XCSP^3 Competition 2026
– Results –

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CP'26

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PyCSP^3/XCSP^3?

- XCSP^3 toolchain: composed of two softwares
  - PyCSP^3: item a Python library for modelling constrained problems
  - XCSP^3: an intermediate format used to represent problem instances

- Project goal: model any integer problem using mainstream technologies
  - natural expression of constraints using Python
  - easy integration of data (in JSON file)
  - compiled XCSP^3 preserves the strucuture of the model

- Many resources:
  - 60 Jupyter notebooks for introducing popular constraints and modelling of classical combinatorial problems
  - parsers: (on GitHub): C++, Java, Rust, and Python
  - repository with several series of instances and more than 340 models (and data); see https://pycsp.org/models

Purpose of Competitions

The goal of a competition is primarly to evaluate solvers and new ideas/techniques in the same conditions.

- results (and rankings) are not an absolute truth (benchmarks selection, experimental conditions)

Competitions are a purpose to collect publicly available benchmarks and data.

- Competitions must be driven by the community: benchmark submission/selection advices, suggestions for improvements, ...

Perimeter of Constraints, as in 2025 (mainly, XCSP^3-core)

For the standard tracks:

- `intension`, `extension`
- `regular`, `mdd`
- `allDifferent`, `allDifferentList`, `allEqual`, `ordered`, `lex`, `precedence`
- `sum`, `count`, `nValues`, `cardinality`
- `maximum`, `minimum`, `element`, `channel`
- `noOverlap`, `cumulative`, `binPacking`, `knapsack`
- `circuit`, `instantiation`
- `slide`

For the Mini-solver tracks:

- `intension`, `extension`
- `allDifferent`
- `sum`
- `element`

Tracks for the 2026 XCSP^3 Competition

There are 4 Standard tracks and 2 Mini-solver tracks.

Problem	Goal	Exploration	Timeout
CSP	one solution	sequential	30 minutes
COP	best solution	sequential	30 minutes
Fast COP	best solution	sequential	3 minutes
Parallel COP	best solution	parallel	30 minutes

Table: Standard Tracks.

Problem	Goal	Exploration	Timeout
Mini CSP	one solution	sequential	30 minutes
Mini COP	best solution	sequential	30 minutes

Table: Mini-solver Tracks.

Computer Infrastructure

- cluster provided by CRIL
- 10 nodes, bi-processors AMD EPYC 9355 with 1 TB de RAM
- one NUMA region (8 cores, dedicated memory channel with 256GB RAM) per job
- effective limits enforced by runsolver:
  - one core for sequential, 8 for parallel
  - 64GB RAM
  - CPU time for sequential, WC time for parallel

Scoring/Ranking

The number of points won by a solver S is decided as follows:

- for CSP, 1 point per solved instance
- for COP, this is roughly speaking the number of times the solver was the best:
  - 1 point per solved unsatisfiable instance
  - 1 point per proved optimal solution (#BB1)
  - 0 points if another solver found a better solution
  - 1 point if best bound (#BB1), 0.5 if this best bound was proved optimal by another solver (#BB2)

Selection of Benchmarks

Note that the selection has been conducted by C. Lecoutre, which is why ACE is labeled *off-competition*.

At the end:

- the selection of instances for the Standard tracks was composed of 200 CSP instances and 250 COP instances
- the selection of instances for the Mini-solver tracks was composed of 150 CSP instances and 155 COP instances

Problems for the Main Track CSP

CSP Problems	Global Constraints
AllDifferentPathological	`allDifferent`
Antichain1	`count`, `lex`
Antichain2	`element`, `lex`
BIBD2	`cardinality`, `lex`, `nValues`
Collatz	`allDifferent`
ColoredGrid	`allDifferent`, `lex`
Dominoes	`allDifferent`, `table`
GeneralizedPigeonHole	`allDifferent`
HIPP	`element`
Inglenook	`table`
KillerSudoku	`allDifferent`, `sum`
MagicHexagon	`allDifferent`, `sum`
PerfectRythmicTiling1	`allDifferent`, `cardinality`, `element`, `table`
PerfectRythmicTiling2	`allDifferent`, `table`
RectPacking	`noOverlap`
Steiner3	`table`

