UNIVERSIDAD DE GRANADA

Técnicas de los sistemas inteligentes

Prácticas Grupo 2, Miércoles 17:30-19:30

Práctica 2: Planificación clásica

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1.- Introducción

Para esta práctica se nos pide resolver una serie de ejercicios de planificación clásica usando PDDL (Planning Domain Definition Language), el cual es un intento de estandarización de los lenguajes orientados a la inteligencia artificial. En las siguientes páginas explicaré la solución que le hemos dado a cada uno de los ejercicios.

2.- Esquema de representación

- Índice
- Tipo de terreno
- Personaje
- Objeto
- Las zonas están orientadas hacia cada una de las adyacentes, es decir, se puede pasar a cada zona y desde una zona x siempre que sean adyacentes.

Ejercicio 1

Ejercicio 1.a y 1.b:

- En este ejercicio se nos pedía resolver un problema que básicamente es el esqueleto de esta práctica. Las decisiones tomadas fueron cambiando a lo largo de la práctica en base a la adquisición de conocimientos sobre pddl y a cada vez sentirnos más cómodos con el.
- Para empezar, puesto que tenemos que representar las posibles orientaciones del jugador y además de las zonas con las zonas adyacentes, decidimos crear un predicado para indicar la orientación actual de un jugador y en un principio las zonas estaban conectadas mediante un predicado llamado connected pero este no recogía la orientación de la zona con las adyacentes y debido a esto eliminamos dicho predicado y nos quedamos solamente con el que señala la orientación de una zona A con una zona B adyacente pues este también indica la unión de ambas además de la orientación.
- En cuanto a la posición del jugador, decidimos que una manera correcta sería la de crear un predicado atPlayer que tenga como primer sujeto al jugador en cuestión y la zona donde está actualmente. Para los objetos y NPCs también optamos por lo mismo pero adaptando atPlayer a los otros tipos de entidades. Los NPCs tendrán un predicado que indica si se les ha entregado un objeto o no.

- Para poder entregar objetos necesitábamos saber antes si teníamos uno cogido y por tanto decidimos crear un predicado hasObjectPlayer que estará activo en el momento en el que cojamos un objeto y dejará de estar activo o bien cuando tiremos el objeto o cuando lo entreguemos y si esta activo no nos permitirá recoger más objetos.

Ejercicio 1.c y 1.d:

- En cuanto a las acciones que puede realizar nuestro jugador, tenemos las de girar a izquierda y girar a derecha, estas acciones necesitan como único parámetro la orientación actual del jugador para saber a qué nueva orientación pasará. El efecto de esta acción será colocar al jugador en una nueva orientación basado en si giramos a la izquierda o a la derecha y su orientación actual.
- Para movernos (solo podemos hacia la orientación actual lo cual sería hacía adelante por esto el nombre de MOVE-FORWARD) recibimos como parámetro la orientación actual, el jugador a mover, la zona en la que está actualmente y a la que pasará. En la precondición colocamos que el jugador este en la zona inicial pasada como parámetro, que esta esté orientada hacia la nueva zona según la orientación pasada como parámetro y que nuestro jugador tenga la orientación correcta para poder avanzar a esa zona desde la actual.
- Para coger objetos tenemos que no tener objetos en posesión, estar en la zona del objeto a coger y que por supuesto el objeto este en esa zona. Una vez cogido el objeto desaparece del suelo y lo llevamos nosotros como jugador, puesto que hay que entregar un objeto el que sea a cada NPC, debido a esto no guardamos el objeto que hemos cogido, simplemente llevamos un objeto x y se lo entregamos a un NPC y.
- Tirar un es muy parecido a recoger un objeto, cuando lo tiramos el objeto queda en el suelo y se puede volver a recoger si se desea, importante señalar que no podemos tirar un objeto encima de otro pues lo sobreescribiríamos.
- Por último, dar un objeto nos lo quita de las manos, el NPC al que se lo hemos dado se lo queda y no podrá recibir más pues así lo especificamos con el predicado de NPC y objeto y en la propia acción de dar objeto pues no se puede dar un objeto al NPC que tiene uno.

- En cuanto a los problemas, hemos creado tres los dos primeros sobre un mapa 5x5 y el tercero con una forma bastante diferente, los objetos que hay en cada uno de los problemas son 1 de cada tipo al igual que NPCs que hay 1 de cada tipo colocados aleatoriamente en los tres problemas, en cada problema del ejercicio 1 el objetivo es que todos los NPCs tengan objeto:

Ej1problema1:				
1 Jugador (Norte)	2 Oscars	3 Princesa	4 Algoritmos	5
6	7 Profesor	8	9	10
11 Rosas	12	13 Bruja	14	15 Principe
16	17	18	19 Oro	20
21 Leonardo	22	23 Manzanas	24	25

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej1dominio.pddl -f Ej1problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 20 into depth [1]
                                  18   [1][2][3]
                                  17   [1]
                                  16   [1][2][3]
                                  15   [1][2][3][4][5]
                                  13   [1][2][3][4][5]
                                  12   [1]
                                  11   [1][2][3][4][5][6]
                                  10   [1][2]
                                   9   [1][2]
                                   8   [1][2][3][4]

```
7       [1][2][3][4][5][6][7]
6       [1]
5       [1]
4       [1][2][3][4][5][6][7]
3       [1]
2       [1]
1       [1]
0
```

ff: found legal plan as follows

step 0: TURN-RIGHT NORTH PLAYER1
1: TURN-RIGHT EAST PLAYER1
2: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
3: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
4: TAKE-OBJECT ROSAS PLAYER1 Z11
5: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
6: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
7: TURN-LEFT SOUTH PLAYER1
8: TURN-LEFT EAST PLAYER1
9: GIVE-OBJECT Z21 WEST PLAYER1 LEONARDODICAPRIO
10: MOVE-FORWARD NORTH PLAYER1 Z21 Z16
11: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
12: TURN-RIGHT NORTH PLAYER1
13: MOVE-FORWARD EAST PLAYER1 Z11 Z12
14: TURN-LEFT EAST PLAYER1
15: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
16: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
17: TURN-RIGHT NORTH PLAYER1
18: TAKE-OBJECT OSCARS PLAYER1 Z2
19: MOVE-FORWARD EAST PLAYER1 Z2 Z3
20: GIVE-OBJECT Z3 WEST PLAYER1 PRINCESA
21: MOVE-FORWARD EAST PLAYER1 Z3 Z4
22: TURN-RIGHT EAST PLAYER1
23: TAKE-OBJECT ALGORITMOS PLAYER1 Z4
24: MOVE-FORWARD SOUTH PLAYER1 Z4 Z9
25: TURN-RIGHT SOUTH PLAYER1
26: MOVE-FORWARD WEST PLAYER1 Z9 Z8
27: MOVE-FORWARD WEST PLAYER1 Z8 Z7
28: TURN-LEFT WEST PLAYER1
29: GIVE-OBJECT Z7 WEST PLAYER1 PROFESOR
30: MOVE-FORWARD SOUTH PLAYER1 Z7 Z12
31: TURN-LEFT SOUTH PLAYER1
32: MOVE-FORWARD EAST PLAYER1 Z12 Z13
33: TURN-RIGHT EAST PLAYER1
34: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18

35: MOVE-FORWARD SOUTH PLAYER1 Z18 Z23
36: TURN-LEFT SOUTH PLAYER1
37: TURN-LEFT EAST PLAYER1
38: TAKE-OBJECT MANZANAS PLAYER1 Z23
39: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
40: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
41: TURN-RIGHT NORTH PLAYER1
42: GIVE-OBJECT Z13 WEST PLAYER1 BRUJA
43: TURN-RIGHT EAST PLAYER1
44: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
45: TURN-LEFT SOUTH PLAYER1
46: MOVE-FORWARD EAST PLAYER1 Z18 Z19
47: TAKE-OBJECT ORO PLAYER1 Z19
48: MOVE-FORWARD EAST PLAYER1 Z19 Z20
49: TURN-LEFT EAST PLAYER1
50: MOVE-FORWARD NORTH PLAYER1 Z20 Z15
51: GIVE-OBJECT Z15 WEST PLAYER1 PRINCIPE

time spent: 0.00 seconds instantiating 2288 easy, 0 hard action templates
0.00 seconds reachability analysis, yielding 1041 facts and 2288 actions
0.00 seconds creating final representation with 1041 relevant facts, 0 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
0.03 seconds searching, evaluating 346 states, to a max depth of 7
0.03 seconds total time

