The 4th (Open) Answer Set Programming Competition

Department of Mathematics and Computer Science, University of Calabria
Institute for Information Systems, Vienna University of Technology

12th International Conference
on Logic Programming and Nonmonotonic Reasoning
A Coruña, Spain

presented by G. Ianni, T. Krennwallner

UNIVERSITÀ DELLA CALABRIA
Dipartimento di Matematica e Informatica
TU WIEN

Outline

Outline

The Fourth ASP Competition

An event moving towards maturity

- $2+1$ tracks: the System Competition Track, the Model and Solve Competition Track, the System Competition Track for parallel systems
- Host institutions: UNICAL and TU-WIEN

The Fourth ASP Competition

An event moving towards maturity

- $2+1$ tracks: the System Competition Track, the Model and Solve Competition Track, the System Competition Track for parallel systems
- Host institutions: UNICAL and TU-WIEN

- **System track(s)**: for "pure" ASP systems
- **Model and Solve track**: open (ASP systems, CSP systems, PDDL based, FO(ID)...)

The Fourth ASP Competition

An event moving towards maturity

- $2+1$ tracks: the System Competition Track, the Model and Solve Competition Track, the System Competition Track for parallel systems
- Host institutions: UNICAL and TU-WIEN

- **System track(s)**: for "pure" ASP systems
- **Model and Solve track**: open (ASP systems, CSP systems, PDDL based, FO(ID)...)

- System Track: 10 Solvers
- System Track (parallel): 6 Solvers
- M&S Track: 7 Teams

UNIVERSITÀ DELLA CALABRIA
Dipartimento di Matematica e Informatica
TU WIEN

Benchmark Selection - I

1. Facts:
   - Reducing modelling burden for participants is important;
   - The new ASP-Core 2 can embrace much more new real world situations.
2. Actions taken:
   - Problems reduced to a total of 26 (M&S Featuring only 15 problems of these);
   - 2011: 35 problems (System track featuring only 18 of these):

Benchmark Selection - II

Field of provenance

- **AI**: Connected Maximum-density Still Life, Strategic Companies, Hanoi Tower
- **Combinatorial**: Permutation Pattern Matching, Valves Location, Bottle Filling
- **Database**: Weighted Sequence
- **Diagnosis**: Minimal Diagnosis
- **Formal Logic**: Qualitative Spatial Temporal Reasoning, Abstract Dialectical Frameworks Well-founded Model
- **Graph**: Graceful Graphs, Crossing Minimization, Reachability, Stable Marriage, Maximal Clique, Graph Colouring
- **Natural Sciences**: Chemical Classification
- **Planning**: Nomystery, Sokoban, Visit-all
- **Puzzle**: Ricochet Robot, Solitaire, Knight Tour with Holes, Labyrinth
- **Scheduling**: Incremental Scheduling
- **Synthetic**: Complex Optimization of Answer Sets

Benchmark Selection - III

- Problems derived from the Third Competition: 14

Benchmark Selection - III

- Problems derived from the Third Competition: 14
- New problems: 12

Benchmark Selection - III

- Problems derived from the Third Competition: 14
- New problems: 12
- For old problems, harder instances and/or harder variants introduced whenever necessary (e.g. Knight tour with holes);

Benchmark Selection - III

- Problems derived from the Third Competition: 14
- New problems: 12
- For old problems, harder instances and/or harder variants introduced whenever necessary (e.g. Knight tour with holes);
- Too easy problems were retired
- Instance selection procedure changed to ensure instances can fairly range from easy to hard, and to be *objective*;

Benchmark Selection - III

- Problems derived from the Third Competition: 14
- New problems: 12
- For old problems, harder instances and/or harder variants introduced whenever necessary (e.g. Knight tour with holes);
- Too easy problems were retired
- Instance selection procedure changed to ensure instances can fairly range from easy to hard, and to be *objective*;
- Three problems reformulated as specified at IPC Competition Series, with same instance sets (Nomystery, Visitall, Sokoban)

Benchmark Selection - III

- Problems derived from the Third Competition: 14
- New problems: 12
- For old problems, harder instances and/or harder variants introduced whenever necessary (e.g. Knight tour with holes);
- Too easy problems were retired
- Instance selection procedure changed to ensure instances can fairly range from easy to hard, and to be *objective*;
- Three problems reformulated as specified at IPC Competition Series, with same instance sets (Nomystery, Visitall, Sokoban)
- Categories: Polynomial (2+1 problems), NP (15 problems), Beyond-NP (Σ_2^P, 3 problems), Optimization (5 problems, now in all tracks):

Scoring

Each participant is awarded the sum of scores per each benchmark domain, naturally weighing NP ($> 60\%$) more than P (10-15%) and Beyond-NP/Opt (20-25%).

