Declarative Programming
User Manual

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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

- $is\_valid(-S)$

- $violates\_sc(+S, -SC)$

- $is\_optimal(?S)$

- $find\_heuristically(-S, +T)$

- $pretty\_print(+SID, +S)$

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),cost(schedule(X),Cost).
X = [event(e1, r2, 3, 10), event(e2, r2, 4, 10), event(e3, r1, 5, 10),
 event(e4, r2, 5, 10), event(e5, r2, 1, 10)],
Cost = 2.75.


?- 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
```