Ej1problema2:				
1 Profesor	2 Oscars	3 Leonardo	4 Rosas	5 Principe
6	7	8 Manzanas	9	10
11	12 Jugador (Norte)	13	14	15 Bruja
16 Oro	17	18	19	20
21	22 Princesa	23	24	25 Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej1dominio.pddl -f Ej1problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined

```
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.


no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.



checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then  best-first on 1*g(s) + 5*h(s) where
    metric is  plan length

Cueing down from goal distance:   22 into depth [1]
                                  21          [1][2]
                                  20          [1]
                                  19          [1][2][3]
                                  17          [1][2][3][4][5][6]
                                  16          [1][2][3][4][5][6][7][8]
                                  15          [1][2][3]
                                  14          [1][2][3][4][5]
                                  13          [1]
                                  12          [1][2][3]
                                  11          [1]
                                  10          [1][2]
                                   9          [1][2][3][4][5][6]
                                   8          [1][2][3][4][5][6][7][8][9]
                                   7          [1][2][3][4][5][6][7]
                                   6          [1]
                                   5          [1]
                                   4          [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16]
                                   3          [1]
                                   2          [1]
                                   1          [1]
                                   0

ff: found legal plan as follows

step    0: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
        1: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
        2: TURN-LEFT NORTH PLAYER1
        3: TAKE-OBJECT OSCARS PLAYER1 Z2
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4: MOVE-FORWARD WEST PLAYER1 Z2 Z1
5: TURN-LEFT WEST PLAYER1
6: GIVE-OBJECT Z1 WEST PLAYER1 PROFESOR
7: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
8: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
9: TURN-LEFT SOUTH PLAYER1
10: MOVE-FORWARD EAST PLAYER1 Z11 Z12
11: MOVE-FORWARD EAST PLAYER1 Z12 Z13
12: TURN-LEFT EAST PLAYER1
13: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
14: TURN-LEFT NORTH PLAYER1
15: TAKE-OBJECT MANZANAS PLAYER1 Z8
16: MOVE-FORWARD WEST PLAYER1 Z8 Z7
17: TURN-LEFT WEST PLAYER1
18: MOVE-FORWARD SOUTH PLAYER1 Z7 Z12
19: MOVE-FORWARD SOUTH PLAYER1 Z12 Z17
20: MOVE-FORWARD SOUTH PLAYER1 Z17 Z22
21: TURN-LEFT SOUTH PLAYER1
22: GIVE-OBJECT Z22 WEST PLAYER1 PRINCESA
23: MOVE-FORWARD EAST PLAYER1 Z22 Z23
24: TURN-LEFT EAST PLAYER1
25: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
26: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
27: TURN-RIGHT NORTH PLAYER1
28: MOVE-FORWARD EAST PLAYER1 Z13 Z14
29: MOVE-FORWARD EAST PLAYER1 Z14 Z15
30: TURN-LEFT EAST PLAYER1
31: MOVE-FORWARD NORTH PLAYER1 Z15 Z10
32: MOVE-FORWARD NORTH PLAYER1 Z10 Z5
33: TURN-LEFT NORTH PLAYER1
34: MOVE-FORWARD WEST PLAYER1 Z5 Z4
35: TURN-LEFT WEST PLAYER1
36: TURN-LEFT SOUTH PLAYER1
37: TAKE-OBJECT ROSAS PLAYER1 Z4
38: MOVE-FORWARD EAST PLAYER1 Z4 Z5
39: TURN-RIGHT EAST PLAYER1
40: TURN-RIGHT SOUTH PLAYER1
41: MOVE-FORWARD WEST PLAYER1 Z5 Z4
42: MOVE-FORWARD WEST PLAYER1 Z4 Z3
43: TURN-LEFT WEST PLAYER1
44: TURN-LEFT SOUTH PLAYER1
45: GIVE-OBJECT Z3 WEST PLAYER1 LEONARDODICAPRIO
46: MOVE-FORWARD EAST PLAYER1 Z3 Z4
47: MOVE-FORWARD EAST PLAYER1 Z4 Z5
48: TURN-RIGHT EAST PLAYER1
49: MOVE-FORWARD SOUTH PLAYER1 Z5 Z10

50: MOVE-FORWARD SOUTH PLAYER1 Z10 Z15
51: MOVE-FORWARD SOUTH PLAYER1 Z15 Z20
52: MOVE-FORWARD SOUTH PLAYER1 Z20 Z25
53: TURN-LEFT SOUTH PLAYER1
54: TURN-LEFT EAST PLAYER1
55: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
56: MOVE-FORWARD NORTH PLAYER1 Z25 Z20
57: MOVE-FORWARD NORTH PLAYER1 Z20 Z15
58: GIVE-OBJECT Z15 WEST PLAYER1 BRUJA
59: TURN-LEFT NORTH PLAYER1
60: MOVE-FORWARD WEST PLAYER1 Z15 Z14
61: MOVE-FORWARD WEST PLAYER1 Z14 Z13
62: MOVE-FORWARD WEST PLAYER1 Z13 Z12
63: MOVE-FORWARD WEST PLAYER1 Z12 Z11
64: TURN-LEFT WEST PLAYER1
65: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
66: TURN-LEFT SOUTH PLAYER1
67: TAKE-OBJECT ORO PLAYER1 Z16
68: MOVE-FORWARD EAST PLAYER1 Z16 Z17
69: MOVE-FORWARD EAST PLAYER1 Z17 Z18
70: MOVE-FORWARD EAST PLAYER1 Z18 Z19
71: MOVE-FORWARD EAST PLAYER1 Z19 Z20
72: TURN-LEFT EAST PLAYER1
73: MOVE-FORWARD NORTH PLAYER1 Z20 Z15
74: MOVE-FORWARD NORTH PLAYER1 Z15 Z10
75: MOVE-FORWARD NORTH PLAYER1 Z10 Z5
76: GIVE-OBJECT Z5 WEST PLAYER1 PRINCIPE

time spent: 0.00 seconds instantiating 2288 easy, 0 hard action templates
0.00 seconds reachability analysis, yielding 1041 facts and 2288 actions
0.01 seconds creating final representation with 1041 relevant facts, 0 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
0.10 seconds searching, evaluating 873 states, to a max depth of 16
0.11 seconds total time

Ej1problema3:					
		23	24		
19	20	21	22 Princesa		
18	1 Profesor	2 Oscars	3 Leonardo	4 Rosas	5 Principe
17		25 Algoritmos			6
16 Oro					7
15 Bruja					8 Manzanas
14	13	12 Jugador (Norte)	11	10	9

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej1dominio.pddl -f Ej1problema3.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 25 into depth [1][2][3]
                                  19   [1]
                                  17   [1]
                                  16   [1][2][3][4][5][6][7]
                                  15   [1][2]
                                  14   [1]
                                  13   [1][2][3]
                                  12   [1][2]

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11          [1][2][3][4]
10          [1][2][3]
 9          [1]
 8          [1]
 7          [1][2][3][4][5][6][7][8][9][10][11]
 6          [1][2]
 5          [1]
 4          [1]
 3          [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18]
 2          [1]
 1          [1]
 0
```

ff: found legal plan as follows

step 0: TURN-LEFT NORTH PLAYER1
1: MOVE-FORWARD WEST PLAYER1 Z12 Z13
2: MOVE-FORWARD WEST PLAYER1 Z13 Z14
3: TURN-RIGHT WEST PLAYER1
4: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
5: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
6: TURN-LEFT NORTH PLAYER1
7: TURN-LEFT WEST PLAYER1
8: TAKE-OBJECT ORO PLAYER1 Z16
9: MOVE-FORWARD SOUTH PLAYER1 Z16 Z15
10: TURN-LEFT SOUTH PLAYER1
11: TURN-LEFT EAST PLAYER1
12: GIVE-OBJECT Z15 WEST PLAYER1 BRUJA
13: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
14: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
15: MOVE-FORWARD NORTH PLAYER1 Z17 Z18
16: TURN-RIGHT NORTH PLAYER1
17: MOVE-FORWARD EAST PLAYER1 Z18 Z1
18: MOVE-FORWARD EAST PLAYER1 Z1 Z2
19: TAKE-OBJECT OSCARS PLAYER1 Z2
20: MOVE-FORWARD EAST PLAYER1 Z2 Z3
21: MOVE-FORWARD EAST PLAYER1 Z3 Z4
22: MOVE-FORWARD EAST PLAYER1 Z4 Z5
23: TURN-LEFT EAST PLAYER1
24: TURN-LEFT NORTH PLAYER1
25: GIVE-OBJECT Z5 WEST PLAYER1 PRINCIPE
26: MOVE-FORWARD WEST PLAYER1 Z5 Z4
27: TAKE-OBJECT ROSAS PLAYER1 Z4
28: MOVE-FORWARD WEST PLAYER1 Z4 Z3
29: MOVE-FORWARD WEST PLAYER1 Z3 Z2
30: MOVE-FORWARD WEST PLAYER1 Z2 Z1

31: TURN-RIGHT WEST PLAYER1
32: TURN-RIGHT NORTH PLAYER1
33: GIVE-OBJECT Z1 WEST PLAYER1 PROFESOR
34: MOVE-FORWARD EAST PLAYER1 Z1 Z2
35: TURN-RIGHT EAST PLAYER1
36: MOVE-FORWARD SOUTH PLAYER1 Z2 Z25
37: TURN-LEFT SOUTH PLAYER1
38: TURN-LEFT EAST PLAYER1
39: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
40: MOVE-FORWARD NORTH PLAYER1 Z25 Z2
41: TURN-RIGHT NORTH PLAYER1
42: MOVE-FORWARD EAST PLAYER1 Z2 Z3
43: TURN-LEFT EAST PLAYER1
44: GIVE-OBJECT Z3 WEST PLAYER1 LEONARDODICAPRIO
45: TURN-RIGHT NORTH PLAYER1
46: MOVE-FORWARD EAST PLAYER1 Z3 Z4
47: MOVE-FORWARD EAST PLAYER1 Z4 Z5
48: TURN-RIGHT EAST PLAYER1
49: MOVE-FORWARD SOUTH PLAYER1 Z5 Z6
50: MOVE-FORWARD SOUTH PLAYER1 Z6 Z7
51: MOVE-FORWARD SOUTH PLAYER1 Z7 Z8
52: TURN-LEFT SOUTH PLAYER1
53: TURN-LEFT EAST PLAYER1
54: TAKE-OBJECT MANZANAS PLAYER1 Z8
55: MOVE-FORWARD NORTH PLAYER1 Z8 Z7
56: MOVE-FORWARD NORTH PLAYER1 Z7 Z6
57: MOVE-FORWARD NORTH PLAYER1 Z6 Z5
58: TURN-LEFT NORTH PLAYER1
59: MOVE-FORWARD WEST PLAYER1 Z5 Z4
60: MOVE-FORWARD WEST PLAYER1 Z4 Z3
61: TURN-RIGHT WEST PLAYER1
62: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
63: GIVE-OBJECT Z22 WEST PLAYER1 PRINCESA

time spent: 0.00 seconds instantiating 2266 easy, 0 hard action templates
0.00 seconds reachability analysis, yielding 1041 facts and 2266 actions
0.00 seconds creating final representation with 1041 relevant facts, 0 relevant fluents
0.01 seconds computing LNF
0.01 seconds building connectivity graph
0.03 seconds searching, evaluating 328 states, to a max depth of 18
0.05 seconds total time

Ejercicio 2

Ejercicio 2.a y 2.b:

- Para este ejercicio solo teníamos que añadir distancias entre zonas, las cuales están colocadas de tal manera que cada zona con sus adyacentes tiene 1 de distancia, esto lo hacemos mediante la inclusión de dos nuevas funciones, una para que podemos indicar la distancia entre las zonas y la otra para saber la distancia que hemos recorrido en total. Cómo añadimos esto, tenemos que en la acción de MOVE-FORWARD tendremos que añadir que se sumen las distancias, esto lo hacemos con un increase la distancia total en función de la distancia entre las dos zonas (inicial y final).

- En cuanto a los problemas, hemos creado tres los dos primeros sobre un mapa 5x5 y el tercero con una forma bastante diferente, los objetos que hay en cada uno de los problemas son 1 de cada tipo al igual que NPCs que hay 1 de cada tipo colocados aleatoriamente en los tres problemas, en cada problema del ejercicio 1 el objetivo es que todos los NPCs tengan objeto y además que la distancia total recorrida sea menor a un umbral establecido por el usuario, en este caso por ejemplo menor que 100 (problema 1), en caso de no ser posible en el número de pasos que el usuario indique ff no conseguirá obtener ningún plan. Los problemas tienen como umbral 100, 80 y 60 (se pueden cambiar según se necesite):

Ej2problema1:				
1 Jugador (Norte)	2 Oscars	3 Princesa	4 Algoritmos	5
6	7 Profesor	8	9	10
11 Rosas	12	13 Bruja	14	15 Principe
16	17	18	19 Oro	20
21 Leonardo	22	23 Manzanas	24	25

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej2dominio.pddl -f Ej2problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined

... done.

no optimization required. skipping criterion.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
metric is plan length

Cueing down from goal distance: 20 into depth [1]

18	[1][2][3]
17	[1]
16	[1][2][3]
15	[1][2][3][4][5]
13	[1][2][3][4][5]
12	[1]
11	[1][2][3][4][5][6]
10	[1][2]
9	[1][2]
8	[1][2][3][4]
7	[1][2][3][4][5][6][7]
6	[1]
5	[1]
4	[1][2][3][4][5][6][7]
3	[1]
2	[1]
1	[1]
0	

ff: found legal plan as follows

step 0: TURN-RIGHT NORTH PLAYER1
1: TURN-RIGHT EAST PLAYER1
2: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
3: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
4: TAKE-OBJECT ROSAS PLAYER1 Z11
5: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16

