# Declarative Programming
# User Manual

Bruno Rocha Pereira (0529512)

Vrije Universiteit Brussel
Master in Applied Science and Engineering: Computer Science
August 10, 2016

## 1 Loading the program

In order to test all the functionalities, the user needs to consult the assign.pl file that acts like a main file. The user then needs to load the data file he wants to use. He can afterwards call any of the functions that are listed below.

```
?- consult('assign.pl').
true.

?- consult('small_instance.pl').
true.

?- is_valid(schedule([event(e2, r2, 2, 10), event(e1, r2, 1, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 13)])).
true.
```

## 2 Available functionalities

This program shows all the requested functionalities as well as all the extra ones. The complete list of available functions is:

- $is\_valid(+S)$
- $cost(+S, ?Cost)$
- $find\_optimal(-S)$
- $find\_heuristically(+S)$
- $pretty\_print(+S)$

**Extensions**

- $is\_valid(-S)$
- $violates\_sc(+S, -SC)$
- $is\_optimal(?S)$
- $find\_heuristically(-S, +T)$
- $pretty\_print(+SID, +S)$

Add heuristically

# 3 Example with the small instance

```
?- is_valid(schedule([event(e1, r2, 3, 10), event(e2, r2, 2, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 12)])).
true.

?- cost(schedule([event(e1, r2, 3, 10), event(e2, r2, 2, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 12)]),7.5).
true.

?- cost(schedule([event(e1, r2, 3, 10), event(e2, r2, 2, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 12)]),X).
X = 7.5.

?- find_optimal(S).
S = schedule([event(e1, r2, 2, 10), event(e2, r2, 5, 10),
 event(e3, r1, 4, 10), event(e4, r2, 4, 10), event(e5, r2, 3, 13)]).


?- is_optimal(schedule([event(e1, r2, 2, 10), event(e2, r2, 5, 10),
 event(e3, r1, 4, 10), event(e4, r2, 4, 10), event(e5, r2, 3, 13)])).
true .

?- find_heuristically(X).
X = [event(e1, r2, 3, 10), event(e2, r2, 5, 10), event(e3, r2, 4, 10),
 event(e4, r1, 4, 10), event(e5, r2, 2, 10)].


?- pretty_print(schedule([event(e1, r2, 3, 10), event(e2, r2, 2, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 12)])).
=======================
       Schedule
=======================

 Day 2
========

Large room :
10:00 - 12:00 : Science & Technology

 Day 3
========

Large room :
10:00 - 12:00 : Math
Large room :
12:00 - 14:00 : English

 Day 4
========

Small room :
10:00 - 12:00 : Religion

 Day 5
========

Small room :
10:00 - 12:00 : Philosophy
true .

?- is_valid(X).
X = schedule([event(e1, r2, 1, 10), event(e2, r2, 2, 10),
 event(e3, r1, 3, 10), event(e4, r1, 3, 12), event(e5, r2, 4, 10)]) ;
X = schedule([event(e1, r2, 1, 10), event(e2, r2, 2, 10),
 event(e3, r1, 3, 10), event(e4, r1, 3, 12), event(e5, r2, 5, 10)])
...

?- violates_sc(schedule([event(e1, r2, 3, 10), event(e2, r2, 2, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 12)]),X).
X = [sc_lunch_break(l4, e5, 1), sc_lunch_break(s4, e5, 1),
 sc_lunch_break(s3, e5, 1), sc_lunch_break(s2, e5, 1),
  sc_lunch_break(s1, e5, 1), sc_correction_time(l2, 1, 3),
```

```
  sc_study_time(s1, 2, 6), sc_study_time(s2, 2, 6),
   sc_study_time(s3, 2, 6), sc_study_time(s4, 2, 6),
   sc_b2b(s1, e5, e1, 5), sc_b2b(s2, e5, e1, 5),
   sc_b2b(s3, e5, e1, 5), sc_b2b(s4, e5, e1, 5),
    sc_same_day(s1, e1, e5, 2), sc_same_day(s2, e1, e5, 2),
     sc_same_day(s3, e1, e5, 2), sc_same_day(s4, e1, e5, 2)]

?- is_optimal(X).
X = schedule([event(e1, r2, 2, 10), event(e2, r2, 5, 10),
 event(e3, r1, 4, 10), event(e4, r2, 4, 10), event(e5, r2, 3, 13)]) ;
X = schedule([event(e1, r2, 2, 10), event(e2, r2, 5, 10),
 event(e3, r2, 4, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 13)]).




?- pretty_print(s2,schedule([event(e1, r2, 3, 10), event(e2, r2, 2, 10),
 event(e3, r1, 5, 10), event(e4, r1, 4, 10), event(e5, r2, 3, 12)])).
=======================
       Schedule
=======================

 Day 2
========

Large room :
10:00 - 12:00 : Science & Technology

 Day 3
========

Large room :
10:00 - 12:00 : Math
Large room :
12:00 - 14:00 : English

 Day 5
========

Small room :
10:00 - 12:00 : Philosophy
true
```