Scoring

Each participant is awarded the sum of scores per each benchmark domain, naturally weighing NP ($> 60\%$) more than P (10-15%) and Beyond-NP/Opt (20-25%).

Instance Quota

$$S_{solve}(P) = \alpha \frac{N_S}{N}$$

N_S = number of solved instances for problem P, N = total number of instances for problem P.

Scoring

Each participant is awarded the sum of scores per each benchmark domain, naturally weighing NP ($> 60\%$) more than P (10-15%) and Beyond-NP/Opt (20-25%).

Instance Quota

$$S_{solve}(P) = \alpha \frac{N_S}{N}$$

N_S = number of solved instances for problem P, N = total number of instances for problem P.

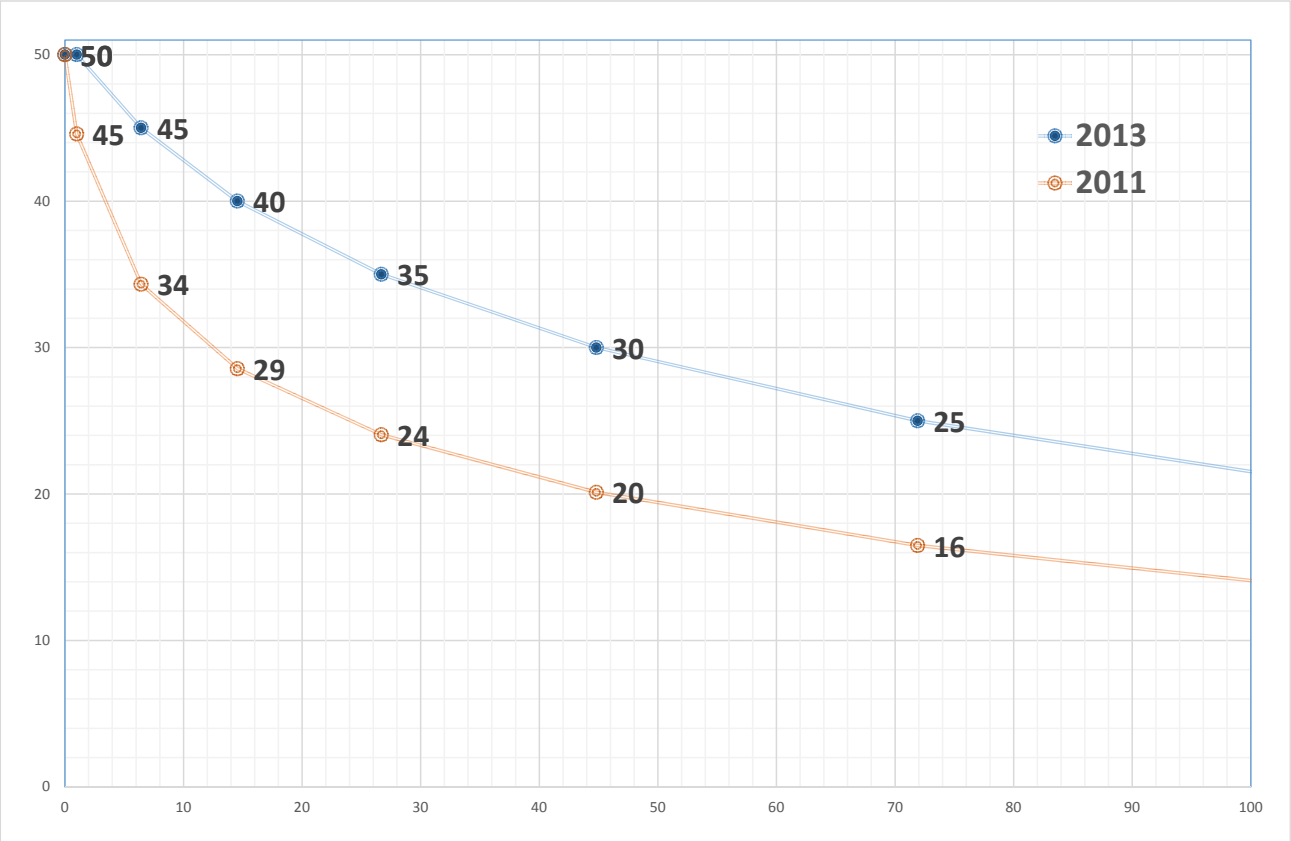
Time Quota

$$S_{time}(P) = \frac{100 - \alpha}{N\gamma} \sum_{i=1}^{N} \left(1 - \left(\frac{\log_{10}(\max(1, t_i) + s)}{\log_{10}(t_{out} + s)}\right)\right)$$

t_{out} = maximum allowed time, t_i on instance i, N as above.

More on the time quota

Awards faster systems logarithmically. Milder slope w.r.t. 2011's score.
For $t_{out} = 600$ and S_{time} normalized to 50:



Optimization Quota

$S_{opt} =$

- Inconsistent instances: a flat score of $\frac{1}{2N}$ for detecting it;
- Satisfiable instances:
  - A flat reward of $\frac{1}{4N}$ for finding a witness;
  - A flat reward of $\frac{1}{4N}$ for finding an optimal witness;
  - A quality reward of

$$\frac{1}{2N} e^{\frac{B_i - Q_i}{Q_i}}$$

depending on the distance of the solution cost Q_i from the best solution cost B_i for instance i.

More on Optimization Quota

Some additional score awarded to solutions within 3% of the *measured* optimal solution. Finding an optimum is strongly rewarded. For $N = 1$ and S_{opt} normalized within 0 and 50:

Quality Gap (%)	Score (0-50)
0	50
1	22
2	16
3	14
>4	13

Is a Competition "scientific"?

Competition vs Evaluation

- Summing, averaging, shuffling heterogeneous quotas is arbitrary
- Benchmarks are sometimes provided by participants themselves. Bias is compensated but not eliminable
- Checkers are "self-referential" and often use participant systems
- The competition however produces lot of detailed data which is left for interpretation beyond rankings (# of instances solved, individual timings, memory vs time outs, etc.)

