

The First Answer Set Programming System Competition

Martin Gebser Lengning Liu Gayathri Namasivayam André Neumann
Torsten Schaub Mirosław Truszczyński

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- Prelude
- Setting
- Benchmarks
- ASP Systems
- Results
- Lessons

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- Goals
 1. collect challenging benchmark problems
 2. assess a broad variety of ASP systems

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- ASP System = Grounder + Solver
- The ASP Competition was run prior to the LPNMR'07 on the Asparagus platform
 - ☞ <http://asparagus.cs.uni-potsdam.de/contest>

Agenda

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The Competition

was run in three different categories:

- **MGS:** Modeling, Grounding, Solving
- **SCore:** Solver, Core language
- **SLparse:** Solver, Lparse language

The Competition Category MGS

Modeling, Grounding, Solving

- Benchmarks consist of
 1. a problem statement,
 2. a set of instances (specified in terms of ground facts), and
 3. the names of the predicates and their arguments to be used by programmers to encode solutions
- The *overall performance* of an ASP system (including both the grounding of input programs and the solving of their ground instantiations) is measured
- Success depends on
 1. the problem encoding,
 2. the efficiency of a grounder, and
 3. the speed of a solver

The Competition Category SCore

Solver, Core language

- Benchmarks are ground programs in the format common to *dlv* and *lparse*
 - ➔ Aggregates are not allowed
- Instances are classified further into two subgroups:
 - *normal* (SCore) and
 - *disjunctive* (SCore^V)
- The time needed by *solvers* to compute answer sets of ground programs is measured

The Competition Category SLparse

Solver, Lparse language

- Benchmarks are ground programs in the Lparse format, *including aggregates*
- The performance of *solvers* on ground programs in Lparse format is measured

Assessing ASP Systems

- UNSAT: No Answer Set

Assessing ASP Systems

Output format

- **SAT:** Answer Set: $\langle atom_1 \rangle \langle atom_1 \rangle \dots \langle atom_n \rangle$
 - ↳ Certificates allowed for checking the *correctness* of a solution
- **UNSAT:** No Answer Set

Assessing ASP Systems

Output format

- **SAT:** *Answer Set:* $\langle atom_1 \rangle \langle atom_1 \rangle \dots \langle atom_n \rangle$
 - ↳ Certificates allowed for checking the *correctness* of a solution
- **UNSAT:** *No Answer Set*

Performance

- The number of instances solved within the allocated time and space was used as the *primary measure* of the performance of an ASP system
- Average running time is only used as a tie breaker

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Benchmarks submitted by the ASP community I

Benchmark Class	#Instances	Contributors	M	C	L
15-Puzzle	15	Lengning Liu and Mirosław Truszczyński	×	–	×
15-Puzzle	11	Asparagus	–	×	–
Blocked N-Queens	40	Gayathri Namasivayam and Mirosław Truszczyński	×	–	×
Blocked N-Queens	400	Asparagus	–	×	–
Bounded Spanning Tree	30	Gayathri Namasivayam and Mirosław Truszczyński	×	–	×
Car Sequencing	54	Marco Cadoli	×	–	×
Disjunctive Loops	9	Marco Maratea	–	×	–
EqTest	10	Asparagus	–	×	–
Factoring	10	Asparagus	–	×	×
Fast Food	221	Wolfgang Faber	×	–	×
Gebser Suite	202	Martin Gebser	–	×	×
Grammar-Based Information Extraction	102	Marco Manna	–	×	–
Hamiltonian Cycle	30	Lengning Liu and Mirosław Truszczyński	×	–	×
Hamiltonian Path	58	Asparagus	–	×	×
Hashiwokakero	211	Martin Brain	–	–	×
Hitori	211	Martin Brain	–	–	×
Knight's Tour	165	Martin Brain	–	–	×
Mutex	7	Marco Maratea	–	×	–
Random Non-Tight	120	Enno Schultz and Martin Gebser	–	×	×

