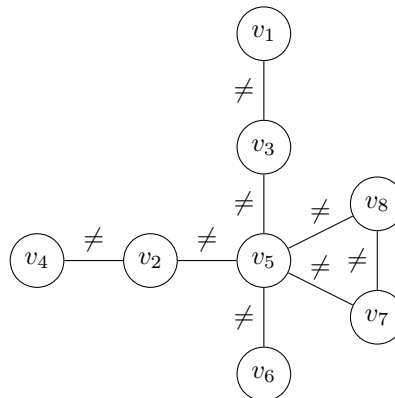# Exercise Sheet 8
Due: Monday 02.07.2012

Exercise 8.1 (6 Points)
Let $N = \langle (v_1, \ldots, v_8), (D_1, \ldots, D_8), C \rangle$ with

- $D_1 = D_8 = \{1\}$,
- $D_3 = \{0\}$,
- $D_5 = \{1, 2\}$,
- $D_7 = \{0, 1\}$.

- $D_2 = \{2, 3\}$,
- $D_4 = \{3\}$,
- $D_6 = \{3, 4\}$,

The constraints C are provided by the following graph:

In the following use lexicographic orderings, i.e., the variable ordering $v_1 \prec v_2 \prec \cdots \prec v_8$ and for value ordering $0 \prec 1 \prec \cdots \prec 4$. Do not use any look-ahead strategies.

It is sufficient to provide the *jumps* and the identified *internal* and *leave dead ends* in the order they appear during search.

(a) Apply backtracking search with Gaschnig's Backjumping to N.

(b) Apply backtracking search with Conflict-Directed Backjumping to N. Provide the jump-back sets where used.

Exercise 8.2 (2 Points)
Prove that Conflict-Directed Backjumping only performs safe jumps.

Exercise 8.3 (2 Points)

Show that jumping back further than the culprit variable for Gaschnig's Back-jumping is incorrect. To this end, let $(a_1, \ldots, a_i)$ be a leaf dead-end, v_b its culprit variable, and construct an example where jumping back to $(a_1, \ldots, a_j)$, $j < b$ skips solutions.