Some Competition Details

1. VCWC infrastructure ran on a battery of AMD Opteron Magny-Cours 6176 SE CPUs (total of 96 cores) running at 2.3 GHz with a total of 512GiB;
2. 6 GiB limit per run, 600 seconds timeout;
3. 23 participants, 26 domains, about 30 instances per domain, 3 runs $\rightarrow$ more than 50K runs (not including re-runs);
4. Time of runs were properly averaged. Median time discrepancy about 0.1 secs, median score discrepancy below 0.06 points, with average score discrepancy less than 2 points (due to rare outliers).

Outline

Driving Principles of the System Track

Driving Principles of the System Track

Language standardization

- Try to enlarge the number of acknowledged common constructs of ASP systems;

Driving Principles of the System Track

Language standardization

- Try to enlarge the number of acknowledged common constructs of ASP systems;

Compare systems in fixed conditions

- Fixed input problem encoding;
- Fixed default heuristics and internal settings in each domain;

From driving principles to rules

Rules

- Language fixed to the new ASP-Core-2;
- Organizers provided ASP-Core-2 encodings for each benchmark;
- Forbidden to look for *syntactic* aspects of problem encodings in order to trigger ad-hoc heuristics (e.g. predicate names). Non-syntactic feature lookup allowed.

ASP-Core-2 and encodings

- The new language eventually embeds and standardizes a large number of constructs: function symbols, aggregates, choice rules, weak constraints, queries, arithmetics
- Encodings in 1-to-1 correspondence were used for systems not ready for ASP-Core-2;
- Encodings were submitted by benchmark maintainers and subject to minimal modifications by organizers.
- New grounders supporting (large part of) ASP-Core-2 now available (Gringo 4 and DLV-g)

Participants

- **clasp**, **claspD-2**, **claspD-2-asp-core2**, **claspfolio**, from Potassco team at University of Potsdam
- **DLV+WASP**, from University of Calabria
- **IDP3**, from KRR Group at KU Leuven
- **LP2BV-1**, **LP2BV-2**, **LP2MIP**, **LP2SAT**, from Aalto University (former Helsinki UT)