Benchmarks submitted by the ASP community II

Benchmark Class	#Instances	Contributors	M	C	L
Random Quantified Boolean Formulas	40	Marco Maratea	–	×	–
Reachability	53	Giorgio Terracina	×	×	×
RLP	573	Yuting Zhao and Fangzhen Lin	–	×	×
Schur Numbers	33	Lengning Liu and Mirosław Truszczyński	×	–	×
Schur Numbers	5	Asparagus	–	×	–
Social Golfer	175	Marco Cadoli	×	–	×
Sokoban	131	Wolfgang Faber	×	–	–
Solitaire Backward	36	Martin Brain	–	–	×
Solitaire Backward (2)	10	Lengning Liu and Mirosław Truszczyński	–	–	×
Solitaire Forward	41	Martin Brain	–	–	×
Strategic Companies	35	Nicola Leone	–	×	–
Su-Doku	8	Martin Brain	–	–	×
TOAST	54	Martin Brain	–	–	×
Towers of Hanoi	29	Gayathri Namasivayam and Mirosław Truszczyński	×	–	×
Traveling Salesperson	30	Lengning Liu and Mirosław Truszczyński	×	–	×
Weight-Bounded Dominating Set	30	Lengning Liu and Mirosław Truszczyński	×	–	×
Weighted Latin Square	35	Gayathri Namasivayam and Mirosław Truszczyński	×	–	×
Weighted Spanning Tree	30	Gayathri Namasivayam and Mirosław Truszczyński	×	–	×
Word Design DNA	5	Marco Cadoli	×	–	×

Benchmark (Instance) Selection

- Aimed at a total of $|Classes| * max \approx 100$ benchmark instances per competition category (if feasible)
- A benchmark instance had to satisfy the following criteria:
 1. at least one call script was able to solve it and
 2. at most three call scripts solved it in less than one second
- ☞ In other words: *Some system can solve it, yet it is not too easy!*
- The selection of candidates for benchmark instances was done randomly

Algorithm 1: Semiautomatic Benchmarking Procedure

Input: *Classes* — set of benchmark classes

Used — set of benchmark instances run already

Fresh — set of benchmark instances not run so far

max — maximum number of suitable benchmark instances
per benchmark class

1 repeat

2 *ToRun* $\leftarrow \emptyset$ /* no runs scheduled yet */

3 **foreach** *C* in *Classes* **do**

4 *done* $\leftarrow |\text{Suitable}(\text{Used}[C])|$

5 **if** *done* < *max* **then**

ToRun $\leftarrow \text{ToRun} \cup \text{Select}(\text{max} - \text{done}, \text{Fresh}[C])$

6 Run(*ToRun*) /* execute the scheduled runs */

7 *Used* $\leftarrow \text{Used} \cup \text{ToRun}$

8 *Fresh* $\leftarrow \text{Fresh} \setminus \text{ToRun}$

9 until *ToRun* = \emptyset

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Participating ASP Systems I

Solver	Affiliation	MGS	SCore	SLparse
asper	Angers		ASPeR-call-script ASPeRS20-call-script ASPeRS30-call-script	
assat	Hongkong	script.assat.normal		script.assat.lparse-output
clasp	Potsdam	clasp_cmp_score clasp_cmp_score2 clasp_score_def	clasp_cmp_score_glp clasp_cmp_score_glp2 clasp_score_glp_def	clasp_cmp_slparse clasp_cmp_slparse2 clasp_slparse_def
cmodels	Texas	default scriptAtomreasonLp scriptEloopLp	defaultGlparsed.sh scriptAtomreasonGlparsed scriptEloopGlparsed disjGlparsedDefault [∇] disjGlparsedEloop [∇] disjGlparsedVerMin [∇]	groundedDefault scriptAtomreasonGr scriptEloopGr
dlv	Vienna/ Calabria	dlv-contest-special dlv-contest	dlv-contest-special* dlv-contest*	

Participating ASP Systems II

Solver	Affiliation	MGS	SCore	SLparse
gnt	Helsinki	gnt dencode+gnt dencode_bc+gnt	gnt_score* dencode+gnt_score* dencode_bc+gnt_score*	gnt_slparse dencode+gnt_slparse dencode_bc+gnt_slparse
lp2sat	Helsinki		lp2sat+minisat wf+lp2sat+minisat lp2sat+siege	
nomore	Potsdam	nomore-default nomore-localprop nomore-D	nomore-default-SCore nomore-localprop-SCore nomore-D-SCore	nomore-default-slparse nomore-localprop-slparse nomore-D-slparse
pbmodels	Kentucky	pbmodels-minisat+-MGS pbmodels-pueblo-MGS pbmodels-wsatcc-MGS	pbmodels-minisat+-SCore pbmodels-pueblo-SCore pbmodels-wsatcc-SCore	pbmodels-minisat+-SLparse pbmodels-pueblo-SLparse pbmodels-wsatcc-SLparse
smodels	Helsinki	smodels smodels_rs smodels_rsn	smodels_score smodels_rs_score smodels_rsn_score	smodels_slparse smodels_rs_slparse smodels_rsn_slparse

