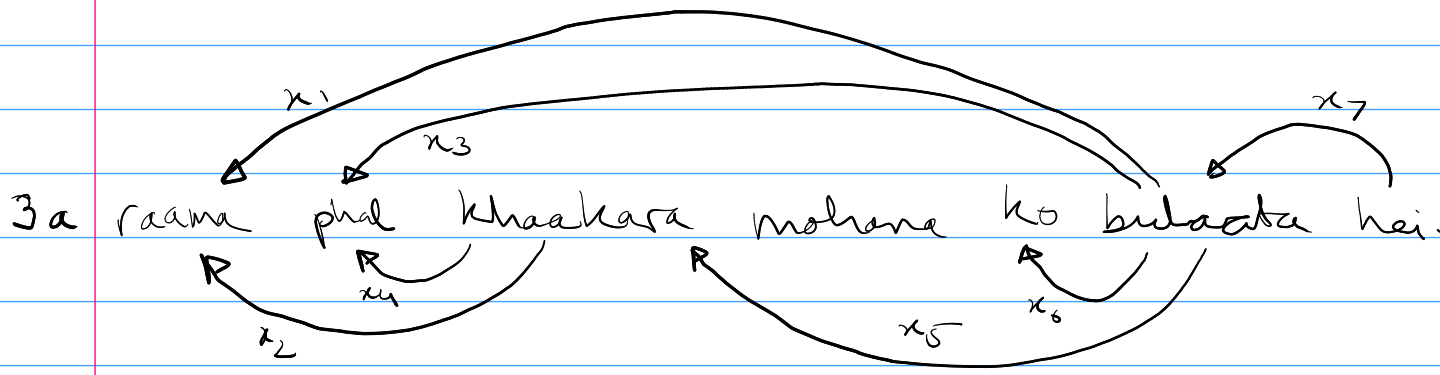






Graph 3 is not possible. (crossing edges).

3a



bulaa : k_1 : $x_1 + x_3 = 1$

k_2 : $x_6 = 1$

khaa : k2 : $x_2 + x_4 = 1$

fn : $x_5 = 1$

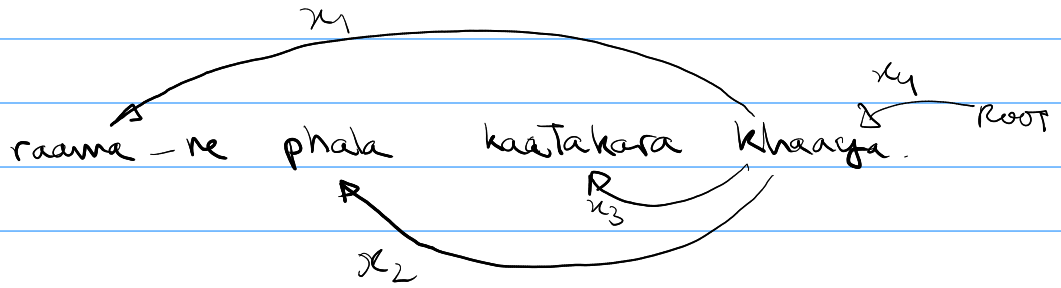
raama : $x_1 + x_2 = 1$

phala : $x_3 + x_4 = 1$

bulaa : $x_7 = 1$

max utility, keeping constraints : $U = x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7$

3b.



khaa : k1 : $x_1 = 1$

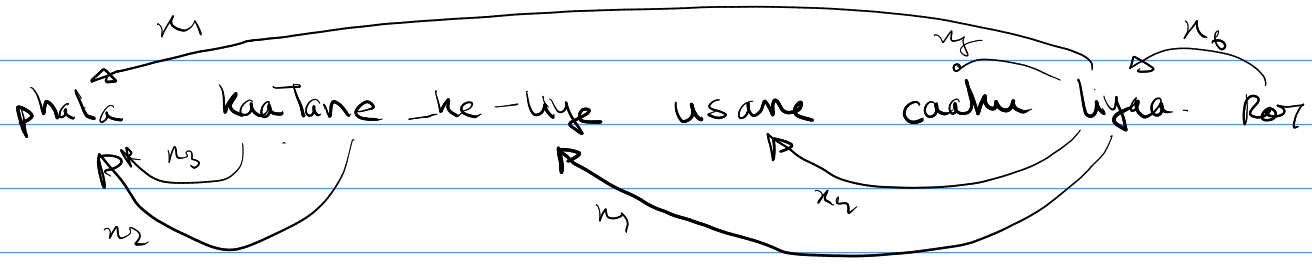
k2 : $x_2 = 1$

kaata : fn : $x_3 = 1$

khaa $x_4 = 1$

max utility, keeping constraints: $U = x_1 + x_2 + x_3 + x_4$

3c.