6: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
7: TURN-LEFT SOUTH PLAYER1
8: TURN-LEFT EAST PLAYER1
9: GIVE-OBJECT Z21 WEST PLAYER1 LEONARDODICAPRIO
10: MOVE-FORWARD NORTH PLAYER1 Z21 Z16
11: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
12: TURN-RIGHT NORTH PLAYER1
13: MOVE-FORWARD EAST PLAYER1 Z11 Z12
14: TURN-LEFT EAST PLAYER1
15: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
16: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
17: TURN-RIGHT NORTH PLAYER1
18: TAKE-OBJECT OSCARS PLAYER1 Z2
19: MOVE-FORWARD EAST PLAYER1 Z2 Z3
20: GIVE-OBJECT Z3 WEST PLAYER1 PRINCESA
21: MOVE-FORWARD EAST PLAYER1 Z3 Z4
22: TURN-RIGHT EAST PLAYER1
23: TAKE-OBJECT ALGORITMOS PLAYER1 Z4
24: MOVE-FORWARD SOUTH PLAYER1 Z4 Z9
25: TURN-RIGHT SOUTH PLAYER1
26: MOVE-FORWARD WEST PLAYER1 Z9 Z8
27: MOVE-FORWARD WEST PLAYER1 Z8 Z7
28: TURN-LEFT WEST PLAYER1
29: GIVE-OBJECT Z7 WEST PLAYER1 PROFESOR
30: MOVE-FORWARD SOUTH PLAYER1 Z7 Z12
31: TURN-LEFT SOUTH PLAYER1
32: MOVE-FORWARD EAST PLAYER1 Z12 Z13
33: TURN-RIGHT EAST PLAYER1
34: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
35: MOVE-FORWARD SOUTH PLAYER1 Z18 Z23
36: TURN-LEFT SOUTH PLAYER1
37: TURN-LEFT EAST PLAYER1
38: TAKE-OBJECT MANZANAS PLAYER1 Z23
39: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
40: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
41: TURN-RIGHT NORTH PLAYER1
42: GIVE-OBJECT Z13 WEST PLAYER1 BRUJA
43: TURN-RIGHT EAST PLAYER1
44: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
45: TURN-LEFT SOUTH PLAYER1
46: MOVE-FORWARD EAST PLAYER1 Z18 Z19
47: TAKE-OBJECT ORO PLAYER1 Z19
48: MOVE-FORWARD EAST PLAYER1 Z19 Z20
49: TURN-LEFT EAST PLAYER1
50: MOVE-FORWARD NORTH PLAYER1 Z20 Z15
51: GIVE-OBJECT Z15 WEST PLAYER1 PRINCIPE

time spent: 0.00 seconds instantiating 2288 easy, 0 hard action templates
0.00 seconds reachability analysis, yielding 1041 facts and 2288 actions
0.00 seconds creating final representation with 1041 relevant facts, 2 relevant fluents
0.01 seconds computing LNF
0.01 seconds building connectivity graph
0.04 seconds searching, evaluating 383 states, to a max depth of 7
0.06 seconds total time

Ej2problema2:				
1 Profesor	2 Oscars	3 Leonardo	4 Rosas	5 Principe
6	7	8 Manzanas	9	10
11	12 Jugador (Norte)	13	14	15 Bruja
16 Oro	17	18	19	20
21	22 Princesa	23	24	25 Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej2dominio.pddl -f Ej2problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no optimization required. skipping criterion.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
   metric is plan length

Cueing down from goal distance: 22 into depth [1]

21	[1][2]
20	[1]
19	[1][2][3]
17	[1][2][3][4][5][6]
16	[1][2][3][4][5][6][7][8]
15	[1][2][3]
14	[1][2][3][4][5]
13	[1]
12	[1][2][3]
11	[1]
10	[1][2]
9	[1][2][3][4][5][6]
8	[1][2][3][4][5][6][7][8][9]
7	[1][2][3][4][5][6][7]
6	[1]
5	[1]
4	[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16]
3	[1]
2	[1]
1	[1]
0	

ff: found legal plan as follows

step   0: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
        1: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
        2: TURN-LEFT NORTH PLAYER1
        3: TAKE-OBJECT OSCARS PLAYER1 Z2
        4: MOVE-FORWARD WEST PLAYER1 Z2 Z1
        5: TURN-LEFT WEST PLAYER1
        6: GIVE-OBJECT Z1 WEST PLAYER1 PROFESOR
        7: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
        8: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
        9: TURN-LEFT SOUTH PLAYER1
       10: MOVE-FORWARD EAST PLAYER1 Z11 Z12
       11: MOVE-FORWARD EAST PLAYER1 Z12 Z13
       12: TURN-LEFT EAST PLAYER1
       13: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
       14: TURN-LEFT NORTH PLAYER1
       15: TAKE-OBJECT MANZANAS PLAYER1 Z8

16: MOVE-FORWARD WEST PLAYER1 Z8 Z7
17: TURN-LEFT WEST PLAYER1
18: MOVE-FORWARD SOUTH PLAYER1 Z7 Z12
19: MOVE-FORWARD SOUTH PLAYER1 Z12 Z17
20: MOVE-FORWARD SOUTH PLAYER1 Z17 Z22
21: TURN-LEFT SOUTH PLAYER1
22: GIVE-OBJECT Z22 WEST PLAYER1 PRINCESA
23: MOVE-FORWARD EAST PLAYER1 Z22 Z23
24: TURN-LEFT EAST PLAYER1
25: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
26: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
27: TURN-RIGHT NORTH PLAYER1
28: MOVE-FORWARD EAST PLAYER1 Z13 Z14
29: MOVE-FORWARD EAST PLAYER1 Z14 Z15
30: TURN-LEFT EAST PLAYER1
31: MOVE-FORWARD NORTH PLAYER1 Z15 Z10
32: MOVE-FORWARD NORTH PLAYER1 Z10 Z5
33: TURN-LEFT NORTH PLAYER1
34: MOVE-FORWARD WEST PLAYER1 Z5 Z4
35: TURN-LEFT WEST PLAYER1
36: TURN-LEFT SOUTH PLAYER1
37: TAKE-OBJECT ROSAS PLAYER1 Z4
38: MOVE-FORWARD EAST PLAYER1 Z4 Z5
39: TURN-RIGHT EAST PLAYER1
40: TURN-RIGHT SOUTH PLAYER1
41: MOVE-FORWARD WEST PLAYER1 Z5 Z4
42: MOVE-FORWARD WEST PLAYER1 Z4 Z3
43: TURN-LEFT WEST PLAYER1
44: TURN-LEFT SOUTH PLAYER1
45: GIVE-OBJECT Z3 WEST PLAYER1 LEONARDODICAPRIO
46: MOVE-FORWARD EAST PLAYER1 Z3 Z4
47: MOVE-FORWARD EAST PLAYER1 Z4 Z5
48: TURN-RIGHT EAST PLAYER1
49: MOVE-FORWARD SOUTH PLAYER1 Z5 Z10
50: MOVE-FORWARD SOUTH PLAYER1 Z10 Z15
51: MOVE-FORWARD SOUTH PLAYER1 Z15 Z20
52: MOVE-FORWARD SOUTH PLAYER1 Z20 Z25
53: TURN-LEFT SOUTH PLAYER1
54: TURN-LEFT EAST PLAYER1
55: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
56: MOVE-FORWARD NORTH PLAYER1 Z25 Z20
57: MOVE-FORWARD NORTH PLAYER1 Z20 Z15
58: GIVE-OBJECT Z15 WEST PLAYER1 BRUJA
59: TURN-LEFT NORTH PLAYER1
60: MOVE-FORWARD WEST PLAYER1 Z15 Z14
61: MOVE-FORWARD WEST PLAYER1 Z14 Z13

62: MOVE-FORWARD WEST PLAYER1 Z13 Z12
63: MOVE-FORWARD WEST PLAYER1 Z12 Z11
64: TURN-LEFT WEST PLAYER1
65: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
66: TURN-LEFT SOUTH PLAYER1
67: TAKE-OBJECT ORO PLAYER1 Z16
68: MOVE-FORWARD EAST PLAYER1 Z16 Z17
69: MOVE-FORWARD EAST PLAYER1 Z17 Z18
70: MOVE-FORWARD EAST PLAYER1 Z18 Z19
71: MOVE-FORWARD EAST PLAYER1 Z19 Z20
72: TURN-LEFT EAST PLAYER1
73: MOVE-FORWARD NORTH PLAYER1 Z20 Z15
74: MOVE-FORWARD NORTH PLAYER1 Z15 Z10
75: MOVE-FORWARD NORTH PLAYER1 Z10 Z5
76: GIVE-OBJECT Z5 WEST PLAYER1 PRINCIPE

time spent: 0.00 seconds instantiating 2288 easy, 0 hard action templates
0.00 seconds reachability analysis, yielding 1041 facts and 2288 actions
0.00 seconds creating final representation with 1041 relevant facts, 2 relevant fluents
0.01 seconds computing LNF
0.00 seconds building connectivity graph
0.15 seconds searching, evaluating 1594 states, to a max depth of 16
0.16 seconds total time

Ej2problema3:					
		23	24		
19	20	21	22 Princesa		
18	1 Profesor	2 Oscars	3 Leonardo	4 Rosas	5 Principe
17		25 Algoritmos			6
16 Oro					7
15 Bruja					8 Manzanas
14	13	12 Jugador (Norte)	11	10	9

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej2dominio.pddl -f Ej2problema3.pddl

```
ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.



no optimization required. skipping criterion.


no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.



checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then  best-first on 1*g(s) + 5*h(s) where
    metric is  plan length

Cueing down from goal distance:   25 into depth [1][2]
                                  24          [1]
                                  23          [1]
                                  22          [1]
                                  21          [1]
                                  20          [1]
                                  19          [1]
                                  18          [1]
                                  17          [1][2][3][4][5][6][7]
                                  16          [1][2][3]
                                  15          [1]
                                  14          [1][2][3][4]
                                  13          [1][2][3][4][5][6][7][8][9]
                                  12          [1][2][3][4][5][6][7]
                                  11          [1][2][3][4][5]
                                  10          [1][2][3][4][5][6]
                                   9          [1]
                                   8          [1][2]
                                   7          [1][2][3][4][5][6][7]
                                   6          [1][2][3]
                                   5          [1]
                                   4          [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16]
                                   3          [1]
```

2 [1]
1 [1]
0

ff: found legal plan as follows

step 0: TURN-RIGHT NORTH PLAYER1
1: MOVE-FORWARD EAST PLAYER1 Z12 Z11
2: MOVE-FORWARD EAST PLAYER1 Z11 Z10
3: MOVE-FORWARD EAST PLAYER1 Z10 Z9
4: TURN-LEFT EAST PLAYER1
5: MOVE-FORWARD NORTH PLAYER1 Z9 Z8
6: MOVE-FORWARD NORTH PLAYER1 Z8 Z7
7: MOVE-FORWARD NORTH PLAYER1 Z7 Z6
8: MOVE-FORWARD NORTH PLAYER1 Z6 Z5
9: TURN-LEFT NORTH PLAYER1
10: MOVE-FORWARD WEST PLAYER1 Z5 Z4
11: TURN-RIGHT WEST PLAYER1
12: TURN-RIGHT NORTH PLAYER1
13: TAKE-OBJECT ROSAS PLAYER1 Z4
14: MOVE-FORWARD EAST PLAYER1 Z4 Z5
15: TURN-LEFT EAST PLAYER1
16: TURN-LEFT NORTH PLAYER1
17: GIVE-OBJECT Z5 WEST PLAYER1 PRINCIPE
18: MOVE-FORWARD WEST PLAYER1 Z5 Z4
19: MOVE-FORWARD WEST PLAYER1 Z4 Z3
20: TURN-RIGHT WEST PLAYER1
21: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
22: TURN-LEFT NORTH PLAYER1
23: TURN-LEFT WEST PLAYER1
24: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
25: TURN-RIGHT SOUTH PLAYER1
26: MOVE-FORWARD WEST PLAYER1 Z3 Z2
27: TURN-RIGHT WEST PLAYER1
28: TAKE-OBJECT OSCARS PLAYER1 Z2
29: MOVE-FORWARD NORTH PLAYER1 Z2 Z21
30: TURN-RIGHT NORTH PLAYER1
31: MOVE-FORWARD EAST PLAYER1 Z21 Z22
32: TURN-RIGHT EAST PLAYER1
33: TURN-RIGHT SOUTH PLAYER1
34: GIVE-OBJECT Z22 WEST PLAYER1 PRINCESA
35: MOVE-FORWARD WEST PLAYER1 Z22 Z21
36: MOVE-FORWARD WEST PLAYER1 Z21 Z20
37: MOVE-FORWARD WEST PLAYER1 Z20 Z19
38: TURN-LEFT WEST PLAYER1
39: MOVE-FORWARD SOUTH PLAYER1 Z19 Z18