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Results

- MGS
- SCore
- SCore^v
- SLparse

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Time limit 600 seconds execution time

Memory limit 448 MB RAM memory usage

Results

- MGS
- SCore
- SCore^v
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Time limit 600 seconds execution time

Memory limit 448 MB RAM memory usage

 Only one place was allocated to each ASP system, although three variants were allowed to participate

Winners: MGS

Modeling, Grounding, Solving

Winners: MGS

Modeling, Grounding, Solving

3

Winners: MGS

Modeling, Grounding, Solving

clasp

(UP)

3

Winners: MGS

Modeling, Grounding, Solving

2

clasp

(UP)

3

Winners: MGS

Modeling, Grounding, Solving

pbmodels

(UK)

2

clasp

(UP)

3

Winners: MGS

Modeling, Grounding, Solving

pbmodels

(UK)

2

1

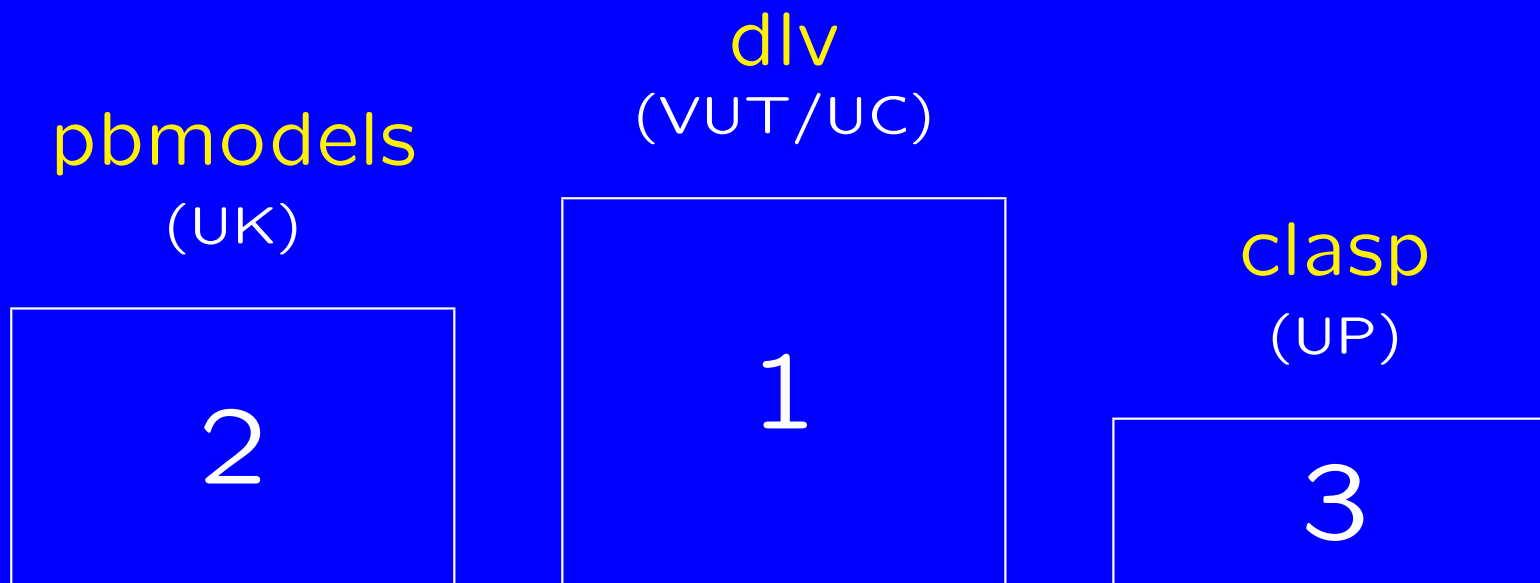
clasp

(UP)

