Huiswerk 1

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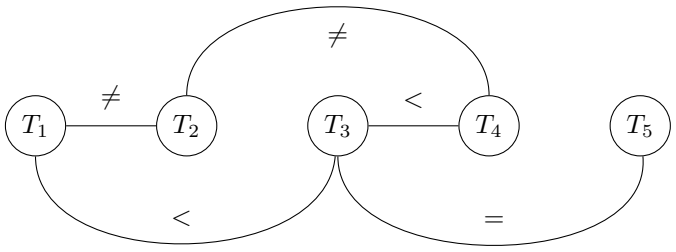
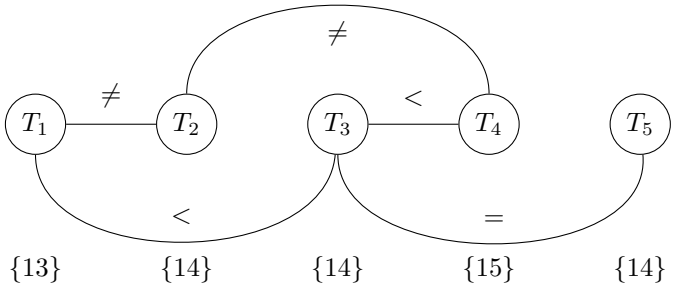
1 Question 1

a) $V = \{X_1, X_2..., X_n\}$, $D = \{D_1, D_2, ..., D_n\}$ where $D_1 = D_2 = ... = D_n = \{13.00, 14.00, 15.00\}$ and $C = \{T_1 < T_3, T_3 < T_4, T_3 = T_5, T_2 \neq T_1, T_2 \neq T_4, T_4 \neq 14.00\}$

b) Constraint Graph (unary constraint $T_4 \neq 14.00$ is reflected in omission of 14.00 in D_4)

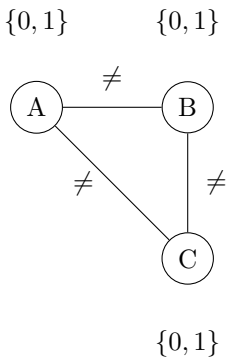


c) Arc-consistent Graph after constraint propogation



d) A solution to the CSP is $T_1 = 13, T_2 = 14, T_3 = 14, T_4 = 15, T_5 = 14$

e) It is not true that for very element x in the domain of a varaible v after propogation that there exists a solution where $v = x$. The propogation algorithm ensures that every pair of nodes are arc-consistent both ways (local consistency if nodes are also consistent). However, local consistency does not guarantee global consistency An example of such a graph is the one shown in the lecture:



All the nodes are consistent and also consistent with respect to their neighbours but there is not solution, showing by conuterexample that there could still be elements left in the domain of a variable that are not in any solution.