40: MOVE-FORWARD SOUTH PLAYER1 Z18 Z17
41: MOVE-FORWARD SOUTH PLAYER1 Z17 Z16
42: TAKE-OBJECT ORO PLAYER1 Z16
43: MOVE-FORWARD SOUTH PLAYER1 Z16 Z15
44: TURN-LEFT SOUTH PLAYER1
45: TURN-LEFT EAST PLAYER1
46: GIVE-OBJECT Z15 WEST PLAYER1 BRUJA
47: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
48: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
49: MOVE-FORWARD NORTH PLAYER1 Z17 Z18
50: TURN-LEFT NORTH PLAYER1
51: TURN-LEFT WEST PLAYER1
52: TURN-LEFT SOUTH PLAYER1
53: MOVE-FORWARD EAST PLAYER1 Z18 Z1
54: MOVE-FORWARD EAST PLAYER1 Z1 Z2
55: TURN-RIGHT EAST PLAYER1
56: MOVE-FORWARD SOUTH PLAYER1 Z2 Z25
57: TURN-RIGHT SOUTH PLAYER1
58: TURN-RIGHT WEST PLAYER1
59: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
60: MOVE-FORWARD NORTH PLAYER1 Z25 Z2
61: TURN-LEFT NORTH PLAYER1
62: MOVE-FORWARD WEST PLAYER1 Z2 Z1
63: TURN-LEFT WEST PLAYER1
64: TURN-LEFT SOUTH PLAYER1
65: GIVE-OBJECT Z1 WEST PLAYER1 PROFESOR
66: MOVE-FORWARD EAST PLAYER1 Z1 Z2
67: MOVE-FORWARD EAST PLAYER1 Z2 Z3
68: MOVE-FORWARD EAST PLAYER1 Z3 Z4
69: MOVE-FORWARD EAST PLAYER1 Z4 Z5
70: TURN-RIGHT EAST PLAYER1
71: MOVE-FORWARD SOUTH PLAYER1 Z5 Z6
72: MOVE-FORWARD SOUTH PLAYER1 Z6 Z7
73: MOVE-FORWARD SOUTH PLAYER1 Z7 Z8
74: TURN-LEFT SOUTH PLAYER1
75: TURN-LEFT EAST PLAYER1
76: TAKE-OBJECT MANZANAS PLAYER1 Z8
77: MOVE-FORWARD NORTH PLAYER1 Z8 Z7
78: MOVE-FORWARD NORTH PLAYER1 Z7 Z6
79: MOVE-FORWARD NORTH PLAYER1 Z6 Z5
80: TURN-LEFT NORTH PLAYER1
81: MOVE-FORWARD WEST PLAYER1 Z5 Z4
82: MOVE-FORWARD WEST PLAYER1 Z4 Z3
83: GIVE-OBJECT Z3 WEST PLAYER1 LEONARDODICAPRIO

time spent: 0.00 seconds instantiating 2266 easy, 0 hard action templates
0.00 seconds reachability analysis, yielding 1041 facts and 2265 actions
0.00 seconds creating final representation with 1041 relevant facts, 2 relevant fluents
0.01 seconds computing LNF
0.01 seconds building connectivity graph
0.06 seconds searching, evaluating 683 states, to a max depth of 16
0.08 seconds total time

Ejercicio 3

Ejercicio 3.a, 3.b y 3.c:

- Ahora se nos pide que coloquemos tipos de zonas a cada una de las zonas, y que nuestro jugador solo pueda moverse en base a las restricciones impuestas en el ejercicio. Además ahora tendremos una mochila donde podremos guardar un objeto en ella. Como para poder movernos por bosque y por agua necesitamos de zapatillas y bikini respectivamente, necesitaremos modificar nuestro predicado de hasObjectPlayer por uno que si refleje que objeto en concreto llevamos en las manos, además tendremos un objeto en la mochila el cual también tendremos que saber cuál es pues también se puede usar para pasar por agua y bosque si tenemos el adecuado.
- Se ha añadido un predicado para que podamos indicar el tipo de zona, se señalará la zona y el tipo, también podríamos haber modificado nuestro predicado orientedZone pero decidimos hacerlos por separado.
- Se han añadido predicados para saber el estado de la mochila, si podemos meter cosas y que cosa llevamos en ella.
- Hemos tenido que añadir varias acciones más las cuales son moverse por agua, moverse por bosque y sacar y meter en la mochila.
- Las acciones de movimiento son básicamente como la de de movimiento original (que sigue estando para los otros tipos de zona) solo que añadiendo la prohibición de que solo se puede pasar por la zona si se cumplen las condiciones que señalamos. También hay que añadir que la de movimiento original se ha modificado para que así no se puede usar cuando estamos frente agua, bosque o precipicio (común a las tres -> precipicio).
- Las acciones de colocar en la mochila y sacar de la mochila han sido creadas a partir de este ejercicio. Colocar un objeto en la mochila nos lo quita de las manos y sacarlo nos lo pone en las manos por lo que si tenemos un objeto en la mano no podremos sacar uno de esta a no ser que tiremos el actual de las manos. Los objetos siguen desapareciendo cuando son recogidos y aparecen de nuevo cuando son tirados, en la zona en la que son tirados.

- En cuanto a los problemas, hemos creado tres los dos primeros sobre un mapa 5x5 y el tercero con una forma bastante diferente, los objetos que hay en cada uno de los problemas son 1 de cada tipo al igual que NPCs que hay 1 de cada tipo colocados aleatoriamente en los tres problemas, en cada problema del ejercicio 1 el objetivo es que todos los NPCs tengan objeto y además que la distancia total recorrida sea menor a un umbral establecido por el usuario, en este caso por ejemplo menor que 32 (problema 1), en caso de no ser posible en el número de pasos que el usuario indique ff no conseguirá obtener ningún plan. Los problemas tienen como umbral 32, 50 y 80 (se pueden cambiar según se necesite):

Ej3problema1:				
1 Agua Algoritmos	2 Arena Profesor	3 Arena Jugador (Norte) Manzanas	4 Bosque	5 Roca
6 Bosque	7 Bosque Oro	8 Arena Zapatillas	9 Arena Princesa	10 Precipicio
11 Roca Rosas	12 Arena	13 Arena Bruja	14 Bosque	15 Precipicio
16 Agua	17 Agua	18 Arena Principe	19 Arena	20 Arena
21 Roca Leonardo	22 Agua	23 Bosque Bikini	24 Bosque Oscars	25 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej3dominio.pddl -f Ej3problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 28 into depth [1][2][3][4][5][6]
                                  27   [1][2]
                                  26   [1][2][3][4][5]
                                  25   [1]
                                  24   [1][2][3][4][5][6][7][8]
                                  23   [1][2]
                                  22   [1][2][3][4][5][6]
                                  21   [1]
                                  19
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20]
                                  18   [1][2][3][4]
                                  17   [1][2][3][4][5][6][7][8][9][10][11]
                                  16   [1][2][3][4][5][6][7][8][9][10][11] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12]

Enforced Hill-climbing failed !
switching to Best-first Search now.

advancing to distance: 28
                                  27
                                  26
                                  25
                                  24
                                  22
                                  21
                                  20
                                  19
                                  18
                                  17
                                  16
                                  15
                                  14
                                  13
                                  12
                                  11
                                  10
                                   9
                                   8
                                   7
                                   6
                                   5

4
3
2
1
0

ff: found legal plan as follows

step 0: TAKE-OBJECT MANZANAS PLAYER1 Z3
1: TURN-RIGHT NORTH PLAYER1
2: TURN-RIGHT EAST PLAYER1
3: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
4: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
5: GIVE-OBJECT Z13 MANZANAS PLAYER1 BRUJA
6: TURN-RIGHT SOUTH PLAYER1
7: TURN-RIGHT WEST PLAYER1
8: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
9: TAKE-OBJECT ZAPATILLA PLAYER1 Z8
10: PUT-OBJECT-BAG ZAPATILLA PLAYER1
11: TURN-LEFT NORTH PLAYER1
12: MOVE-FORWARD-FOREST WEST PLAYER1 Z8 Z7
13: TURN-RIGHT WEST PLAYER1
14: TURN-RIGHT NORTH PLAYER1
15: TAKE-OBJECT ORO PLAYER1 Z7
16: MOVE-FORWARD EAST PLAYER1 Z7 Z8
17: TURN-RIGHT EAST PLAYER1
18: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
19: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
20: GIVE-OBJECT Z18 ORO PLAYER1 PRINCIPE
21: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z18 Z23
22: TURN-LEFT SOUTH PLAYER1
23: MOVE-FORWARD-FOREST EAST PLAYER1 Z23 Z24
24: TURN-LEFT EAST PLAYER1
25: TAKE-OBJECT OSCARS PLAYER1 Z24
26: MOVE-FORWARD NORTH PLAYER1 Z24 Z19
27: TURN-LEFT NORTH PLAYER1
28: MOVE-FORWARD WEST PLAYER1 Z19 Z18
29: DROP-OBJECT OSCARS PLAYER1 Z18
30: TURN-LEFT WEST PLAYER1
31: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z18 Z23
32: TAKE-OBJECT BIKINI PLAYER1 Z23
33: TURN-RIGHT SOUTH PLAYER1
34: TURN-RIGHT WEST PLAYER1
35: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
36: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
37: DROP-OBJECT BIKINI PLAYER1 Z13

38: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
39: TURN-RIGHT NORTH PLAYER1
40: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
41: DROP-OBJECT ZAPATILLA PLAYER1 Z8
42: TURN-RIGHT EAST PLAYER1
43: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
44: TAKE-OBJECT BIKINI PLAYER1 Z13
45: PUT-OBJECT-BAG BIKINI PLAYER1
46: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
47: TAKE-OBJECT OSCARS PLAYER1 Z18
48: TURN-RIGHT SOUTH PLAYER1
49: MOVE-FORWARD-WATER WEST PLAYER1 Z18 Z17
50: MOVE-FORWARD-WATER WEST PLAYER1 Z17 Z16
51: TURN-LEFT WEST PLAYER1
52: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
53: GIVE-OBJECT Z21 OSCARS PLAYER1 LEONARDODICAPRIO
54: TURN-RIGHT SOUTH PLAYER1
55: TURN-RIGHT WEST PLAYER1
56: MOVE-FORWARD-WATER NORTH PLAYER1 Z21 Z16
57: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
58: TURN-LEFT NORTH PLAYER1
59: TURN-LEFT WEST PLAYER1
60: TAKE-OBJECT ROSAS PLAYER1 Z11
61: TURN-LEFT SOUTH PLAYER1
62: MOVE-FORWARD EAST PLAYER1 Z11 Z12
63: MOVE-FORWARD EAST PLAYER1 Z12 Z13
64: TURN-LEFT EAST PLAYER1
65: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
66: TURN-RIGHT NORTH PLAYER1
67: MOVE-FORWARD EAST PLAYER1 Z8 Z9
68: GIVE-OBJECT Z9 ROSAS PLAYER1 PRINCESA
69: TURN-LEFT EAST PLAYER1
70: TURN-LEFT NORTH PLAYER1
71: MOVE-FORWARD WEST PLAYER1 Z9 Z8
72: TURN-RIGHT WEST PLAYER1
73: MOVE-FORWARD NORTH PLAYER1 Z8 Z3
74: TURN-LEFT NORTH PLAYER1
75: MOVE-FORWARD WEST PLAYER1 Z3 Z2
76: MOVE-FORWARD-WATER WEST PLAYER1 Z2 Z1
77: TAKE-OBJECT ALGORITMOS PLAYER1 Z1
78: TURN-RIGHT WEST PLAYER1
79: TURN-RIGHT NORTH PLAYER1
80: MOVE-FORWARD EAST PLAYER1 Z1 Z2
81: GIVE-OBJECT Z2 ALGORITMOS PLAYER1 PROFESOR

time spent: 0.00 seconds instantiating 2727 easy, 68 hard action templates
0.00 seconds reachability analysis, yielding 1698 facts and 482 actions
0.01 seconds creating final representation with 444 relevant facts, 2 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
3.15 seconds searching, evaluating 40004 states, to a max depth of 20
3.16 seconds total time