3

Winners: MGS

Modeling, Grounding, Solving



Complete Ranking

Place	Call Script	Solved	%	min	max	avg	avg ^t	EuclDist
1	dlv-contest-special	76/119	63.87	0.07	565.38	54.31	251.49	3542.79
2	dlv-contest	66/119	55.46	0.06	579.09	49.73	294.81	3948.30
3	pbmodels-minisat+-MGS	65/111	58.56	0.52	563.39	83.27	297.41	4142.88
4	clasp_cmp_score2	64/111	57.66	0.87	579.14	115.35	320.56	4285.59
5	clasp_score_def	60/111	54.05	0.91	542.64	80.09	318.97	4277.69
6	clasp_cmp_score	58/111	52.25	0.83	469.46	87.40	332.16	4280.92
7	pbmodels-pueble-MGS	54/111	48.65	0.34	584.31	80.94	347.49	4491.85
8	default	51/119	42.86	0.23	453.88	64.96	370.7	4543.12
9	smodels_rs	34/118	28.81	0.30	539.33	153.86	471.45	5349.11
10	smodels	34/104	32.69	1.14	584.06	173.60	460.6	4974.14
11	pbmodels-wsatcc-MGS	23/111	20.72	1.05	563.52	136.97	504.06	5409.17
12	smodels_rsn	22/111	19.82	0.12	579.10	163.14	513.42	5471.81
13	nomore-default	13/111	11.71	22.04	521.11	315.78	566.71	5714.67
14	scriptAtomreasonLp	12/24	50.00	3.59	259.88	91.18	345.59	2121.13
15	nomore-localprop	10/111	9.01	19.54	521.03	324.83	575.21	5787.71
16	nomore-D	9/111	8.11	48.50	473.89	161.99	564.49	5763.96
17	scriptEloopLp	4/16	25.00	49.92	223.03	106.09	476.52	2088.98
18	gnt	0/8	0.00				600	1696.31
19	dencode+gnt	0/8	0.00				600	1696.31
20	dencode_bc+gnt	0/8	0.00				600	1696.31
21	script.assat.normal	0/50	0.00				600	4101.66

Complete Ranking

Benchmarks

Benchmark Class	#	Solved	%	SAT	%	UNSAT	%	min	max	avg
Sokoban	8	16/16	100.00	6/6	100.00	10/10	100.00	12.66	109.52	54.39
Weighted Spanning Tree	8	89/127	70.08	89/127	70.08	0/0		0.06	579.10	115.27
Social Golfer	8	75/120	62.50	59/75	78.67	16/45	35.56	0.23	579.09	40.34
Bounded Spanning Tree	8	73/127	57.48	73/127	57.48	0/0		0.23	519.09	65.47
Towers of Hanoi	8	71/136	52.21	71/136	52.21	0/0		1.74	584.31	101.10
Blocked N-Queens	8	60/120	50.00	44/75	58.67	16/45	35.56	6.50	542.64	181.69
Hamiltonian Cycle	8	64/150	42.67	64/150	42.67	0/0		0.88	453.88	57.46
Weighted Latin Square	8	41/120	34.17	22/45	48.89	19/75	25.33	0.12	477.67	93.04
Weight-bound Dom. Set	8	42/127	33.07	42/127	33.07	0/0		0.83	563.39	127.87
Schur Numbers	8	32/120	26.67	18/90	20.00	14/30	46.67	3.27	468.79	120.96
15-Puzzle	7	24/105	22.86	24/105	22.86	0/0		52.91	579.14	291.20
Car Sequencing	8	25/120	20.83	24/105	22.86	1/15	6.67	0.69	563.52	106.08
Fast Food	8	19/127	14.96	8/64	12.50	11/63	17.46	5.30	352.11	113.08
Traveling Salesperson	8	16/128	12.50	16/128	12.50	0/0		0.72	11.18	2.17
Reachability	8	8/160	5.00	6/120	5.00	2/40	5.00	0.26	169.90	49.48

Winners: SCore

Solver, Core language

Winners: SCore

Solver, Core language

3

Winners: SCore

Solver, Core language

cmodels

(UT)