Find more details on the Competition website

Scores

System	Total	P	NP	Σ_2^P	Opt
	1233	63	796	158	216
Instance	766	50	463	88	165
Time	467	13	333	70	51
	1167	70	803	156	138
Instance	716	48	464	90	114
Time	451	22	339	66	24
	1109	17	788	164	140
Instance	689	12	459	98	120
Time	420	5	329	66	20
	969	53	775	0	141
Instance	611	40	455	0	116
Time	358	13	320	0	25
	758	127	452	63	116
Instance	517	90	290	40	97
Time	241	37	162	23	19
	631	8	623	0	0
Instance	384	5	379	0	0
Time	247	3	244	0	0
	543	8	535	0	0
Instance	337	5	332	0	0
Time	206	3	203	0	0
	512	8	504	0	0
Instance	324	5	319	0	0
Time	188	3	185	0	0
	267	8	145	0	114
Instance	162	5	96	0	61
Time	105	3	49	0	53
	19	0	19	0	0
Instance	12	0	12	0	0
Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
		969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
		758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
		631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
		543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
		512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
		267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
		969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
		758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
		631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
		543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
		512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
		969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
		758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
		631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
		543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
		969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
		758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
		631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
		969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
		758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
LP2SAT	Total	631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
		969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
DLV+WASP	Total	758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
LP2SAT	Total	631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
		1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
clasp	Total	969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
DLV+WASP	Total	758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
LP2SAT	Total	631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
		1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
claspfolio	Total	1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
clasp	Total	969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
DLV+WASP	Total	758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
LP2SAT	Total	631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
claspD-asp-core2	Total	1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
claspfolio	Total	1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
clasp	Total	969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
DLV+WASP	Total	758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
LP2SAT	Total	631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
claspD	Total	1233	63	796	158	216
	Instance	766	50	463	88	165
	Time	467	13	333	70	51
claspD-asp-core2	Total	1167	70	803	156	138
	Instance	716	48	464	90	114
	Time	451	22	339	66	24
claspfolio	Total	1109	17	788	164	140
	Instance	689	12	459	98	120
	Time	420	5	329	66	20
clasp	Total	969	53	775	0	141
	Instance	611	40	455	0	116
	Time	358	13	320	0	25
DLV+WASP	Total	758	127	452	63	116
	Instance	517	90	290	40	97
	Time	241	37	162	23	19
LP2SAT	Total	631	8	623	0	0
	Instance	384	5	379	0	0
	Time	247	3	244	0	0
LP2BV-1	Total	543	8	535	0	0
	Instance	337	5	332	0	0
	Time	206	3	203	0	0
LP2BV-2	Total	512	8	504	0	0
	Instance	324	5	319	0	0
	Time	188	3	185	0	0
LP2MIP	Total	267	8	145	0	114
	Instance	162	5	96	0	61
	Time	105	3	49	0	53
IDP3	Total	19	0	19	0	0
	Instance	12	0	12	0	0
	Time	7	0	7	0	0

Participants

- **clasp-mt**, **claspD-2-mt**, **claspfolio-mt**, from Potassco team at University of Potsdam
- **LP2MIP-mt**, **LP2SAT-mt**, **LP2SOLRED-mt**, from Aalto University (former Helsinki UT)

Find more details on the Competition website

Scores

System	Total	P	NP	Σ_2^P	Opt
	1249	52	770	164	263
Instance	804	40	463	98	203
Time	445	12	307	66	60
	1038	17	821	83	117
Instance	642	12	484	50	96
Time	396	5	337	33	21
	988	52	757	0	179
Instance	643	40	455	0	148
Time	345	12	302	0	31
	574	8	566	0	0
Instance	362	5	357	0	0
Time	212	3	209	0	0
	495	8	487	0	0
Instance	321	5	316	0	0
Time	174	3	171	0	0
	265	8	145	0	112
Instance	161	5	95	0	61
Time	104	3	50	0	51

Scores

System		Total	P	NP	Σ_2^P	Opt
		1249	52	770	164	263
	Instance	804	40	463	98	203
	Time	445	12	307	66	60
		1038	17	821	83	117
	Instance	642	12	484	50	96
	Time	396	5	337	33	21
		988	52	757	0	179
	Instance	643	40	455	0	148
	Time	345	12	302	0	31
		574	8	566	0	0
	Instance	362	5	357	0	0
	Time	212	3	209	0	0
		495	8	487	0	0
	Instance	321	5	316	0	0
	Time	174	3	171	0	0
LP2MIP-mt	Total	265	8	145	0	112
	Instance	161	5	95	0	61
	Time	104	3	50	0	51

