HAM-ALC

Volker Haarslev and **Ralf Möller** and **Anni-Yasmin Turhan**
University of Hamburg, Computer Science Department
Vogt-Kölln-Strasse 30, 22527 Hamburg, Germany
`<name>@informatik.uni-hamburg.de`

HAM-ALC:
The tests were performed using HAM-ALC version 1.1. HAM-ALC [2] is a description logic classifier which has been constructed for providing a basis for an optimized $\mathcal{ALCRP}(\mathcal{D})$ [1] implementation. Based on a sound and complete tableau algorithm HAM-ALC currently implements a true ABox reasoner for the logic $\mathcal{ALC}$.

HAM-ALC employs a few optimizations inspired by FaCT [3], in particular semantic branching and a form of dependency-directed backtracking called *backjumping* (see [3]).
Programming language: Common Lisp (compiled).

Availability:
The sources for HAM-ALC will be available from the authors home pages in fall 1998:

http://kogs-www.informatik.uni-hamburg.de/~<name>/

Advantages:
We think of the current state of HAM-ALC as a first step towards an optimized $\mathcal{ALC}$ and $\mathcal{ALCRP}(\mathcal{D})$ reasoner. Therefore, these benchmark results are considered as preliminary.

Hardware and Software:
Sun Ultra Sparc 2 CPU (300 MHz); 348 MB main memory; Allegro CL 4.3.1.

Results:
HAM-ALC supports the KRSS interface for TBox and ABox declarations and assertions. However, it currently implements a TBox classification scheme without selective unfolding and without any model caching. This is the reason why we did not run other (application) KB benchmarks. HAM-ALC passes the benchmarks but the runtimes are currently not comparable with other systems due to the lack of these techniques. The next major release of HAM-ALC will also include facilities for selective unfolding and model caching. The ABox reasoner currently works without any reference to TBox reasoning and tests only *on demand* the satisfiability of arbitrary ABox assertions. Therefore, we added in Table 3 another column (marked by $*$) that also includes the runtime for testing the concept membership of individuals. These tests are performed during the verification phase of the ABox benchmark.

Table 1: Tableaux'98 Concept Satisfiability Tests

	Incoherent		**Coherent**	
Test	**Size**	**Correct**	**Size**	**Correct**
k_branch	21	Y	11	Y
k_d4	11	Y	7	Y
k_dum	21	Y	21	Y
k_grz	21	Y	21	Y
k_lin	21	Y	21	Y
k_path	8	Y	7	Y
k_ph	7	Y	10	Y
k_poly	21	Y	21	Y
k_t4p	21	Y	7	Y

References

[1] V. Haarslev, C. Lutz, and R. Möller. Foundations of spatioterminological reasoning with description logics. In T. Cohn, L. Schubert, and S. Shapiro, editors, *Proceedings of Sixth International Conference on Principles of Knowledge Representation and Reasoning (KR'98), Trento, Italy, June 2-5, 1998*, June 1998. In press.

[2] V. Haarslev, R. Möller, and A.-Y. Turhan. Implementing an $\mathcal{ALCRP}(\mathcal{D})$ ABox reasoner: Progress report. In E. Franconi et al., editors, *Proceedings of the International Workshop on Description Logics (DL'98), June 6-8, 1998, Trento, Italy*, June 1998. In press.

[3] I. Horrocks. *Optimising Tableaux Decision Procedures for Description Logics*. PhD thesis, University of Manchester, 1997.

Table 2: Tableaux'98 KB Tests

	Incoherent			Coherent		
Test	**Size**	**Concepts**	**Correct**	**Size**	**Concepts**	**Correct**
k_branch	3	316	Y	3	312	Y
k_d4	9	531	Y	5	320	Y
k_dum	21	585	Y	14	394	Y
k_grz	11	472	Y	18	1,037	Y
k_lin	21	934	Y	8	819	Y
k_path	5	429	Y	4	424	Y
k_ph	4	151	Y	4	151	Y
k_poly	3	164	Y	3	186	Y
k_t4p	8	273	Y	4	240	Y

Table 3: Tableaux'98 Abox Realisation Tests

Test	Concepts	Individuals	Time (s)	Time* (s)	Correct
k_branch_n	71	27	0.01	0.05	Y
k_d4_n	48	24	0.01	0.05	Y
k_dum_n	71	14	0.01	0.04	Y
k_grz_n	109	19	0.01	0.11	Y
k_lin_n	10	10	0.00	0.01	Y
k_path_n	91	174	0.10	1.38	Y
k_ph_n	7	8	0.00	0.00	Y
k_poly_n	66	128	0.04	1.19	Y
k_t4p_n	72	97	0.05	0.79	Y