3

Winners: SCore

Solver, Core language

2

cmodels

(UT)

3

Winners: SCore

Solver, Core language

smodels

(HUT)

2

cmmodels

(UT)

3

Winners: SCore

Solver, Core language

smodels

(HUT)

2

1

cmmodels

(UT)

3

Winners: SCore

Solver, Core language



Complete Ranking

Place	Call Script	Solved	%	min	max	avg	avg ^t	EuclidDist
1	clasp_cmp_score_glp2	89/95	93.68	0.56	530.21	29.81	65.82	1080.46
2	clasp_cmp_score_glp	89/95	93.68	0.75	504.49	30.36	66.34	1099.14
3	clasp_score_glp_def	86/95	90.53	0.75	431.66	25.20	79.66	1386.63
4	smodels_rs_score	81/95	85.26	1.21	346.36	38.93	121.61	1872.81
5	defaultGlparsed.sh	81/95	85.26	1.35	597.97	46.86	128.38	2089.18
6	scriptAtomreasonGlparsed	80/95	84.21	1.30	576.80	42.40	130.44	2107.83
7	pbmodels-minisat+-SCore	80/95	84.21	0.72	436.11	57.18	142.89	2170.40
8	pbmodels-pueblo-SCore	78/95	82.11	0.34	452.84	41.00	141.03	2210.39
9	dencode+gnt_score	78/95	82.11	1.27	363.19	42.80	142.51	2162.64
10	smodels_score	77/95	81.05	1.28	352.41	40.40	146.43	2217.61
11	dencode_bc+gnt_score	77/95	81.05	1.27	360.70	42.52	148.15	2228.65
12	gnt_score	77/95	81.05	1.27	359.77	42.56	148.18	2228.83
13	scriptEloopGlparsed	75/95	78.95	1.36	598.20	42.86	160.15	2493.41
14	smodels_rsn_score	75/95	78.95	1.21	486.23	63.00	176.05	2503.32
15	lp2sat+minisat	75/95	78.95	1.10	561.06	79.89	189.39	2621.13
16	wf+lp2sat+minisat	73/95	76.84	1.56	587.40	86.42	205.35	2792.51
17	dlv-contest-special	69/95	72.63	0.24	586.62	102.47	238.64	3090.71
18	dlv-contest	68/95	71.58	0.24	587.83	96.69	239.74	3110.36
19	lp2sat+siege	68/95	71.58	1.11	471.36	97.50	240.32	3052.80
20	nomore-localprop-SCore	64/95	67.37	2.45	550.43	103.23	265.34	3316.33
21	nomore-default-SCore	63/95	66.32	2.45	554.76	124.62	284.75	3415.78
22	nomore-D-SCore	62/95	65.26	2.77	559.88	161.15	313.59	3583.85
23	ASPeR-call-script	24/95	25.26	1.47	592.24	98.28	473.25	4906.79
24	ASPeRS30-call-script	21/95	22.11	1.51	561.20	88.99	487.04	4995.78
25	ASPeRS20-call-script	21/95	22.11	1.49	381.33	89.40	487.13	4980.24
26	pbmodels-wsatcc-SCore	6/95	6.32	25.57	529.80	208.15	575.25	5514.97

Complete Ranking

Benchmarks

Benchmark Class	#	Solved	%	SAT	%	UNSAT	%	min	max	avg
15-Puzzle	10	236/260	90.77	121/130	93.08	115/130	88.46	0.74	480.13	25.49
Factoring	5	114/130	87.69	46/52	88.46	68/78	87.18	1.21	554.76	50.35
RLP-150	14	306/364	84.07	21/26	80.77	285/338	84.32	0.34	205.03	22.01
RLP-200	14	287/364	78.85	0/0		287/364	78.85	0.39	581.98	75.21
Schur Numbers	5	99/130	76.15	88/104	84.62	11/26	42.31	2.76	561.20	49.82
EqTest	5	93/130	71.54	0/0		93/130	71.54	0.66	592.24	75.02
Hamiltonian Path	14	219/364	60.16	201/338	59.47	18/26	69.23	0.24	559.88	64.74
Random Non-Tight	14	216/364	59.34	38/52	73.08	178/312	57.05	0.57	598.20	121.87
Blocked N-Queens	14	167/364	45.88	55/156	35.26	112/208	53.85	13.70	587.40	110.59

