

# PDDL

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## □ Domain definition. Operators.

```
(:action take-out
  :parameters (?x - physob)
  :precondition (not (= ?x B))
  :effect (not (in ?x B) ) )
```

```
(:action  Mov-B
  :parameters (?m ?l - location)
  :precondition (and (at B ?m) (not (= ?m ?l)))
  :effect (and (at B ?l) (not (at B ?m))
    (forall (?z)
      (when (and (in ?z B) (not (= ?z B)))
        (and (at ?z ?l) (not (at ?z ?m))))))) )
```

```
(:action put-in
  :parameters (?x - physob ?l - location)
  :precondition (not (= ?x B))
  :effect (when (and (at ?x ?l) (at B ?l))
    (in ?x B) ) )
```

# PDDL

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## □ Problem definition

```
(define (problem get-paid)  
  (:domain briefcase-world)  
  (:objects P D - physob  home office - location )  
  (:init (at B home) (at P home) (at D home) (in P B))  
  (:goal (and (at B office) (at D office) (at P home))))
```

# PDDL: example

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- Model in PDDL the blocks world domain
- There are 4 operators:
  - Stack
  - Unstack
  - Pick-up
  - Put-down

# PDDL: example

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- UNSTACK(x; y)
  - preconditions: encima(x; y), libre(x), brazo-libre
  - add: sujeto(x), libre(y)
  - del: encima(x; y), brazo-libre, libre(x)
- STACK(x; y)
  - preconditions: sujeto(x), libre(y)
  - add: encima(x; y), libre(x), brazo-libre
  - del: sujeto(x), libre(y)
- PUT-DOWN(x)
  - preconditions: sujeto(x)
  - add: en-mesa(x), libre(x), brazo-libre
  - del: sujeto(x)
- PICK-UP(x)
  - preconditions: en-mesa(x), libre(x), brazo-libre
  - add: sujeto(x)
  - del: en-mesa(x), brazo-libre, libre(x)

# Some Planners available

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- Planners (available in Blackboard)

- FF

- <http://members.deri.at/~joergh/ff.html>

- Blackbox:

- <http://www.cs.rochester.edu/u/kautz/satplan/blackbox/blackbox-download.html>

- LPG

- <http://zeus.ing.unibs.it/lpg/>

- **SGPlan**

- <http://wah.cse.cuhk.edu.hk/wah/programs/SGPlan/sgplan4.html>

# Execute FF (Windows)

```
C:\ Command Prompt

C:\Documents and Settings\Malola\My Documents\Año2008\Master satelites\Planifica
dores\FF>ff

usage of ff:

OPTIONS   DESCRIPTIONS

-p <str>   path for operator and fact file
-o <str>   operator file name
-f <str>   fact file name

-i <num>   run-time information level< preset: 1 >
           0 only times
           1 problem name, planning process infos
           101 parsed problem data
           102 cleaned up ADL problem
           103 collected string tables
           104 encoded domain
           105 predicates inertia info
           106 splitted initial state
           107 domain with Wff s normalized
           108 domain with NOT conds translated
           109 splitted domain
           110 cleaned up easy domain
           111 unaries encoded easy domain
           112 effects multiplied easy domain
           113 inertia removed easy domain
           114 easy action templates
           115 cleaned up hard domain representation
           116 mixed hard domain representation
           117 final hard domain representation
           118 reachability analysis results
           119 facts selected as relevant
           120 final domain and problem representations
           121 connectivity graph
           122 fixpoint result on each evaluated state
           123 1P extracted on each evaluated state
           124 H set collected for each evaluated state
           125 False sets of goals <GAM>
           126 detected ordering constraints leq_h <GAM>
           127 the Goal Agenda <GAM>

-d <num>   switch on debugging

C:\Documents and Settings\Malola\My Documents\Año2008\Master satelites\Planifica
dores\FF>ff -o blocks_d.pddl -f blocks_p1.pddl
```

# Execute SGPlan (Linux)

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```
viki@c3po: ~/Documents
viki@c3po:~/Documents$ ./sgplan522
#
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#
# The program is copyrighted by the University of Illinois, and should
# not be distributed without prior approval. Commercialization of this
# product requires prior licensing from the University of Illinois.
# Commercialization includes the integration of this code in part or
# whole into a product for resale.
#
#-----
# Author: C. W. Hsu, B. W. Wah, R. Y. Huang, Y. X. Chen
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SGPlan-5 settings:
-o <string>           specifies the file of the operators
-f <string>           specifies the file of (init/goal) facts
-out <string>         specifies the file name for computed plans, standard output if not specified
-cputime <number>    specifies the maximum CPU-time (in seconds)

viki@c3po:~/Documents$ ./sgplan522 -o blocksWorld.pddl -f blocks1.pddl
```