Ontology Pre-Processor Language (OPPL)

http://oppl.sourceforge.net/

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Introduction to OPPL

"Macro" language for manipulating content of OWL ontologies

Motivation: authors' needs when creating/maintaining bio-ontologies (Use cases)

Nearly API-level functionality with minimum programming/OWL knowledge

Manchester OWL Syntax + **SELECT**, **ADD**, **REMOVE**

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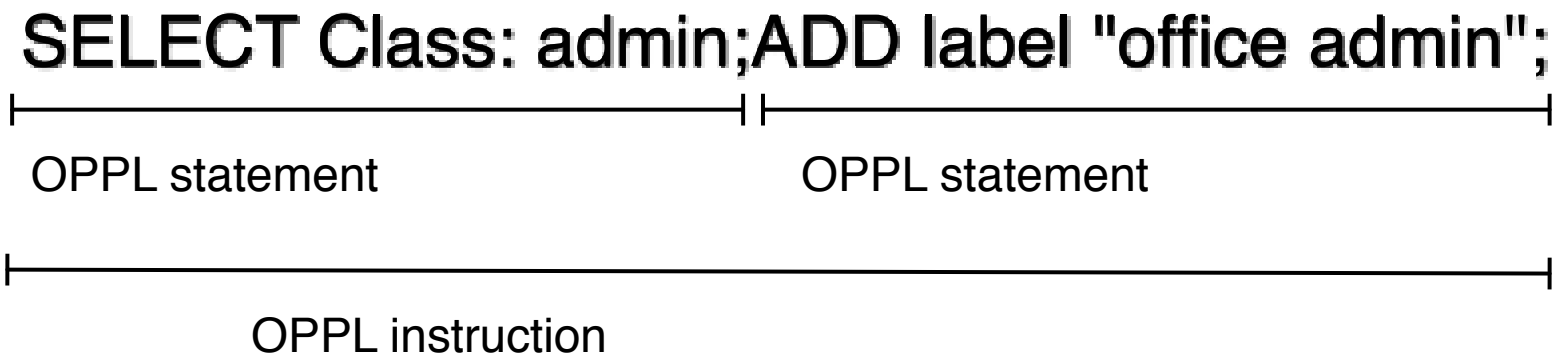
OPPL instruction



OPPL instruction examples

```
ADD Class:  undergraduate;
```

```
REMOVE Class:  undergraduate;
```

```
SELECT equivalentTo participates_in only
(intellectual_dinner and party);
ADD label "professor";
REMOVE subClassOf lives_on only (not campus);
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OPPL instruction examples

```
SELECT subClassOf MoleOfSalt;
ADD subClassOf hasDensity value 0.0;
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```
SELECT inverse participates_in;
ADD range student;
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disjointWith, differentFrom, sameAs, type,
descendantOf, ancestorOf, subPropertyOf, ...
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OPPL extra instructions

```
SELECT_PRIMITIVE descendantOf student;

SELECT_DEFINED descendantOf student;
```

```
SELECT descendantOf person;
ADD disjointWithSiblings;
```

```
SELECT assertedSubClassOf participates_in some
sport;
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OPPL software

`http://oppl.sourceforge.net/`

`OPPLInstructionManager`
Java library for processing OPPL instructions (LGPL)
OWL API, Pellet, FaCT++, DIG

OPPL reference implementation: OPPL instructions in flat file

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Use case 1: Bio-ontology axiomatic enrichment

Gene Ontology Next Generation

`http://www.gong.manchester.ac.uk/`

```
alanine:sodium symporter activity

—— Axiomatic enrichment based in rdfs:label ——

EquivalentTo:  symporter activity
and transports only (alanine or sodium)
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Use case 1: Bio-ontology axiomatic enrichment

rdfs:label: `alanine:sodium symporter activity`
rdfs:label: `glycine:potassium symporter activity`
rdfs:label: `valine:sodium symporter activity`
...

```
SELECT label "(.+):(.+) (symporter activity)";
ADD equivalentTo symporter_activity and
transports only (<1> or <2>);
```

Use case 2: Cell Cycle Ontology

`http://www.cellcycleontology.org/`

Gather knowledge about the cell cycle in 5 ontologies

Ontologies created anew each pipeline execution

Impossible to add new axioms by hand to 5 ontologies:
- Axioms overwritten each time the pipeline is executed
- Many axioms in different places
- Ontologies too big

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Add axioms automatically each time the pipeline is executed

Explicit development

Querying capabilities

Flexible development

Ontology Design Patterns
http://odps.sourceforge.net

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```
# Create object property inmediately_precedes

ADD ObjectProperty: inmediately_precedes;ADD functional;
ADD subPropertyOf precedes;ADD inverse inmediately_preceded_by;ADD domain
CCO_U0000002;ADD range CCO_U0000002;

# Meiotic cell cycle: G1 -> S -> G2 -> M

SELECT Class: CCO_P0000327;ADD subClassOf inmediately_preceded_by some
CCO_P0000325;ADD subClassOf inmediately_precedes some CCO_P0000326;

# Query 1: Proteins acting in the mitotic S phase (At)

ADD Class: query_1;ADD subClassOf query;REMOVE subClassOf Thing;
ADD comment "Proteins acting in the mitotic S phase";

SELECT subClassOf participates_in some (CCO_P0000014 or (part_of some
CCO_P0000014));ADD subClassOf query_1;
```

Future of OPPL

Syntax closer to OWL?

```
ADD Class:  professor
ADD professor subClassOf Thing
```

Loops, conditional control, subroutines, ...

Variables?

```
SELECT subClassOf part_of some ?x;
ADD equivalentTo part_of only ?x;
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SET professor label "new label";
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Acknowledgements

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