Scores

System		Total	P	NP	Σ_2^P	Opt
		1249	52	770	164	263
	Instance	804	40	463	98	203
	Time	445	12	307	66	60
		1038	17	821	83	117
	Instance	642	12	484	50	96
	Time	396	5	337	33	21
		988	52	757	0	179
	Instance	643	40	455	0	148
	Time	345	12	302	0	31
		574	8	566	0	0
	Instance	362	5	357	0	0
	Time	212	3	209	0	0
LP2SAT-mt	Total	495	8	487	0	0
	Instance	321	5	316	0	0
	Time	174	3	171	0	0
LP2MIP-mt	Total	265	8	145	0	112
	Instance	161	5	95	0	61
	Time	104	3	50	0	51

Scores

System	Total	P	NP	Σ_2^P	Opt
	1249	52	770	164	263
Instance	804	40	463	98	203
Time	445	12	307	66	60
	1038	17	821	83	117
Instance	642	12	484	50	96
Time	396	5	337	33	21
	988	52	757	0	179
Instance	643	40	455	0	148
Time	345	12	302	0	31
LP2SOLRED-mt Total	574	8	566	0	0
Instance	362	5	357	0	0
Time	212	3	209	0	0
LP2SAT-mt Total	495	8	487	0	0
Instance	321	5	316	0	0
Time	174	3	171	0	0
LP2MIP-mt Total	265	8	145	0	112
Instance	161	5	95	0	61
Time	104	3	50	0	51

Scores

System		Total	P	NP	Σ_2^P	Opt
		1249	52	770	164	263
	Instance	804	40	463	98	203
	Time	445	12	307	66	60
		1038	17	821	83	117
	Instance	642	12	484	50	96
	Time	396	5	337	33	21
clasp-mt	Total	988	52	757	0	179
	Instance	643	40	455	0	148
	Time	345	12	302	0	31
LP2SOLRED-mt	Total	574	8	566	0	0
	Instance	362	5	357	0	0
	Time	212	3	209	0	0
LP2SAT-mt	Total	495	8	487	0	0
	Instance	321	5	316	0	0
	Time	174	3	171	0	0
LP2MIP-mt	Total	265	8	145	0	112
	Instance	161	5	95	0	61
	Time	104	3	50	0	51

Scores

System		Total	P	NP	Σ_2^P	Opt
		1249	52	770	164	263
	Instance	804	40	463	98	203
	Time	445	12	307	66	60
claspfolio-mt	Total	1038	17	821	83	117
	Instance	642	12	484	50	96
	Time	396	5	337	33	21
clasp-mt	Total	988	52	757	0	179
	Instance	643	40	455	0	148
	Time	345	12	302	0	31
LP2SOLRED-mt	Total	574	8	566	0	0
	Instance	362	5	357	0	0
	Time	212	3	209	0	0
LP2SAT-mt	Total	495	8	487	0	0
	Instance	321	5	316	0	0
	Time	174	3	171	0	0
LP2MIP-mt	Total	265	8	145	0	112
	Instance	161	5	95	0	61
	Time	104	3	50	0	51

Scores

System		Total	P	NP	Σ_2^P	Opt
claspD-mt	Total	1249	52	770	164	263
	Instance	804	40	463	98	203
	Time	445	12	307	66	60
claspfolio-mt	Total	1038	17	821	83	117
	Instance	642	12	484	50	96
	Time	396	5	337	33	21
clasp-mt	Total	988	52	757	0	179
	Instance	643	40	455	0	148
	Time	345	12	302	0	31
LP2SOLRED-mt	Total	574	8	566	0	0
	Instance	362	5	357	0	0
	Time	212	3	209	0	0
LP2SAT-mt	Total	495	8	487	0	0
	Instance	321	5	316	0	0
	Time	174	3	171	0	0
LP2MIP-mt	Total	265	8	145	0	112
	Instance	161	5	95	0	61
	Time	104	3	50	0	51

Outline

Driving Principles of the Model and Solve track

Open comparison with other declarative paradigm

Competition open to any “declarative”-based system

Driving Principles of the Model and Solve track

Open comparison with other declarative paradigm

Competition open to any "declarative"-based system

Development of new linguistic constructs

No restriction on input language. Participants develop their own problem specifications

Driving Principles of the Model and Solve track

Open comparison with other declarative paradigm

Competition open to any "declarative"-based system

Development of new linguistic constructs

No restriction on input language. Participants develop their own problem specifications

Development of new heuristics and/or algorithms

No restrictions in fine-tuning, on a per benchmark basis.

