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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Manchester OWL Syntax + SELECT, ADD, REMOVE
SELECT Class: admin;ADD label "office admin";
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;

SELECT inverse participates_in;
ADD range student;

ADD Class: professor;
ADD label "staff";
ADD equivalentTo participates_in only (intellectual_dinner and party);
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disjointWith, differentFrom, sameAs, type, descendantOf, ancestorOf, subPropertyOf, ...

http://oppl.sourceforge.net/test.oppl
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OPPL extra instructions

```oppl
SELECT_PRIMITIVE descendantOf student;
SELECT_DEFINED descendantOf student;
SELECT descendantOf person;
ADD disjointWithSiblings;
SELECT assertedSubClassOf participates_in some sport;
```
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OPPLInstructionManager
Java library for processing OPPL instructions (LGPL)
OWL API, Pellet, FaCT++, DIG

OPPL reference implementation: OPPL instructions in flat file
java -jar oppl.jar
pellet ins.oppl ont.owl new_ont.owl
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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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```
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 immediately_precedes

ADD ObjectProperty: immediately_precedes;ADD functional;
ADD subPropertyOf precedes;ADD inverse immediately_preceded_by;ADD domain
CCO_U0000002;ADD range CCO_U0000002;

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

SELECT Class: CCO_P0000327;ADD subClassOf immediately_preceded_by some
CCO_P0000325;ADD subClassOf immediately_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;
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;

SET professor label "new label";
Future of OPPL

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Formal grammar

Protégé plugin (autocomplete, syntax validation, logs, ...)

Mikel Egaña, Robert Stevens, Erick Antezana
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