Ej3problema2:

1 Arena Profesor	2 Arena Oscars	3 Arena Leonardo	4 Arena Rosas	5 Arena Principe
6 Arena Zapatilla	7 Arena	8 Arena Manzanas	9 Arena	10 Arena
11 Arena	12 Arena Jugador (Norte)	13 Arena	14 Arena	15 Arena Bruja
16 Arena Oro	17 Precipicio	18 Precipicio	19 Precipicio	20 Precipicio
21 Arena Bikini	22 Arena Princesa	23 Arena	24 Agua	25 Arena Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej3dominio.pddl -f Ej3problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 34 into depth [1]
31 [1]
30 [1][2][3]
29 [1][2][3][4][5][6]
28 [1][2][3][4]
27 [1][2][3][4][5][6][7][8]
26 [1][2][3][4][5][6][7][8][9][10][11]
25 [1][2][3]
24 [1][2][3]
23 [1][2][3][4][5][6]
22 [1]
21 [1][2][3][4]
20 [1][2][3][4][5][6][7]
19 [1][2][3][4]
18 [1][2][3][4][5][6][7][8][9][10]
17 [1][2][3]
16 [1][2][3][4][5][6]
15 [1][2][3][4][5][6][7][8][9][10]
14 [1][2][3][4][5][6][7][8][9][10][11][12][13] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20]

Enforced Hill-climbing failed !
switching to Best-first Search now.

advancing to distance: 34
31
30
29
28
27
26
25
24
23
21
20
19
18
17
16
15

14
13
11
10
9
8
7
6
5
4
3
2
1
0

ff: found legal plan as follows

step 0: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
1: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
2: TAKE-OBJECT OSCARS PLAYER1 Z2
3: TURN-RIGHT NORTH PLAYER1
4: MOVE-FORWARD EAST PLAYER1 Z2 Z3
5: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
6: TURN-RIGHT EAST PLAYER1
7: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
8: TAKE-OBJECT MANZANAS PLAYER1 Z8
9: TURN-LEFT SOUTH PLAYER1
10: MOVE-FORWARD EAST PLAYER1 Z8 Z9
11: MOVE-FORWARD EAST PLAYER1 Z9 Z10
12: TURN-RIGHT EAST PLAYER1
13: MOVE-FORWARD SOUTH PLAYER1 Z10 Z15
14: GIVE-OBJECT Z15 MANZANAS PLAYER1 BRUJA
15: TURN-RIGHT SOUTH PLAYER1
16: MOVE-FORWARD WEST PLAYER1 Z15 Z14
17: TURN-RIGHT WEST PLAYER1
18: MOVE-FORWARD NORTH PLAYER1 Z14 Z9
19: MOVE-FORWARD NORTH PLAYER1 Z9 Z4
20: TURN-LEFT NORTH PLAYER1
21: TAKE-OBJECT ROSAS PLAYER1 Z4
22: MOVE-FORWARD WEST PLAYER1 Z4 Z3
23: MOVE-FORWARD WEST PLAYER1 Z3 Z2
24: MOVE-FORWARD WEST PLAYER1 Z2 Z1
25: TURN-LEFT WEST PLAYER1
26: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
27: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
28: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16

29: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
30: TURN-LEFT SOUTH PLAYER1
31: PUT-OBJECT-BAG ROSAS PLAYER1
32: TAKE-OBJECT BIKINI PLAYER1 Z21
33: MOVE-FORWARD EAST PLAYER1 Z21 Z22
34: DROP-OBJECT BIKINI PLAYER1 Z22
35: EXTRACT-OBJECT-BAG ROSAS PLAYER1
36: GIVE-OBJECT Z22 ROSAS PLAYER1 PRINCESA
37: TAKE-OBJECT BIKINI PLAYER1 Z22
38: PUT-OBJECT-BAG BIKINI PLAYER1
39: MOVE-FORWARD EAST PLAYER1 Z22 Z23
40: MOVE-FORWARD-WATER EAST PLAYER1 Z23 Z24
41: MOVE-FORWARD EAST PLAYER1 Z24 Z25
42: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
43: TURN-RIGHT EAST PLAYER1
44: TURN-RIGHT SOUTH PLAYER1
45: MOVE-FORWARD-WATER WEST PLAYER1 Z25 Z24
46: MOVE-FORWARD WEST PLAYER1 Z24 Z23
47: MOVE-FORWARD WEST PLAYER1 Z23 Z22
48: MOVE-FORWARD WEST PLAYER1 Z22 Z21
49: TURN-RIGHT WEST PLAYER1
50: MOVE-FORWARD NORTH PLAYER1 Z21 Z16
51: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
52: MOVE-FORWARD NORTH PLAYER1 Z11 Z6
53: MOVE-FORWARD NORTH PLAYER1 Z6 Z1
54: TURN-RIGHT NORTH PLAYER1
55: GIVE-OBJECT Z1 ALGORITMOS PLAYER1 PROFESOR
56: TURN-RIGHT EAST PLAYER1
57: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
58: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
59: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
60: TAKE-OBJECT ORO PLAYER1 Z16
61: TURN-LEFT SOUTH PLAYER1
62: TURN-LEFT EAST PLAYER1
63: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
64: MOVE-FORWARD NORTH PLAYER1 Z11 Z6
65: MOVE-FORWARD NORTH PLAYER1 Z6 Z1
66: TURN-RIGHT NORTH PLAYER1
67: MOVE-FORWARD EAST PLAYER1 Z1 Z2
68: MOVE-FORWARD EAST PLAYER1 Z2 Z3
69: MOVE-FORWARD EAST PLAYER1 Z3 Z4
70: MOVE-FORWARD EAST PLAYER1 Z4 Z5
71: GIVE-OBJECT Z5 ORO PLAYER1 PRINCIPE

time spent: 0.00 seconds instantiating 2749 easy, 6 hard action templates

0.01 seconds reachability analysis, yielding 1682 facts and 409 actions
0.00 seconds creating final representation with 414 relevant facts, 2 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
1.80 seconds searching, evaluating 25881 states, to a max depth of 20
1.81 seconds total time

Ej3problema3:					
		23 Roca	24 Arena		
19 Arena	20 Roca	21 Precipicio	22 Arena Princesa		
18 Bosque	1 Arena Profesor	2 Roca Oscars	3 Arena Leonardo Bikini	4 Agua Rosas	5 Arena Principe
17 Arena		25 Agua Algoritmos			6 Roca
16 Arena Oro					7 Precipicio
15 Roca Bruja					8 Roca Manzanas
14 Arena Zapatillas	13 Arena	12 Roca Jugador (Norte)	11 Roca	10 Arena	9 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej3dominio.pddl -f Ej3problema3.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 32 into depth [1][2][3][4]
                                  31   [1][2]
                                  30   [1][2][3][4][5][6][7][8][9][10][11][12]
                                  29   [1][2][3][4][5][6]
                                  28
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][28][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51][52][53][54][55][56][57][58][59][60][61][62][63][64][65][66][67][68][69][70][71][72][73][74][75][76][77][78][79][80][81][82][83][84][85][86][87][88][89][90][91][92][93][94][95][96][97][98][99][100][101][102][103][104][105][106][107][108][109][110][111][112][113][114][115][116][117][118][119][120][121][122][123] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16]
                                  27   [1][2][3] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14]
                                  26   [1][2][3]
                                  25   [1]
                                  24   [1][2][3] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17]
                                  23   [1][2][3][4][5][6]
                                  22   [1]
                                  21   [1][2][3] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21]
                                  20   [1][2][3]
                                  19   [1]
                                  18   [1]
                                  16   [1]
                                  14   [1][2][3][4][5][6]
                                  13   [1][2][3]
                                  12   [1]
                                  11   [1][2][3][4]
                                  10   [1][2] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20]
                                   9   [1]
                                   8   [1]
                                   7   [1]
                                   6   [1][2][3][4][5][6][7][8][9]

```
                    5
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32] --- pruning stopped --- [1][2][3][4][5][6][7][8][9][10][11][12][13]
                    4       [1]
                    3       [1]
                    2       [1]
                    1       [1]
                    0

ff: found legal plan as follows

step    0: TURN-LEFT NORTH PLAYER1
        1: MOVE-FORWARD WEST PLAYER1 Z12 Z13
        2: MOVE-FORWARD WEST PLAYER1 Z13 Z14
        3: TURN-LEFT WEST PLAYER1
        4: TAKE-OBJECT ZAPATILLA PLAYER1 Z14
        5: PUT-OBJECT-BAG ZAPATILLA PLAYER1
        6: TURN-LEFT SOUTH PLAYER1
        7: TURN-LEFT EAST PLAYER1
        8: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
        9: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
       10: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
       11: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
       12: TURN-RIGHT NORTH PLAYER1
       13: MOVE-FORWARD EAST PLAYER1 Z18 Z1
       14: MOVE-FORWARD EAST PLAYER1 Z1 Z2
       15: TAKE-OBJECT OSCARS PLAYER1 Z2
       16: MOVE-FORWARD EAST PLAYER1 Z2 Z3
       17: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
       18: TURN-RIGHT EAST PLAYER1
       19: TURN-RIGHT SOUTH PLAYER1
       20: MOVE-FORWARD WEST PLAYER1 Z3 Z2
       21: MOVE-FORWARD WEST PLAYER1 Z2 Z1
       22: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
       23: TURN-LEFT WEST PLAYER1
       24: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
       25: TURN-LEFT SOUTH PLAYER1
       26: MOVE-FORWARD EAST PLAYER1 Z18 Z1
       27: DROP-OBJECT ZAPATILLA PLAYER1 Z1
       28: MOVE-FORWARD EAST PLAYER1 Z1 Z2
       29: MOVE-FORWARD EAST PLAYER1 Z2 Z3
       30: TURN-LEFT EAST PLAYER1
       31: TAKE-OBJECT BIKINI PLAYER1 Z3
       32: TURN-LEFT NORTH PLAYER1
       33: PUT-OBJECT-BAG BIKINI PLAYER1
       34: MOVE-FORWARD WEST PLAYER1 Z3 Z2
```