From driving principles to rules

Rules

- Participants submit a "solution" on a per benchmark basis.
- Benchmark domain knowledge can be exploited (but: separation of "training instances" and competition instances)

Participants

- **B-Prolog**: the B-Prolog International Team at Charles University, University of Udine, University of Ferrara, Roskilde University, University of Alberta, Texas Tech University, CUNY Brooklyn College and Graduate Center
- **Enfragmo**: Simon Fraser University
- **ezcsp**: Drexel University, University of Nebraska at Omaha, University of Texas
- **IDP2, IDP3**: the KRR Group at KU Leuven
- **INCA**: NICTA and the University of New South Wales
- **Potassco**: University of Potsdam

Find more details on the Competition website

UNIVERSITÀ DELLA CALABRIA
Dipartimento di Matematica e Informatica
TU WIEN

Scores

System	Total	P	NP	Σ_2^P	Opt
	1126	166	695	88	177
Instance	641	100	371	50	120
Time	485	66	324	38	57
	832	159	532	33	108
Instance	494	100	292	17	85
Time	338	59	240	16	23
	769	151	462	87	69
Instance	466	92	268	50	56
Time	303	59	194	37	13
	534	93	347	53	41
Instance	313	50	195	37	31
Time	221	43	152	16	10
	504	75	410	0	19
Instance	303	50	234	0	19
Time	201	25	176	0	0
	284	0	255	0	29
Instance	162	0	133	0	29
Time	122	0	122	0	0
	66	0	66	0	0
Instance	46	0	46	0	0
Time	20	0	20	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1126	166	695	88	177
	Instance	641	100	371	50	120
	Time	485	66	324	38	57
		832	159	532	33	108
	Instance	494	100	292	17	85
	Time	338	59	240	16	23
		769	151	462	87	69
	Instance	466	92	268	50	56
	Time	303	59	194	37	13
		534	93	347	53	41
	Instance	313	50	195	37	31
	Time	221	43	152	16	10
		504	75	410	0	19
	Instance	303	50	234	0	19
	Time	201	25	176	0	0
		284	0	255	0	29
	Instance	162	0	133	0	29
	Time	122	0	122	0	0
Enfragmo	Total	66	0	66	0	0
	Instance	46	0	46	0	0
	Time	20	0	20	0	0

Scores

System	Total	P	NP	Σ_2^P	Opt
	1126	166	695	88	177
Instance	641	100	371	50	120
Time	485	66	324	38	57
	832	159	532	33	108
Instance	494	100	292	17	85
Time	338	59	240	16	23
	769	151	462	87	69
Instance	466	92	268	50	56
Time	303	59	194	37	13
	534	93	347	53	41
Instance	313	50	195	37	31
Time	221	43	152	16	10
	504	75	410	0	19
Instance	303	50	234	0	19
Time	201	25	176	0	0
B-Prolog team Total	284	0	255	0	29
Instance	162	0	133	0	29
Time	122	0	122	0	0
Enfragmo Total	66	0	66	0	0
Instance	46	0	46	0	0
Time	20	0	20	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1126	166	695	88	177
	Instance	641	100	371	50	120
	Time	485	66	324	38	57
		832	159	532	33	108
	Instance	494	100	292	17	85
	Time	338	59	240	16	23
		769	151	462	87	69
	Instance	466	92	268	50	56
	Time	303	59	194	37	13
		534	93	347	53	41
	Instance	313	50	195	37	31
	Time	221	43	152	16	10
IDP2	Total	504	75	410	0	19
	Instance	303	50	234	0	19
	Time	201	25	176	0	0
B-Prolog team	Total	284	0	255	0	29
	Instance	162	0	133	0	29
	Time	122	0	122	0	0
Enfragmo	Total	66	0	66	0	0
	Instance	46	0	46	0	0
	Time	20	0	20	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1126	166	695	88	177
	Instance	641	100	371	50	120
	Time	485	66	324	38	57
		832	159	532	33	108
	Instance	494	100	292	17	85
	Time	338	59	240	16	23
		769	151	462	87	69
	Instance	466	92	268	50	56
	Time	303	59	194	37	13
IDP3	Total	534	93	347	53	41
	Instance	313	50	195	37	31
	Time	221	43	152	16	10
IDP2	Total	504	75	410	0	19
	Instance	303	50	234	0	19
	Time	201	25	176	0	0
B-Prolog team	Total	284	0	255	0	29
	Instance	162	0	133	0	29
	Time	122	0	122	0	0
Enfragmo	Total	66	0	66	0	0
	Instance	46	0	46	0	0
	Time	20	0	20	0	0

