TENTAMEN CAPITA FUNDAMENTELE INFORMATICA
Vrijdag 5 januari 1996, 10.00 u. - 13.00 u.

- We consider only *reversible* 2-structures.
- Please always explain your answers, and in particular quote the results you use to arrive at a given answer.

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1. Let g be a 2s and $X, Y \in \mathcal{C}(g)$.
   (i) Prove that if X and Y are disjoint then there is an equivalence class K such that for all $x \in X$ and $y \in Y$: $(x, y) \in K$.
   Is the disjointness condition necessary? If not, prove it; otherwise give a counterexample.
   (ii) Prove that if $X \cap Y \neq \emptyset$ then $X \cup Y \in \mathcal{C}(g)$. Is the nonemptiness of the intersection necessary? If not, prove it; otherwise give a counterexample.

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2. (i) Give the definition of a *linear 2-structure.*
   (ii) Give a characterization of the clans of a linear 2-structure in terms of segments of linear orders. Prove it.

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3. (i) Give the definitions of a morphism, a uniform morphism and an isomorphism between ℓp2s's.
   (ii) Give an example of two ℓp2s's and a morphism ϕ between them, such that ϕ is *not* an isomorphism.
   (iii) Prove that if ϕ is a uniform morphism from g_1 to g_2 then for all $W \in R_{g_2}$, $\phi^{-1}(W) \in R_{g_1}$.

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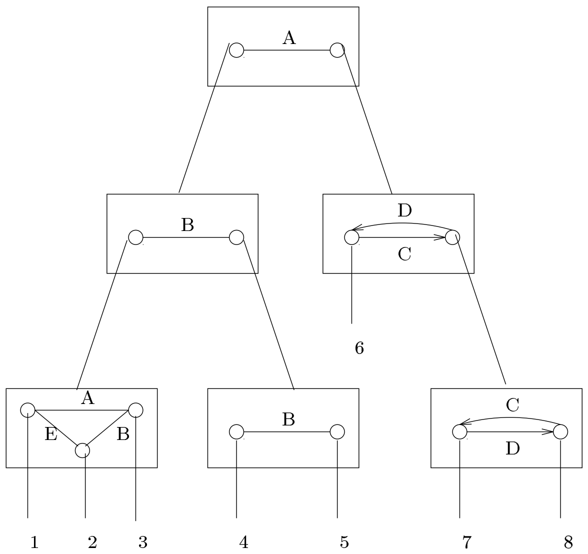
4. Let g be the ℓ2s such that the following ℓ2s-labeled tree family β is in **L2STF**(g).



Give the shape of g without computing g, but rather by transforming β. Describe the transformations you apply and prove that the result is indeed the shape of g.