35: MOVE-FORWARD WEST PLAYER1 Z2 Z1
36: TAKE-OBJECT ZAPATILLA PLAYER1 Z1
37: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
38: TURN-LEFT WEST PLAYER1
39: DROP-OBJECT ZAPATILLA PLAYER1 Z18
40: TURN-LEFT SOUTH PLAYER1
41: TAKE-OBJECT ZAPATILLA PLAYER1 Z18
42: MOVE-FORWARD EAST PLAYER1 Z18 Z1
43: DROP-OBJECT ZAPATILLA PLAYER1 Z1
44: MOVE-FORWARD EAST PLAYER1 Z1 Z2
45: TURN-RIGHT EAST PLAYER1
46: MOVE-FORWARD-WATER SOUTH PLAYER1 Z2 Z25
47: TURN-LEFT SOUTH PLAYER1
48: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
49: TURN-LEFT EAST PLAYER1
50: MOVE-FORWARD NORTH PLAYER1 Z25 Z2
51: TURN-LEFT NORTH PLAYER1
52: MOVE-FORWARD WEST PLAYER1 Z2 Z1
53: GIVE-OBJECT Z1 ALGORITMOS PLAYER1 PROFESOR
54: TAKE-OBJECT ZAPATILLA PLAYER1 Z1
55: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
56: TURN-LEFT WEST PLAYER1
57: DROP-OBJECT ZAPATILLA PLAYER1 Z18
58: TURN-LEFT SOUTH PLAYER1
59: TAKE-OBJECT ZAPATILLA PLAYER1 Z18
60: MOVE-FORWARD EAST PLAYER1 Z18 Z1
61: DROP-OBJECT ZAPATILLA PLAYER1 Z1
62: MOVE-FORWARD EAST PLAYER1 Z1 Z2
63: MOVE-FORWARD EAST PLAYER1 Z2 Z3
64: MOVE-FORWARD-WATER EAST PLAYER1 Z3 Z4
65: TURN-LEFT EAST PLAYER1
66: TAKE-OBJECT ROSAS PLAYER1 Z4
67: TURN-LEFT NORTH PLAYER1
68: MOVE-FORWARD WEST PLAYER1 Z4 Z3
69: TURN-RIGHT WEST PLAYER1
70: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
71: TURN-LEFT NORTH PLAYER1
72: GIVE-OBJECT Z22 ROSAS PLAYER1 PRINCESA
73: TURN-LEFT WEST PLAYER1
74: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
75: TURN-RIGHT SOUTH PLAYER1
76: MOVE-FORWARD WEST PLAYER1 Z3 Z2
77: MOVE-FORWARD WEST PLAYER1 Z2 Z1
78: TAKE-OBJECT ZAPATILLA PLAYER1 Z1
79: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
80: TURN-LEFT WEST PLAYER1

81: MOVE-FORWARD SOUTH PLAYER1 Z18 Z17
82: MOVE-FORWARD SOUTH PLAYER1 Z17 Z16
83: MOVE-FORWARD SOUTH PLAYER1 Z16 Z15
84: MOVE-FORWARD SOUTH PLAYER1 Z15 Z14
85: TURN-LEFT SOUTH PLAYER1
86: DROP-OBJECT ZAPATILLA PLAYER1 Z14
87: MOVE-FORWARD EAST PLAYER1 Z14 Z13
88: MOVE-FORWARD EAST PLAYER1 Z13 Z12
89: MOVE-FORWARD EAST PLAYER1 Z12 Z11
90: MOVE-FORWARD EAST PLAYER1 Z11 Z10
91: MOVE-FORWARD-WATER EAST PLAYER1 Z10 Z9
92: TURN-LEFT EAST PLAYER1
93: MOVE-FORWARD NORTH PLAYER1 Z9 Z8
94: TURN-LEFT NORTH PLAYER1
95: TAKE-OBJECT MANZANAS PLAYER1 Z8
96: TURN-LEFT WEST PLAYER1
97: MOVE-FORWARD-WATER SOUTH PLAYER1 Z8 Z9
98: TURN-RIGHT SOUTH PLAYER1
99: MOVE-FORWARD WEST PLAYER1 Z9 Z10
100: MOVE-FORWARD WEST PLAYER1 Z10 Z11
101: MOVE-FORWARD WEST PLAYER1 Z11 Z12
102: MOVE-FORWARD WEST PLAYER1 Z12 Z13
103: MOVE-FORWARD WEST PLAYER1 Z13 Z14
104: TURN-RIGHT WEST PLAYER1
105: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
106: TURN-LEFT NORTH PLAYER1
107: TURN-LEFT WEST PLAYER1
108: GIVE-OBJECT Z15 MANZANAS PLAYER1 BRUJA
109: MOVE-FORWARD SOUTH PLAYER1 Z15 Z14
110: TURN-LEFT SOUTH PLAYER1
111: TURN-LEFT EAST PLAYER1
112: TAKE-OBJECT ZAPATILLA PLAYER1 Z14
113: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
114: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
115: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
116: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
117: DROP-OBJECT ZAPATILLA PLAYER1 Z18
118: TURN-RIGHT NORTH PLAYER1
119: TAKE-OBJECT ZAPATILLA PLAYER1 Z18
120: MOVE-FORWARD EAST PLAYER1 Z18 Z1
121: DROP-OBJECT ZAPATILLA PLAYER1 Z1
122: MOVE-FORWARD EAST PLAYER1 Z1 Z2
123: TURN-LEFT EAST PLAYER1
124: EXTRACT-OBJECT-BAG BIKINI PLAYER1
125: TURN-LEFT NORTH PLAYER1
126: DROP-OBJECT BIKINI PLAYER1 Z2

127: MOVE-FORWARD WEST PLAYER1 Z2 Z1
128: TAKE-OBJECT ZAPATILLA PLAYER1 Z1
129: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
130: TURN-LEFT WEST PLAYER1
131: PUT-OBJECT-BAG ZAPATILLA PLAYER1
132: MOVE-FORWARD SOUTH PLAYER1 Z18 Z17
133: MOVE-FORWARD SOUTH PLAYER1 Z17 Z16
134: TURN-LEFT SOUTH PLAYER1
135: TAKE-OBJECT ORO PLAYER1 Z16
136: TURN-LEFT EAST PLAYER1
137: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
138: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
139: TURN-RIGHT NORTH PLAYER1
140: MOVE-FORWARD EAST PLAYER1 Z18 Z1
141: MOVE-FORWARD EAST PLAYER1 Z1 Z2
142: MOVE-FORWARD EAST PLAYER1 Z2 Z3
143: TURN-LEFT EAST PLAYER1
144: TURN-LEFT NORTH PLAYER1
145: DROP-OBJECT ORO PLAYER1 Z3
146: MOVE-FORWARD WEST PLAYER1 Z3 Z2
147: TURN-LEFT WEST PLAYER1
148: TAKE-OBJECT BIKINI PLAYER1 Z2
149: TURN-LEFT SOUTH PLAYER1
150: MOVE-FORWARD EAST PLAYER1 Z2 Z3
151: TURN-LEFT EAST PLAYER1
152: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
153: DROP-OBJECT BIKINI PLAYER1 Z22
154: MOVE-FORWARD NORTH PLAYER1 Z22 Z24
155: TURN-LEFT NORTH PLAYER1
156: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
157: TURN-LEFT WEST PLAYER1
158: DROP-OBJECT ZAPATILLA PLAYER1 Z24
159: MOVE-FORWARD SOUTH PLAYER1 Z24 Z22
160: TAKE-OBJECT BIKINI PLAYER1 Z22
161: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
162: TURN-LEFT SOUTH PLAYER1
163: PUT-OBJECT-BAG BIKINI PLAYER1
164: TAKE-OBJECT ORO PLAYER1 Z3
165: MOVE-FORWARD-WATER EAST PLAYER1 Z3 Z4
166: MOVE-FORWARD EAST PLAYER1 Z4 Z5
167: GIVE-OBJECT Z5 ORO PLAYER1 PRINCIPE

time spent: 0.01 seconds instantiating 2731 easy, 16 hard action templates
0.00 seconds reachability analysis, yielding 1698 facts and 433 actions

0.00 seconds creating final representation with 444 relevant facts, 2 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
132.14 seconds searching, evaluating 483211 states, to a max depth of 123
132.15 seconds total time

Ejercicio 4

Ejercicio 4.a y 4.b:

- Para el siguiente ejercicio tenemos que colocar una tabla de puntuaciones en nuestro ejercicio y en base a estas puntuaciones conseguir un determinado número de puntos (definido por el usuario).
- Puesto que tenemos que introducir nuevo conocimiento, tendremos que crear una nueva función para indicar las puntuaciones de los diferentes objetos según al NPC al que se le entreguen. Junto a este predicado tendremos que crear otro para saber la cantidad de puntos que vamos acumulando así que viendo esto está claro que tendremos que modificar nuestra acción GIVE-OBJECT para que se sumen los puntos cada vez que entregamos un objeto. Se sumará la cantidad de puntos conseguida según al NPC que le entreguemos el objeto (increase). Cabe señalar que no podremos entregar la zapatilla ni el bikini pues los necesitamos así que lo colocamos como restricción en la acción de dar.

- En estos problemas tendremos los mismos objetos que en los anteriores pero ahora el objetivo será superar un determinado umbral de puntos indicado por el usuario (40, 40, 40 -> se pueden modificar según se necesite):

Ej4problema1:				
1 Agua Algoritmos	2 Arena Profesor	3 Arena Jugador (Norte) Manzanas	4 Bosque	5 Roca
6 Bosque	7 Bosque Oro	8 Arena Zapatillas	9 Arena Princesa	10 Precipicio
11 Roca Rosas	12 Arena	13 Arena Bruja	14 Bosque	15 Precipicio
16 Agua	17 Agua	18 Arena Principe	19 Arena	20 Arena
21 Roca Leonardo	22 Agua	23 Bosque Bikini	24 Bosque Oscars	25 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej4dominio.pddl -f Ej4problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 12 into depth [1]
                                  11   [1]
                                  10   [1][2][3]
                                   4   [1][2][3][4][5][6][7][8][9][10][11][12][13]
                                   3   [1][2][3][4][5][6][7][8][9][10][11][12][13][14]

```
                    2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32][33] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25]
                    1          [1]
                    0

ff: found legal plan as follows

step    0: TURN-LEFT NORTH PLAYER1
        1: TAKE-OBJECT MANZANAS PLAYER1 Z3
        2: TURN-LEFT WEST PLAYER1
        3: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
        4: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
        5: GIVE-OBJECT Z13 MANZANAS PLAYER1 BRUJA
        6: TURN-RIGHT SOUTH PLAYER1
        7: MOVE-FORWARD WEST PLAYER1 Z13 Z12
        8: MOVE-FORWARD WEST PLAYER1 Z12 Z11
        9: TURN-RIGHT WEST PLAYER1
       10: TURN-RIGHT NORTH PLAYER1
       11: TAKE-OBJECT ROSAS PLAYER1 Z11
       12: MOVE-FORWARD EAST PLAYER1 Z11 Z12
       13: MOVE-FORWARD EAST PLAYER1 Z12 Z13
       14: TURN-LEFT EAST PLAYER1
       15: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
       16: TURN-RIGHT NORTH PLAYER1
       17: MOVE-FORWARD EAST PLAYER1 Z8 Z9
       18: GIVE-OBJECT Z9 ROSAS PLAYER1 PRINCESA
       19: TURN-LEFT EAST PLAYER1
       20: TURN-LEFT NORTH PLAYER1
       21: MOVE-FORWARD WEST PLAYER1 Z9 Z8
       22: TAKE-OBJECT ZAPATILLA PLAYER1 Z8
       23: PUT-OBJECT-BAG ZAPATILLA PLAYER1
       24: MOVE-FORWARD-FOREST WEST PLAYER1 Z8 Z7
       25: TURN-LEFT WEST PLAYER1
       26: TURN-LEFT SOUTH PLAYER1
       27: TAKE-OBJECT ORO PLAYER1 Z7
       28: MOVE-FORWARD EAST PLAYER1 Z7 Z8
       29: TURN-RIGHT EAST PLAYER1
       30: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
       31: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
       32: GIVE-OBJECT Z18 ORO PLAYER1 PRINCIPE
       33: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z18 Z23
       34: TURN-LEFT SOUTH PLAYER1
       35: TAKE-OBJECT BIKINI PLAYER1 Z23
       36: TURN-LEFT EAST PLAYER1
```