UNIVERSITÀ DELLA CALABRIA
Dipartimento di Matematica e Informatica
TU WIEN

Scores

System		Total	P	NP	Σ_2^P	Opt
		1126	166	695	88	177
	Instance	641	100	371	50	120
	Time	485	66	324	38	57
		832	159	532	33	108
	Instance	494	100	292	17	85
	Time	338	59	240	16	23
ezcsp	Total	769	151	462	87	69
	Instance	466	92	268	50	56
	Time	303	59	194	37	13
IDP3	Total	534	93	347	53	41
	Instance	313	50	195	37	31
	Time	221	43	152	16	10
IDP2	Total	504	75	410	0	19
	Instance	303	50	234	0	19
	Time	201	25	176	0	0
B-Prolog team	Total	284	0	255	0	29
	Instance	162	0	133	0	29
	Time	122	0	122	0	0
Enfragmo	Total	66	0	66	0	0
	Instance	46	0	46	0	0
	Time	20	0	20	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
		1126	166	695	88	177
	Instance	641	100	371	50	120
	Time	485	66	324	38	57
INCA	Total	832	159	532	33	108
	Instance	494	100	292	17	85
	Time	338	59	240	16	23
ezcsp	Total	769	151	462	87	69
	Instance	466	92	268	50	56
	Time	303	59	194	37	13
IDP3	Total	534	93	347	53	41
	Instance	313	50	195	37	31
	Time	221	43	152	16	10
IDP2	Total	504	75	410	0	19
	Instance	303	50	234	0	19
	Time	201	25	176	0	0
B-Prolog team	Total	284	0	255	0	29
	Instance	162	0	133	0	29
	Time	122	0	122	0	0
Enfragmo	Total	66	0	66	0	0
	Instance	46	0	46	0	0
	Time	20	0	20	0	0

Scores

System		Total	P	NP	Σ_2^P	Opt
Potassco	Total	1126	166	695	88	177
	Instance	641	100	371	50	120
	Time	485	66	324	38	57
INCA	Total	832	159	532	33	108
	Instance	494	100	292	17	85
	Time	338	59	240	16	23
ezcsp	Total	769	151	462	87	69
	Instance	466	92	268	50	56
	Time	303	59	194	37	13
IDP3	Total	534	93	347	53	41
	Instance	313	50	195	37	31
	Time	221	43	152	16	10
IDP2	Total	504	75	410	0	19
	Instance	303	50	234	0	19
	Time	201	25	176	0	0
B-Prolog team	Total	284	0	255	0	29
	Instance	162	0	133	0	29
	Time	122	0	122	0	0
Enfragmo	Total	66	0	66	0	0
	Instance	46	0	46	0	0
	Time	20	0	20	0	0

Special Thanks

- Domain maintainers and their patience
- Participant teams and their patience
- The LPNMR Chairs and the LPNMR Steering Committee
- The Organizing Committee

See you at LPNMR 2015 with the 5th ASPCOMP

- ASP-Core-2 System Track
- Special Track for Parallel systems
- Track for Portfolio systems if critical mass reached
- Model & Solve Track on-site

. . . . . and next year at the FLoC Olympic Games 2014

- ASP-Core-2 System Track
- Special Track for Parallel systems
- Track for Portfolio systems if critical mass reached
- Model & Solve Track on-site

Vienna Summer of Logic - FLoC Olympic Games

UNIVERSITÀ DELLA CALABRIA
Dipartimento di Matematica e Informatica
TU WIEN