Problems for the Main Track COP

COP Problems	Global Constraints
BACPj	`binPacking`, `sum`
Clique	`sum`
CrosswordDesign	`sum`, `table`
EternityApprox	`allDifferent`, `cardinality`, `sum`, `table`
ExaminationTimetabling1	`element`, `sum`, `table`
ExaminationTimetabling3	`binPacking`, `element`, `sum`, `table`
Feedback	`allDifferent`, `sum`
GolombRuler	`allDifferent`
MaxAgreemeentForest2	`allDifferent`, `allEqual`, `element`, `sum`, `table`
MicroplateSwapping	`count`, `element`, `sum`, `table`
NonDominatingQueens	`count`, `lex`, `sum`, `table`
SatelliteObservations	`allDifferent`, `sum`, `table`
Sonet2	`count`, `lex`, `sum`
SumSquares	`sum`
TelecomScheduling	`count`, `element`, `maximum`, `precedence`, `sum`, `table`

Teams/Solvers (in alphabetic order)

- ACE (C. Lecoutre)
- Choco (C. Prud'homme)
- CoSoCo (G. Audemard)
- CPMpy (T. Guns, T. Sergeys & CPMpy team)
- KAT (T. Soh)
- MaxiCP-Mini (P. Schaus, G. Derval, A. Delecluse, L. Michel, P. Van Hentenryck)
- Nacre (G. Glorian)
- Picat (N.-F. Zhou)
- PyCSP3-ortools-extra (S. Afifi)
- Qayd (S. Afifi)
- Sat4j (extension of Sat4j by T. Falque and R. Wallon)
- Tempo (E. Hebrard & V. Antuori)
- Toulbar2 (S. de Givry & toulbar2 team)

Scanning the Results

Results ahead !

Full data and results online from XCSP^3 website (soon):

- Full set of XCSP^3 Instances
- PyCSP^3 Models (and Data)
- Proceedings
- Dedicated website (Tables, Plots, Traces)

CSP (200 instances)

	Solver	#Solved	#SAT	#UNSAT
	KAT(-auto)	133	116	17
	CPMpy_ortools	133	115	18
	Picat	126	106	20

COP (250 instances)

	Solver	Score	#OPT	#BB1	#BB2	#UNSAT
	CoSoCo	120.5	36	64	37	2
	Choco	111.0	42	50	38	0
	CPMpy_ortools	95.5	47	36	21	2

Fast COP (250 instances)

	Solver	Score	#OPT	#BB1	#BB2	#UNSAT
	Choco	108.5	30	61	35	0
	CoSoCo	99.5	27	58	29	0
	CPMpy_ortools	81.0	30	37	24	2

Parallel COP (250 instances)

	Solver	Score	#OPT	#BB1	#BB2	#UNSAT
	CoSoCo	132.5	36	77	35	2
	Choco	117.5	42	57	37	0
	CPMpy_ortools	99.5	47	41	19	2

Mini CSP (150 instances)

	Solver	#Solved	#SAT	#UNSAT
	Qayd	43	42	1
	Sat4J	39	38	1
	Tempo	35	34	1

Mini COP (150 instances)

	Solver	Score	#OPT	#BB1	#BB2	#UNSAT
	Qayd	75.5	18	52	11	0
	Tempo	48.0	10	32	12	0
	Toulbar2	41.5	20	21	1	0

Take-away Message

This year, it seems that:

- the selection of CSP instances was favourable to SAT-like solvers
- the selection of COP instances was favourable to CP solvers

Hard to find new instances every year

- if you have some, contact us!

https://www.cril.univ-artois.fr/XCSP26

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