IaCOP

— Interface for the Administration of Cops —

http://coco.nue.riec.tohoku.ac.jp/

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Background

- several confluence tools and certifier appeared

ACP **CeTA** **CSI** **Saigawa** **...**

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- 1st Confluence Competition (CoCo 2012) will run in next session

- common problem set is necessary for fair evaluation

☞ **Con**fluence **P**roblem**s** database (**Cops**)

Conceptual Difference

competition	competition software	problem database
CASC	?	TPTP (.tptp)
termCOMP	TermExec	TPDB (.xml)
CoCo 2012	Zankl's tool	**Cops** (.trs)
CoCo 2013	StarExec	**Cops** (.trs)

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competition	**competition software**	**problem database**
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termCOMP	TermExec	TPDB (.xml)
CoCo 2012	Zankl's tool	**Cops** (.trs)
CoCo 2013	StarExec	**Cops** (.trs)

- often competition site provides interface for database
- **IaCOP** is interface for **Cops** but not competition tool

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- **Cops** is designed for new entrants and working developers
- communication should be easy

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but there are differences ☞ next slides

Problem Syntax

Cops use old WST input format (.trs) TPDB switched to XML...

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```
(VAR x y)                                   immutable
(RULES                                      immutable
  F(x,x) -> A
  F(x,G(x)) -> B
  C -> G(C)
)
(COMMENT from p.813 of \cite{Hue80})   mutable
```

- one needs human readable and writable syntax for communication

File Names

- files in **Cops** are just numbered

  `1.trs`, `2.trs`, `...`, `125.trs`

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- short names (e.g. `D33/33`, `z086` in TPDB) are good for communication

Directory Structures

- **Cops** has no directory structures ☞ scripting is very easy

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- easy to use problem set:

```
for i in *.trs; do acp $i > a/$i.out; done
```

Tags

tags indicate properties and some more information

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(COMMENT %% Tags: non_confluent non_left_linear ..)
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grep -l "%%.*\<non_left_linear\>" *.trs
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- TCT team had to write 150 lines of shell script for extracting

$$\{\mathcal{R} \in \textbf{TPDB} \mid \mathcal{R} \text{ is TRS and Oops answers } \texttt{NO}\}$$

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- categories of problems:

  `literature`: examples from papers, articles, ...

  `crafted`: confluence problems that we manually made

  `generated`: by transformation methods, random generators, ...

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- interesting subsets: `coco2012`, `certified`, ...

Current Tags

- properties (`non_..`):

  `confluent` `locally_confluent` `terminating`

  `left_linear` `linear` `ground`

  `orthogonal` `weakly_orthogonal`

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  left_linear linear ground
  orthogonal weakly_orthogonal

- families:

  literature crafted generated debugging

- to be added (?):

  flat right_linear AC C
  coco2012 certified

Searching & Downloading

Definition

search expression:

$$E \ ::= \ \textit{tag} \ \mid \ E \ E \ \mid \ E \ \texttt{OR} \ E \ \mid \ \texttt{\{} \ E \ \texttt{\}} \ \mid \ \texttt{!} \ E$$

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Example

search: $\boxed{\texttt{non\_left\_linear non\_terminating}}$

$$= \ \{\mathcal{R} \in \textbf{Cops} \mid \mathcal{R} \text{ is non-left-linear and (known) non-terminating}\}$$

$$= \ \{\texttt{1.trs}, \texttt{2.trs}, \texttt{3.trs}, \texttt{15.trs}, \ldots\}$$

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REMARK

`non_termianting` $\neq$ `! terminating` due to undecidability

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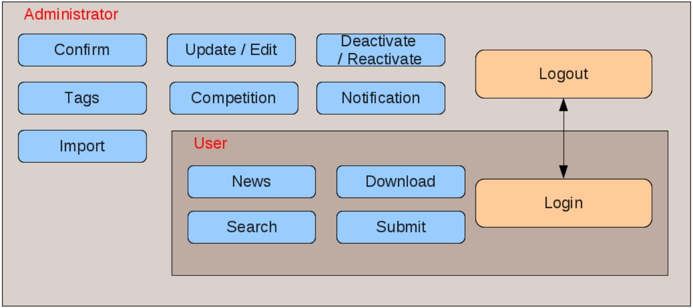
- property tags will be automatically added

Technical Design

Functionalities



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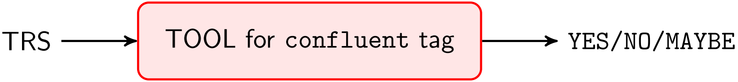

TRS → TOOL for `confluent` tag → `YES/NO/MAYBE`

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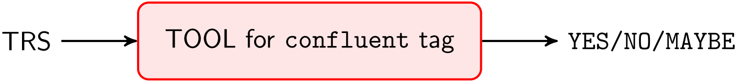

TRS → TOOL for `confluent` tag → `YES/NO/MAYBE`

$$\begin{cases} \texttt{confluent} & \text{if } \texttt{YES} \\ \texttt{non\_confluent} & \text{if } \texttt{NO} \\ \text{---} & \text{otherwise} \end{cases}$$

Conclusion and Further Work

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- call for administrators currently: Harald Zankl, and NH

starts soon

thank you for your attention