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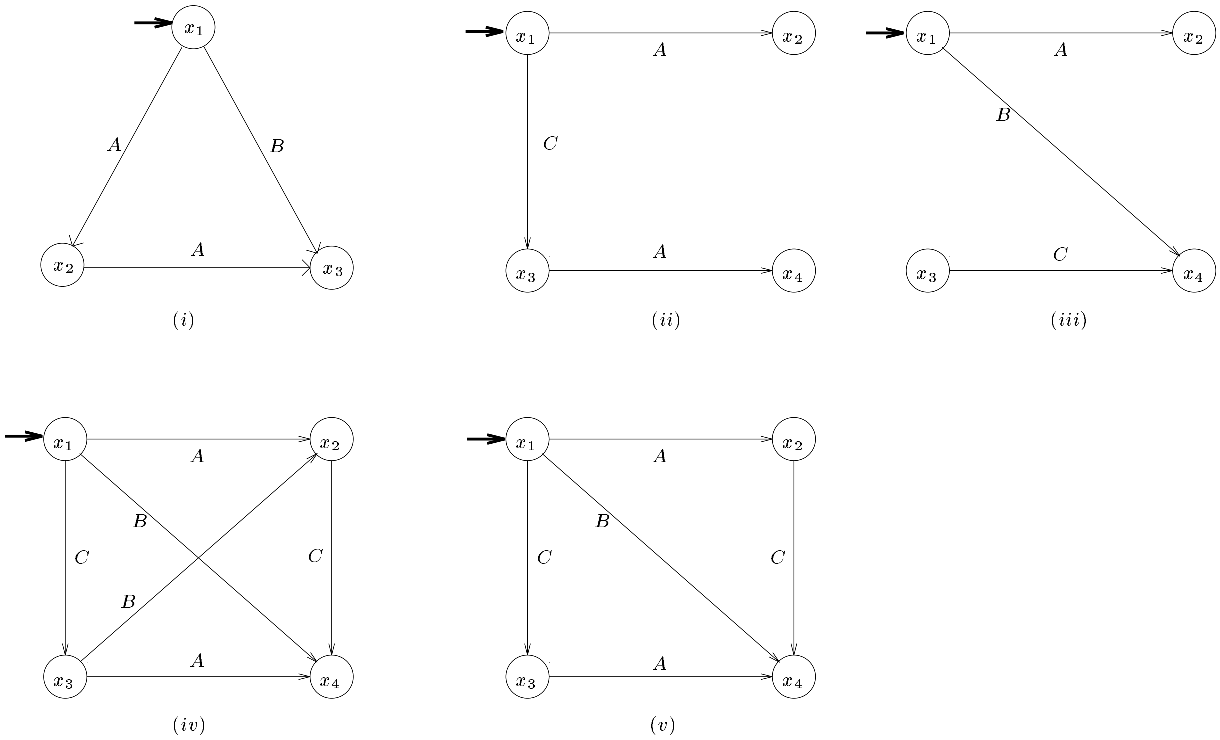
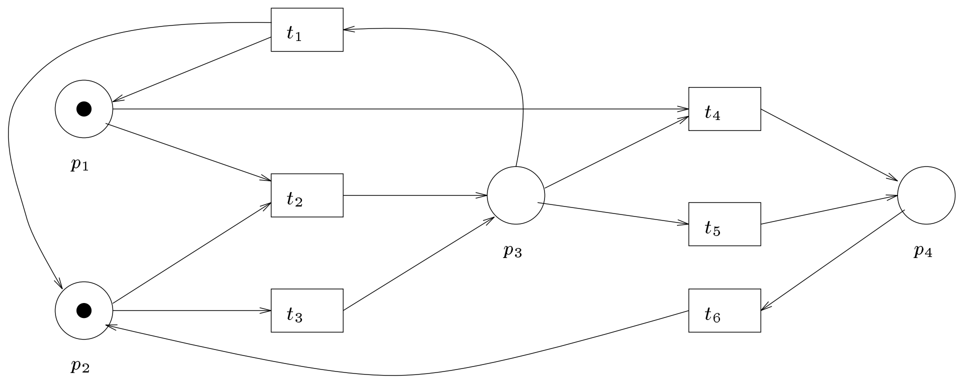
5. Which of the iℓp2s's given below is an abstract version of a sequential case graph? Prove each of your answers.



6. (i) Let N be the following EN system.



a. Give SCG(N).

b. Give the regional version of an abstract version of SCG(N). (Hint: there are 10 regions.)

(ii) Describe in your own words in at most 15 lines how to construct the "saturated" version of an EN system given the regional version of an abstract version of its sequential case graph.

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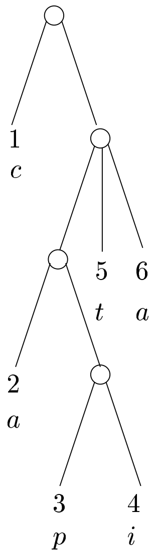
7. Let t be the following leaf-labeled ordered tree.



How many different texts are compatible with t? Give all of them.

8. Let λ such that $\lambda(1) = \lambda(3) = \lambda(5) = a$ and $\lambda(2) = \lambda(4) = \lambda(6) = b$.

   (i) Let $\tau = (\lambda, \rho, \mu)$, with $\rho = (6,3,5,4,1,2)$ and $\mu = (2,1,4,3,5,6)$. Give the structured function of τ.

   (ii) Let $\tau_i = (\lambda, \rho_i, \mu_i)$ for $i = 1,2$, with $\rho_1 = \rho_2 = (1,2,3,4,5,6)$, $\mu_1 = (4,3,6,2,5,1)$, and $\mu_2 = (5,6,4,1,3,2)$.
   Which of these texts is alternating? Answer this *without* computing shape(τ_1) and shape(τ_2).

PUNTENVERDELING

Opgave	i	ii	iii	iv	v	totaal
1	6	6	-	-	-	12
2	4	6	-	-	-	10
3	6	3	6	-	-	15
4	-	-	-	-	-	8
5	3	3	3	3	3	15
6	14	4	-	-	-	18
7	-	-	-	-	-	10
8	5	7	-	-	-	12