37: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
38: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
39: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
40: MOVE-FORWARD NORTH PLAYER1 Z8 Z3
41: TURN-RIGHT NORTH PLAYER1
42: DROP-OBJECT BIKINI PLAYER1 Z3
43: MOVE-FORWARD-FOREST EAST PLAYER1 Z3 Z4
44: TURN-LEFT EAST PLAYER1
45: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
46: TURN-LEFT NORTH PLAYER1
47: DROP-OBJECT ZAPATILLA PLAYER1 Z4
48: MOVE-FORWARD WEST PLAYER1 Z4 Z3
49: TAKE-OBJECT BIKINI PLAYER1 Z3
50: MOVE-FORWARD WEST PLAYER1 Z3 Z2
51: PUT-OBJECT-BAG BIKINI PLAYER1
52: MOVE-FORWARD-WATER WEST PLAYER1 Z2 Z1
53: TURN-LEFT WEST PLAYER1
54: TAKE-OBJECT ALGORITMOS PLAYER1 Z1
55: TURN-LEFT SOUTH PLAYER1
56: MOVE-FORWARD EAST PLAYER1 Z1 Z2
57: GIVE-OBJECT Z2 ALGORITMOS PLAYER1 PROFESOR

time spent: 0.01 seconds instantiating 2727 easy, 68 hard action templates
0.00 seconds reachability analysis, yielding 1698 facts and 472 actions
0.00 seconds creating final representation with 444 relevant facts, 2 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
24.16 seconds searching, evaluating 222118 states, to a max depth of 33
24.17 seconds total time

Ej4problema2:				
1 Arena Profesor	2 Arena Oscars	3 Arena Leonardo	4 Arena Rosas	5 Arena Principe
6 Arena Zapatilla	7 Arena	8 Arena Manzanas	9 Arena	10 Arena
11 Arena	12 Arena Jugador (Norte)	13 Arena	14 Arena	15 Arena Bruja
16 Arena Oro	17 Precipicio	18 Precipicio	19 Precipicio	20 Precipicio
21 Arena Bikini	22 Arena Princesa	23 Arena	24 Agua	25 Arena Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej4dominio.pddl -f Ej4problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 19 into depth [1]
                                  14   [1][2][3][4]
                                  4   [1][2][3][4][5][6][7][8]
                                  3   [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19]
                                  2   [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16]

1 [1]
0

ff: found legal plan as follows

step 0: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
1: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
2: TURN-RIGHT NORTH PLAYER1
3: TAKE-OBJECT OSCARS PLAYER1 Z2
4: MOVE-FORWARD EAST PLAYER1 Z2 Z3
5: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
6: TURN-RIGHT EAST PLAYER1
7: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
8: TAKE-OBJECT MANZANAS PLAYER1 Z8
9: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
10: TURN-LEFT SOUTH PLAYER1
11: MOVE-FORWARD EAST PLAYER1 Z13 Z14
12: MOVE-FORWARD EAST PLAYER1 Z14 Z15
13: GIVE-OBJECT Z15 MANZANAS PLAYER1 BRUJA
14: TURN-LEFT EAST PLAYER1
15: MOVE-FORWARD NORTH PLAYER1 Z15 Z10
16: MOVE-FORWARD NORTH PLAYER1 Z10 Z5
17: TURN-LEFT NORTH PLAYER1
18: MOVE-FORWARD WEST PLAYER1 Z5 Z4
19: TAKE-OBJECT ROSAS PLAYER1 Z4
20: MOVE-FORWARD WEST PLAYER1 Z4 Z3
21: TURN-LEFT WEST PLAYER1
22: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
23: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
24: TURN-RIGHT SOUTH PLAYER1
25: MOVE-FORWARD WEST PLAYER1 Z13 Z12
26: MOVE-FORWARD WEST PLAYER1 Z12 Z11
27: TURN-LEFT WEST PLAYER1
28: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
29: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
30: TURN-LEFT SOUTH PLAYER1
31: MOVE-FORWARD EAST PLAYER1 Z21 Z22
32: GIVE-OBJECT Z22 ROSAS PLAYER1 PRINCESA
33: TURN-LEFT EAST PLAYER1
34: TURN-LEFT NORTH PLAYER1
35: MOVE-FORWARD WEST PLAYER1 Z22 Z21
36: TURN-RIGHT WEST PLAYER1
37: MOVE-FORWARD NORTH PLAYER1 Z21 Z16
38: TAKE-OBJECT ORO PLAYER1 Z16
39: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
40: MOVE-FORWARD NORTH PLAYER1 Z11 Z6

41: TURN-RIGHT NORTH PLAYER1
42: MOVE-FORWARD EAST PLAYER1 Z6 Z7
43: MOVE-FORWARD EAST PLAYER1 Z7 Z8
44: MOVE-FORWARD EAST PLAYER1 Z8 Z9
45: MOVE-FORWARD EAST PLAYER1 Z9 Z10
46: TURN-LEFT EAST PLAYER1
47: MOVE-FORWARD NORTH PLAYER1 Z10 Z5
48: GIVE-OBJECT Z5 ORO PLAYER1 PRINCIPE

time spent: 0.00 seconds instantiating 2749 easy, 6 hard action templates
0.00 seconds reachability analysis, yielding 1682 facts and 399 actions
0.00 seconds creating final representation with 414 relevant facts, 2 relevant fluents
0.00 seconds computing LNF
0.01 seconds building connectivity graph
0.08 seconds searching, evaluating 1696 states, to a max depth of 19
0.09 seconds total time

Ej4problema3:					
		23 Roca	24 Arena		
19 Arena	20 Roca	21 Precipicio	22 Arena Princesa		
18 Bosque	1 Arena Profesor	2 Roca Oscars	3 Arena Leonardo Bikini	4 Agua Rosas	5 Arena Principe
17 Arena		25 Agua Algoritmos			6 Roca
16 Arena Oro					7 Precipicio
15 Roca Bruja					8 Roca Manzanas
14 Arena Zapatillas	13 Arena	12 Roca Jugador (Norte)	11 Roca	10 Arena	9 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej4dominio.pddl -f Ej4problema3.pddl

```
ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.


no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.



checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then  best-first on 1*g(s) + 5*h(s) where
    metric is  plan length

Cueing down from goal distance:   26 into depth [1][2][3]
                                  25          [1]
                                  24          [1]
                                  23          [1][2]
                                  22          [1][2]
                                  21          [1]
                                  20          [1]
                                  19          [1][2]
                                  18          [1]
                                  11          [1]
                                   9          [1]
                                   8          [1]
                                   4
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51][52]
[53][54][55][56][57][58][59][60][61][62][63] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18]
                                   3          [1][2][3][4][5][6][7][8][9][10][11][12][13][14]
                                   2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43]
                                   1          [1]
                                   0

ff: found legal plan as follows

step    0: TURN-LEFT NORTH PLAYER1
```

1: MOVE-FORWARD WEST PLAYER1 Z12 Z13
2: MOVE-FORWARD WEST PLAYER1 Z13 Z14
3: TURN-LEFT WEST PLAYER1
4: TURN-LEFT SOUTH PLAYER1
5: TAKE-OBJECT ZAPATILLA PLAYER1 Z14
6: PUT-OBJECT-BAG ZAPATILLA PLAYER1
7: TURN-LEFT EAST PLAYER1
8: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
9: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
10: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
11: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
12: TURN-RIGHT NORTH PLAYER1
13: MOVE-FORWARD EAST PLAYER1 Z18 Z1
14: MOVE-FORWARD EAST PLAYER1 Z1 Z2
15: TAKE-OBJECT OSCARS PLAYER1 Z2
16: MOVE-FORWARD EAST PLAYER1 Z2 Z3
17: TURN-LEFT EAST PLAYER1
18: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
19: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
20: TURN-LEFT NORTH PLAYER1
21: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
22: TURN-LEFT WEST PLAYER1
23: DROP-OBJECT ZAPATILLA PLAYER1 Z22
24: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
25: TURN-LEFT SOUTH PLAYER1
26: TAKE-OBJECT BIKINI PLAYER1 Z3
27: MOVE-FORWARD-WATER EAST PLAYER1 Z3 Z4
28: TURN-LEFT EAST PLAYER1
29: PUT-OBJECT-BAG BIKINI PLAYER1
30: TURN-LEFT NORTH PLAYER1
31: TAKE-OBJECT ROSAS PLAYER1 Z4
32: MOVE-FORWARD WEST PLAYER1 Z4 Z3
33: TURN-RIGHT WEST PLAYER1
34: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
35: GIVE-OBJECT Z22 ROSAS PLAYER1 PRINCESA
36: TURN-RIGHT NORTH PLAYER1
37: TURN-RIGHT EAST PLAYER1
38: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
39: TURN-RIGHT SOUTH PLAYER1
40: MOVE-FORWARD WEST PLAYER1 Z3 Z2
41: TURN-LEFT WEST PLAYER1
42: MOVE-FORWARD-WATER SOUTH PLAYER1 Z2 Z25
43: TURN-LEFT SOUTH PLAYER1
44: TURN-LEFT EAST PLAYER1
45: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
46: MOVE-FORWARD NORTH PLAYER1 Z25 Z2

47: TURN-LEFT NORTH PLAYER1
48: MOVE-FORWARD WEST PLAYER1 Z2 Z1
49: GIVE-OBJECT Z1 ALGORITMOS PLAYER1 PROFESOR
50: TURN-RIGHT WEST PLAYER1
51: TURN-RIGHT NORTH PLAYER1
52: MOVE-FORWARD EAST PLAYER1 Z1 Z2
53: MOVE-FORWARD EAST PLAYER1 Z2 Z3
54: TURN-LEFT EAST PLAYER1
55: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
56: TURN-RIGHT NORTH PLAYER1
57: TAKE-OBJECT ZAPATILLA PLAYER1 Z22
58: TURN-RIGHT EAST PLAYER1
59: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
60: TURN-RIGHT SOUTH PLAYER1
61: MOVE-FORWARD WEST PLAYER1 Z3 Z2
62: MOVE-FORWARD WEST PLAYER1 Z2 Z1
63: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
64: TURN-LEFT WEST PLAYER1
65: MOVE-FORWARD SOUTH PLAYER1 Z18 Z17
66: DROP-OBJECT ZAPATILLA PLAYER1 Z17
67: MOVE-FORWARD SOUTH PLAYER1 Z17 Z16
68: TAKE-OBJECT ORO PLAYER1 Z16
69: MOVE-FORWARD SOUTH PLAYER1 Z16 Z15
70: GIVE-OBJECT Z15 ORO PLAYER1 BRUJA
71: MOVE-FORWARD SOUTH PLAYER1 Z15 Z14
72: TURN-LEFT SOUTH PLAYER1
73: MOVE-FORWARD EAST PLAYER1 Z14 Z13
74: MOVE-FORWARD EAST PLAYER1 Z13 Z12
75: MOVE-FORWARD EAST PLAYER1 Z12 Z11
76: MOVE-FORWARD EAST PLAYER1 Z11 Z10
77: MOVE-FORWARD-WATER EAST PLAYER1 Z10 Z9
78: TURN-LEFT EAST PLAYER1
79: MOVE-FORWARD NORTH PLAYER1 Z9 Z8
80: TURN-LEFT NORTH PLAYER1
81: TURN-LEFT WEST PLAYER1
82: TAKE-OBJECT MANZANAS PLAYER1 Z8
83: MOVE-FORWARD-WATER SOUTH PLAYER1 Z8 Z9
84: TURN-RIGHT SOUTH PLAYER1
85: MOVE-FORWARD WEST PLAYER1 Z9 Z10
86: MOVE-FORWARD WEST PLAYER1 Z10 Z11
87: MOVE-FORWARD WEST PLAYER1 Z11 Z12
88: MOVE-FORWARD WEST PLAYER1 Z12 Z13
89: MOVE-FORWARD WEST PLAYER1 Z13 Z14
90: TURN-RIGHT WEST PLAYER1
91: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
92: GIVE-OBJECT Z15 MANZANAS PLAYER1 BRUJA

time spent: 0.01 seconds instantiating 2731 easy, 16 hard action templates
0.00 seconds reachability analysis, yielding 1698 facts and 423 actions
0.00 seconds creating final representation with 444 relevant facts, 2 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
1.59 seconds searching, evaluating 25761 states, to a max depth of 63
1.60 seconds total time

Ejercicio 5

Ejercicio 5.a y 5.b:

- Para este ejercicio se nos pide añadir una modificación y es que ahora los NPCs podrán coger más de un objeto siempre y cuando se lo indiquemos en el problema, para resolver este ejercicio decidimos eliminar el predicado que nos indicaba si un NPC tenía un objeto para crear dos funciones nuevas, una para indicar el número de objetos que podrá coger un NPC y otra para saber cuántos objetos lleva actualmente, por supuesto deberemos de modificar nuestra acción de dar objetos pues ahora hay una nueva restricción y sólo podremos dar un objeto a un determinado NPC si aún no hemos alcanzado su tope.
- En el problema señalamos el número de objetos que puede coger cada NPC y además añadiremos más objetos para poder probar esto.

