PDDL

- 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

- 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

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

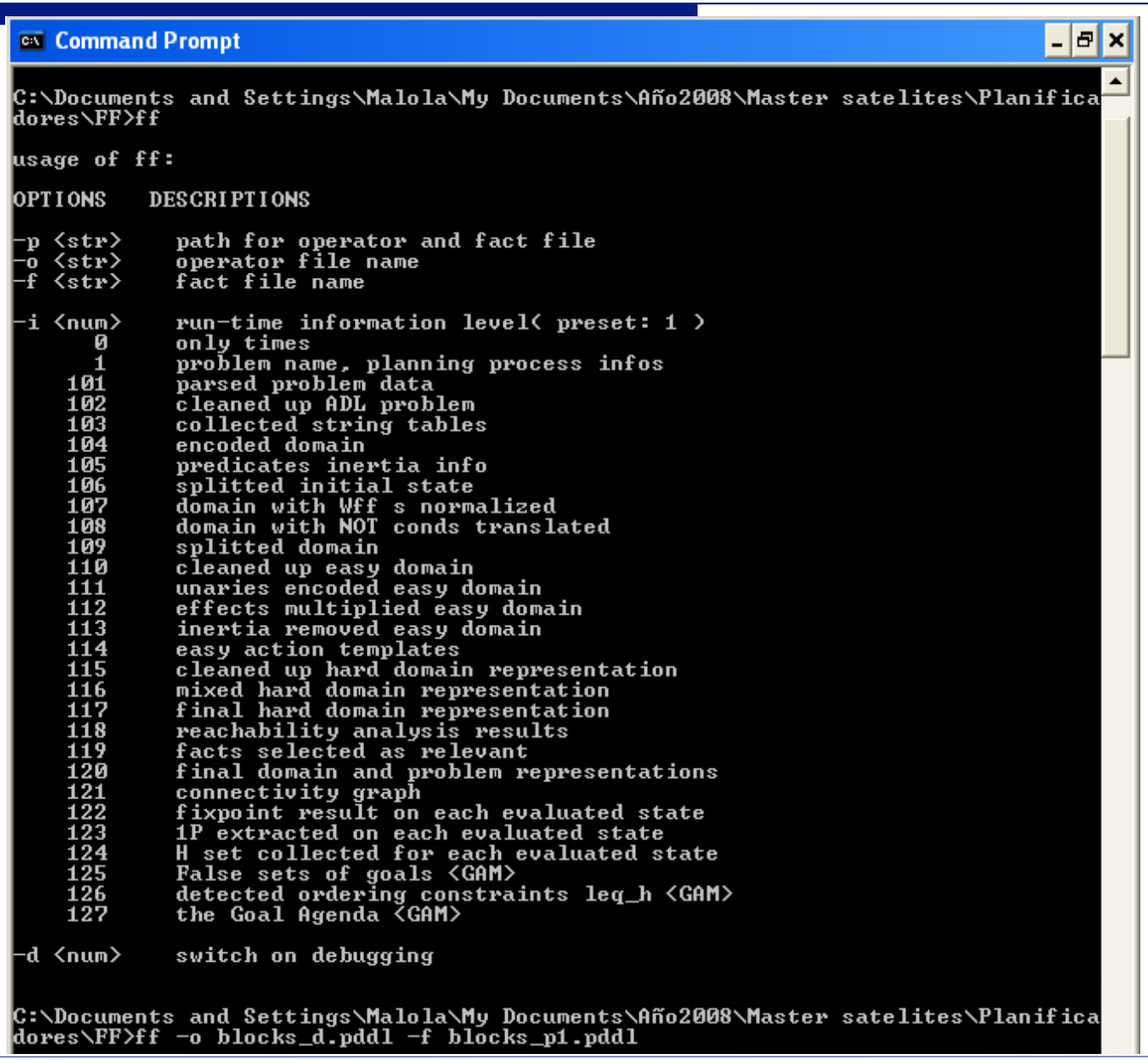
PDDL: example

- 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

- 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)



Execute SGPlan (Linux)

```
viki@c3po: ~/Documents
viki@c3po:~/Documents$ ./sgplan522
#
# Copyright (C) 2006, Board of Trustees of the University of Illinois.
#
# 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
#-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-


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
```