Declarative Programming
User Manual

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1 Loading the program

In order to test all the predicates, the user can consult 'delivery.pl'. This file import all the modules. After that, the user has to load the data file he wants to use.

2 Available functionalities

The list of available predicates is :

- driving_duration(+VID,+FromID,+ToId,-Duration) (module auxiliary.pl)
- earning(+OID,+Day,-Value) (module auxiliary.pl)
- load(+Os,-Weight) (module auxiliary.pl)
- update_inventory(+Inventory,?OID,?NewInventory) (module auxiliary.pl)
- is_valid(+P) (module is_valid.pl)
- profit(+P,-Profit) (module profit.pl)
- find_heuristically(-P) (module find_heuristically.pl)
- pretty_print(+P) (module pretty_print.pl)

find_optimal(-P) is available but does not work. (module find_optimal.pl)

3 Example with the multi_small instance

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

?- consult('instances/multi_small.pl').
true.

?- driving_duration(v1,d1,d2,240.0).
true.

?- load([o10],187.9).
true.

?- earning(o1,1,385.0).
true.

?- update_inventory([p1/50,p3/10,p2/10],o3,X).
X = [p1/40, p3/10, p2/2].

?- update_inventory([p1/50,p3/10,p2/10],X,[p1/40,p2/2,p3/10]).
X = o3.

?- is_valid(plan([schedule(v2,1,[o5,d2]),schedule(v1,1,[o2,d1]),schedule(v2,3
,[o1,d1]),schedule(v1,3,[o3,d2])])).
true.

?- profit(plan([schedule(v2,1,[d2,d1]),schedule(v1,1,[]),schedule(v2,3,[]),
schedule(v1,3,[])]),-280.0).
true.

?- find_heuristically(X).
X = plan([schedule(v2, 3, [o7, d1]), schedule(v1, 3, [o4, d1]), schedule(v2,
1, [o6, o5, d2, o8|...]), schedule(v1, 1, [o1, o9, d2])]).

?- pretty_print(plan([schedule(v2,1,[o5,d2]),schedule(v1,1,[o2,d1]),schedule(
v2,3,[o1,d1]),schedule(v1,3,[o3,d2])])).
*** Schedule for Day 1 ***

< Vehicle v1 >

time    Loc.    load    action
10:00   (50,150)        0.00kg  pick up order(s) o2 from depot d2
10:05   (50,150)        200.00kg        Drive 75km to the location (75,100)
11:35   (75,100)        200.00kg        Deliver order o2.
11:40   (75,100)        0.00kg  Drive 125km to the location (150,50)
11:40   (150,50)        0.00kg  Park at depot d1.

< Vehicle v2 >

time    Loc.    load    action
10:00   (150,50)        0.00kg  pick up order(s) o5 from depot d1
10:05   (150,50)        21.40kg Drive 251km to the location (21,172)
13:13   (21,172)        21.40kg Deliver order o5.
13:18   (21,172)        0.00kg  Drive 51km to the location (50,150)
13:18   (50,150)        0.00kg  Park at depot d2.

*** Schedule for Day 3 ***

< Vehicle v1 >

time    Loc.    load    action
10:00   (150,50)        0.00kg  pick up order(s) o3 from depot d1
10:05   (150,50)        161.00kg        Drive 225km to the location (41,166)
14:35   (41,166)        161.00kg        Deliver order o3.
14:40   (41,166)        0.00kg  Drive 25km to the location (50,150)
14:40   (50,150)        0.00kg  Park at depot d2.
```

```
< Vehicle v2 >

time    Loc.    load     action
10:00   (50,150)         0.00kg  pick up order(s) o1 from depot d2
10:05   (50,150)         0.70kg  Drive 64km to the location (8,172)
10:53   (8,172) 0.70kg   Deliver order o1.
10:58   (8,172) 0.00kg   Drive 264km to the location (150,50)
10:58   (150,50)         0.00kg  Park at depot d1.


true.
```