

Constraint Satisfaction Problems

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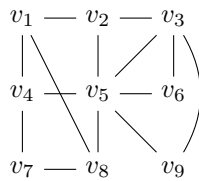
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Exercise Sheet 6

Due: 3.12.2014

Exercise 6.1 (2+2+2 points)

Consider the following constraint graph:



For the following questions, every time you pick a variable provide the list of variables that are considered to be best by the algorithm and from this list pick the one with the smallest index.

- Use the description from the lecture to find a *max-cardinality* ordering.
- Use the description from the lecture to find a *min-width* ordering.
- Use the description from the lecture to find a *cycle-cutset* ordering. For this use a cutset of minimal size.

Exercise 6.2 (4 points)

The algorithm MINWIDTHORDERING from the lecture provides an ordering of nodes for an undirected graph G with nodes $V = \{v_1, \dots, v_n\}$: inductively choose a node v from V with minimal degree, remove it (and its edges) from the graph, and continue. The algorithm then returns the reverse of the order in which nodes have been removed from the graph.

Prove that MINWIDTHORDERING calculates an ordering which has minimal width.

Hint: Use induction over the size n of the graph G .