le : k_1 : $x_4 = 1$

k_2 : $x_1 + x_5 = 1$

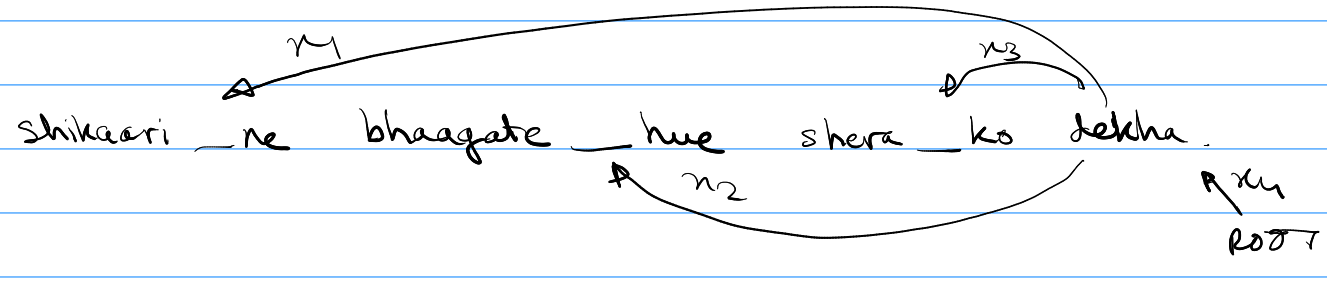
kaatane : k^m : $x_2 = 1$

phala $x_1 + x_2 + x_3 = 1$

le $x_5 = 1$

max utility, keeping constraints: $U = x_1 + x_2 + x_3 + x_4 + x_5 + x_6$

4a.



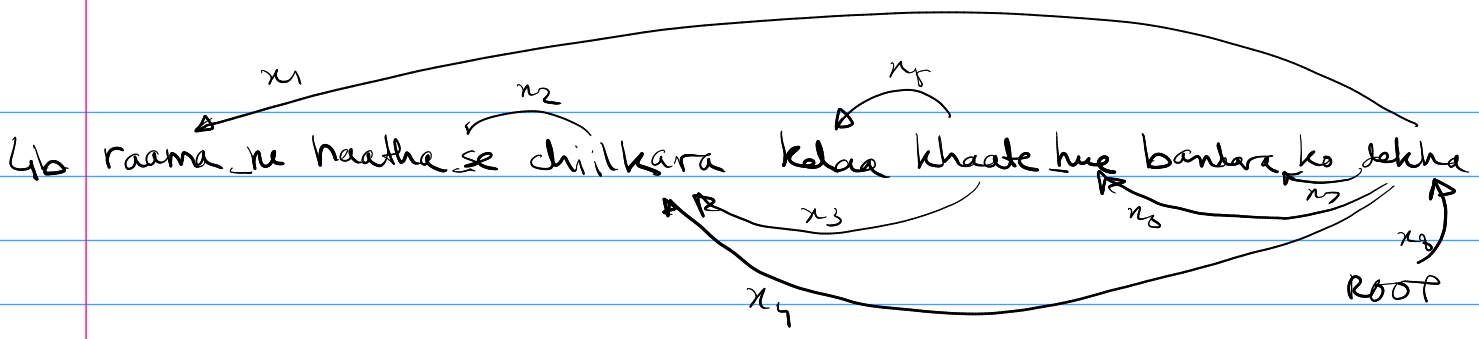
dekh $k1$ $x_4 = 1$

$k2$ $x_3 = 1$

bhaag k^m $x_2 = 1$

dekh $x_4 = 1$

max utility, keeping constraints: $U = x_1 + x_2 + x_3 + x_4$



dekha : $x_1 - x_1 = 1$

$x_2 - x_7 = 1$

khaa : $x_2 - x_5 = 1$

$x_7 - x_6 = 1$

chil : $x_3 - x_2 = 1$

chor $x_8 + x_4 = 1$

dekha $x_8 = 1$

max utility, keeping constraints : $U = x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8$