Winners: SCore^v

Solver, Disjunctive Core language

Winners: SCore^v

Solver, Disjunctive Core language

3

Winners: SCore^v

Solver, Disjunctive Core language

gnt
(HUT)

3

Winners: SCore^v

Solver, Disjunctive Core language

2

gnt
(HUT)

3

Winners: SCore^v

Solver, Disjunctive Core language

cmodels

(UT)

2

gnt

(HUT)

3

Winners: SCore^v

Solver, Disjunctive Core language

cmodels

(UT)

2

1

gnt

(HUT)

3

Winners: SCore^v

Solver, Disjunctive Core language



Complete Ranking

Place	Call Script	Solved	%	min	max	avg	avg ^t	EuclDist
1	dlv-contest-special	54/55	98.18	0.03	258.73	23.59	34.07	279.35
2	dlv-contest	54/55	98.18	0.03	259.97	23.86	34.33	279.44
3	disjGparseDefault	33/55	60.00	1.06	521.59	54.49	272.69	2631.40
4	dencode+gnt_score	29/55	52.73	2.23	521.51	56.34	313.34	2922.73
5	gnt_score	29/55	52.73	2.21	521.91	56.44	313.4	2922.87
6	dencode_bc+gnt_score	29/55	52.73	2.22	522.63	56.45	313.4	2923.17
7	disjGparseEloop	27/55	49.09	1.21	521.55	33.83	322.06	2978.46
8	disjGparseVerMin	27/55	49.09	1.22	523.40	33.98	322.14	2978.77

Complete Ranking

Benchmarks

Benchmark Class	#	Solved	%	SAT	%	UNSAT	%	min	max	avg
Grammar-based Info.Extra.	15	120/120	100.00	64/64	100.00	56/56	100.00	0.62	7.86	5.03
Disjunctive Loops	3	21/24	87.50	0/0		21/24	87.50	0.44	522.63	95.24
Strategic Companies	15	88/120	73.33	88/120	73.33	0/0		0.35	523.40	71.22
Mutex	7	18/56	32.14	0/0		18/56	32.14	0.03	259.97	37.41
Random QBFs	15	35/120	29.17	0/0		35/120	29.17	0.11	290.99	44.41

Winners: SLparse

Solver, Lparse language

Winners: SLparse

Solver, Lparse language

3

Winners: SLparse

Solver, Lparse language

smodels

(HUT)

3

Winners: SLparse

Solver, Lparse language

2

smodels

(HUT)

3

Winners: SLparse

Solver, Lparse language

pbmodels

(UK)

2

smodels

(HUT)

3

Winners: SLparse

Solver, Lparse language

pbmodels

(UK)

2

1

smodels

(HUT)

3

Winners: SLparse

Solver, Lparse language



Complete Ranking

Place	Call Script	Solved	%	min	max	avg	avg ^t	EuclDist
1	clasp_cmp_slparse2	100/127	78.74	0.38	556.49	75.96	187.37	2791.89
2	clasp_cmp_slparse	94/127	74.02	0.41	502.53	61.37	201.33	2919.46
3	pbmodels-minisat+-SLparse	91/127	71.65	0.49	503.57	76.69	225.03	3241.06
4	clasp_slparse_def	89/127	70.08	0.37	546.50	55.62	218.5	3152.34
5	smodels_rs_slparse	87/127	68.50	0.23	576.28	95.92	254.69	3403.90
6	groundedDefault	81/127	63.78	0.25	407.49	46.20	246.79	3448.34
7	scriptAtomreasonGr	81/127	63.78	0.25	407.46	50.55	249.56	3465.67
8	scriptEloopGr	78/127	61.42	0.24	407.48	46.15	259.84	3598.70
9	smodels_slparse	75/127	59.06	0.26	518.08	102.76	306.35	3958.86
10	smodels_rsn_slparse	74/127	58.27	0.35	596.39	70.52	291.49	3815.31
11	pbmodels-pueblo-SLparse	69/127	54.33	0.25	593.05	87.25	321.42	4189.03
12	nomore-D-slparse	54/127	42.52	1.08	530.39	152.78	409.84	4765.06
13	nomore-localprop-slparse	50/127	39.37	1.08	517.63	120.80	411.34	4846.58
14	nomore-default-slparse	49/127	38.58	1.08	549.80	143.44	423.85	4920.23
15	gnt_slparse	35/127	27.56	2.10	482.13	81.40	457.08	5276.26
16	dencode+gnt_slparse	35/127	27.56	2.18	482.81	81.64	457.15	5276.38
17	dencode_bc+gnt_slparse	35/127	27.56	2.10	485.36	81.70	457.16	5276.53
18	script.assat.lparse-output	30/127	23.62	1.00	225.28	38.64	467.4	5379.18
19	pbmodels-wsatcc-SLparse	25/127	19.69	1.12	272.98	46.56	491.05	5585.82

Complete Ranking

Benchmarks

Benchmark Class	#	Solved	%	SAT	%	UNSAT	%	min	max	avg
RLP-200	5	89/95	93.68	18/19	94.74	71/76	93.42	0.25	465.69	60.94
RLP-150	5	87/95	91.58	17/19	89.47	70/76	92.11	0.25	183.29	14.17
Factoring	4	69/76	90.79	36/38	94.74	33/38	86.84	0.63	549.80	64.09
verifyTest (TOAST)	5	81/95	85.26	81/95	85.26	0/0		0.24	303.32	16.43
Random Non-Tight	5	75/95	78.95	41/57	71.93	34/38	89.47	0.41	518.08	123.56
Knight's Tour	5	71/95	74.74	71/95	74.74	0/0		1.04	248.97	28.29
Su-Doku	3	42/57	73.68	42/57	73.68	0/0		18.15	176.69	68.00
searchTest-plain (TOAST)	5	68/95	71.58	18/38	47.37	50/57	87.72	1.54	339.51	45.50
searchTest-verbose (TOAST)	5	63/95	66.32	63/95	66.32	0/0		25.84	485.36	136.07
Hamiltonian Path	5	60/95	63.16	60/95	63.16	0/0		0.37	530.39	58.02
Weighted Spanning Tree	5	58/95	61.05	58/95	61.05	0/0		3.24	596.39	122.04
Solitaire Forward	5	55/95	57.89	55/95	57.89	0/0		1.19	593.05	49.06
Bounded Spanning Tree	5	54/95	56.84	54/95	56.84	0/0		7.43	413.63	70.11
Hamiltonian Cycle	5	51/95	53.68	51/95	53.68	0/0		0.47	464.71	51.30
Solitaire Backward	5	47/95	49.47	33/76	43.42	14/19	73.68	0.30	552.11	71.72
Towers of Hanoi	5	43/95	45.26	43/95	45.26	0/0		6.28	478.30	169.96
Blocked N-Queens	5	40/95	42.11	36/76	47.37	4/19	21.05	1.57	590.04	193.59
Social Golfer	5	37/95	38.95	24/38	63.16	13/57	22.81	0.84	291.48	30.70
Schur Numbers	5	31/95	32.63	11/57	19.30	20/38	52.63	1.23	496.82	104.57
Hashiwokakero	5	26/95	27.37	0/0		26/95	27.37	6.71	377.69	72.36
Weighted Latin Square	5	23/95	24.21	6/19	31.58	17/76	22.37	0.23	576.28	144.13
15-Puzzle	5	17/95	17.89	17/95	17.89	0/0		106.66	502.53	327.56
Weight-bounded Dom. Set	5	15/95	15.79	15/95	15.79	0/0		1.55	467.51	112.55
Traveling Salesperson	5	12/95	12.63	12/95	12.63	0/0		0.35	212.66	20.24
Solitaire Backward (2)	5	11/95	11.58	11/95	11.58	0/0		5.32	330.89	101.55
Car Sequencing	5	7/95	7.37	7/95	7.37	0/0		7.17	556.49	249.51

Agenda

- Prelude
- Setting
- Benchmarks
- ASP Systems
- Results
- Lessons

Major Lessons

- Lack of well-defined
 - input languages,
 - intermediate languages,
 - output languages, as well as
 - error signaling

( ASP Language Forum, SEA'07)

- Need for more modeling practice
- Grounding is of equal importance

And last but not least

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Thank you all so much for your
support and patience!!