- Leonardo podrá coger hasta 6 objetos, la princesa 2, la bruja 1 el profesor 2 y el príncipe 3. El objetivo de estos problemas será llegar a un determinado número de puntos (65, 35, 35):

Ej5problema1:				
1 Agua Algoritmos	2 Arena Profesor Rosas	3 Arena Manzanas	4 Arena Jugador (Norte) Oscars	5 Arena Leonardo
6 Bosque	7 Bosque Oro	8 Arena Zapatillas	9 Arena Princesa	10 Precipicio
11 Roca Rosas	12 Arena Oro	13 Arena Bruja	14 Bosque	15 Precipicio
16 Agua	17 Agua	18 Arena Principe	19 Arena Jugador2 (Norte)	20 Arena
21 Roca Oscars	22 Arena	23 Bosque Bikini	24 Bosque	25 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej5dominio.pddl -f Ej5problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 21 into depth [1]
                                  19   [1][2]
                                  12   [1][2][3][4][5][6][7][8][9]
                                  11   [1][2][3][4][5][6][7][8]
                                   9   [1][2][3][4][5]

```
                    5       [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15]
                    4       [1][2][3][4][5][6][7][8][9][10][11][12][13]
                    3       [1][2][3][4][5][6][7][8][9][10][11][12][13][14]
                    2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22]
                    1       [1]
                    0

ff: found legal plan as follows

step    0: TURN-RIGHT NORTH PLAYER1
        1: TAKE-OBJECT OSCARS PLAYER1 Z4
        2: MOVE-FORWARD EAST PLAYER1 Z4 Z5
        3: TURN-LEFT EAST PLAYER1
        4: GIVE-OBJECT Z5 OSCARS PLAYER1 LEONARDODICAPRIO
        5: TURN-LEFT NORTH PLAYER1
        6: MOVE-FORWARD WEST PLAYER1 Z5 Z4
        7: MOVE-FORWARD WEST PLAYER1 Z4 Z3
        8: TURN-LEFT WEST PLAYER1
        9: TAKE-OBJECT MANZANAS PLAYER1 Z3
       10: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
       11: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
       12: TURN-RIGHT SOUTH PLAYER1
       13: MOVE-FORWARD WEST PLAYER1 Z13 Z12
       14: PUT-OBJECT-BAG MANZANAS PLAYER1
       15: TURN-RIGHT WEST PLAYER1
       16: TURN-RIGHT NORTH PLAYER1
       17: TAKE-OBJECT ORO PLAYER1 Z12
       18: MOVE-FORWARD EAST PLAYER1 Z12 Z13
       19: TURN-RIGHT EAST PLAYER1
       20: DROP-OBJECT ORO PLAYER1 Z13
       21: EXTRACT-OBJECT-BAG MANZANAS PLAYER1
       22: GIVE-OBJECT Z13 MANZANAS PLAYER1 BRUJA
       23: TAKE-OBJECT ORO PLAYER1 Z13
       24: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
       25: GIVE-OBJECT Z18 ORO PLAYER1 PRINCIPE
       26: TURN-LEFT SOUTH PLAYER1
       27: TURN-LEFT EAST PLAYER1
       28: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
       29: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
       30: MOVE-FORWARD NORTH PLAYER1 Z8 Z3
       31: TURN-LEFT NORTH PLAYER1
       32: MOVE-FORWARD WEST PLAYER1 Z3 Z2
       33: TURN-LEFT WEST PLAYER1
       34: TURN-LEFT SOUTH PLAYER1
       35: TAKE-OBJECT ROSAS PLAYER1 Z2
```

36: MOVE-FORWARD EAST PLAYER1 Z2 Z3
37: MOVE-FORWARD EAST PLAYER1 Z3 Z4
38: TURN-RIGHT EAST PLAYER1
39: MOVE-FORWARD SOUTH PLAYER1 Z4 Z9
40: GIVE-OBJECT Z9 ROSAS PLAYER1 PRINCESA
41: TURN-RIGHT SOUTH PLAYER1
42: MOVE-FORWARD WEST PLAYER1 Z9 Z8
43: TAKE-OBJECT ZAPATILLA PLAYER1 Z8
44: MOVE-FORWARD-FOREST WEST PLAYER1 Z8 Z7
45: TURN-RIGHT WEST PLAYER1
46: TURN-RIGHT NORTH PLAYER1
47: PUT-OBJECT-BAG ZAPATILLA PLAYER1
48: TAKE-OBJECT ORO PLAYER1 Z7
49: MOVE-FORWARD EAST PLAYER1 Z7 Z8
50: TURN-RIGHT EAST PLAYER1
51: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
52: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
53: GIVE-OBJECT Z18 ORO PLAYER1 PRINCIPE
54: TURN-LEFT SOUTH PLAYER1
55: TURN-LEFT EAST PLAYER1
56: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
57: TURN-LEFT NORTH PLAYER1
58: MOVE-FORWARD WEST PLAYER1 Z13 Z12
59: MOVE-FORWARD WEST PLAYER1 Z12 Z11
60: TURN-RIGHT WEST PLAYER1
61: TAKE-OBJECT ROSAS PLAYER1 Z11
62: MOVE-FORWARD-FOREST NORTH PLAYER1 Z11 Z6
63: TURN-RIGHT NORTH PLAYER1
64: MOVE-FORWARD-FOREST EAST PLAYER1 Z6 Z7
65: MOVE-FORWARD EAST PLAYER1 Z7 Z8
66: MOVE-FORWARD EAST PLAYER1 Z8 Z9
67: GIVE-OBJECT Z9 ROSAS PLAYER1 PRINCESA
68: TURN-RIGHT EAST PLAYER1
69: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z9 Z14
70: MOVE-FORWARD SOUTH PLAYER1 Z14 Z19
71: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z19 Z24
72: TURN-RIGHT SOUTH PLAYER1
73: MOVE-FORWARD-FOREST WEST PLAYER1 Z24 Z23
74: MOVE-FORWARD WEST PLAYER1 Z23 Z22
75: MOVE-FORWARD WEST PLAYER1 Z22 Z21
76: TURN-LEFT WEST PLAYER1
77: TURN-LEFT SOUTH PLAYER1
78: TAKE-OBJECT OSCARS PLAYER1 Z21
79: MOVE-FORWARD EAST PLAYER1 Z21 Z22
80: MOVE-FORWARD-FOREST EAST PLAYER1 Z22 Z23
81: MOVE-FORWARD-FOREST EAST PLAYER1 Z23 Z24

82: TURN-LEFT EAST PLAYER1
83: MOVE-FORWARD NORTH PLAYER1 Z24 Z19
84: MOVE-FORWARD-FOREST NORTH PLAYER1 Z19 Z14
85: MOVE-FORWARD NORTH PLAYER1 Z14 Z9
86: MOVE-FORWARD NORTH PLAYER1 Z9 Z4
87: TURN-RIGHT NORTH PLAYER1
88: MOVE-FORWARD EAST PLAYER1 Z4 Z5
89: GIVE-OBJECT Z5 OSCARS PLAYER1 LEONARDODICAPRIO

time spent: 0.00 seconds instantiating 2733 easy, 56 hard action templates
0.01 seconds reachability analysis, yielding 1428 facts and 466 actions
0.00 seconds creating final representation with 374 relevant facts, 12 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
0.20 seconds searching, evaluating 3485 states, to a max depth of 22
0.21 seconds total time

Ej5problema2:

1 Arena Profesor	2 Arena Oscars	3 Arena Leonardo	4 Arena Rosas	5 Arena Principe
6 Arena Zapatilla	7 Arena	8 Arena Manzanas	9 Arena	10 Arena
11 Arena	12 Arena Jugador (Norte)	13 Arena	14 Arena	15 Arena Bruja
16 Arena Oro	17 Precipicio	18 Precipicio	19 Precipicio	20 Precipicio
21 Arena Bikini	22 Arena Princesa	23 Arena	24 Agua	25 Arena Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej5dominio.pddl -f Ej5problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
... done.
ff: parsing problem file
problem 'EJERCICIO1' defined

... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
   metric is plan length

Cueing down from goal distance: 17 into depth [1]
                                  12   [1]
                                  10   [1]
                                   9   [1][2][3][4]
                                   7   [1][2][3][4][5][6]
                                   4   [1][2][3][4][5][6][7][8]
                                   3
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20]
                                   2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27]
                                   1   [1]
                                   0

ff: found legal plan as follows

step   0: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
        1: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
        2: TAKE-OBJECT OSCARS PLAYER1 Z2
        3: TURN-LEFT NORTH PLAYER1
        4: MOVE-FORWARD WEST PLAYER1 Z2 Z1
        5: TURN-LEFT WEST PLAYER1
        6: TURN-LEFT SOUTH PLAYER1
        7: MOVE-FORWARD EAST PLAYER1 Z1 Z2
        8: MOVE-FORWARD EAST PLAYER1 Z2 Z3
        9: MOVE-FORWARD EAST PLAYER1 Z3 Z4
       10: TURN-LEFT EAST PLAYER1
       11: TURN-LEFT NORTH PLAYER1
       12: MOVE-FORWARD WEST PLAYER1 Z4 Z3
       13: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
       14: TURN-LEFT WEST PLAYER1
       15: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
       16: TAKE-OBJECT MANZANAS PLAYER1 Z8

17: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
18: TURN-LEFT SOUTH PLAYER1
19: MOVE-FORWARD EAST PLAYER1 Z13 Z14
20: MOVE-FORWARD EAST PLAYER1 Z14 Z15
21: GIVE-OBJECT Z15 MANZANAS PLAYER1 BRUJA
22: TURN-LEFT EAST PLAYER1
23: TURN-LEFT NORTH PLAYER1
24: MOVE-FORWARD WEST PLAYER1 Z15 Z14
25: MOVE-FORWARD WEST PLAYER1 Z14 Z13
26: MOVE-FORWARD WEST PLAYER1 Z13 Z12
27: MOVE-FORWARD WEST PLAYER1 Z12 Z11
28: TURN-LEFT WEST PLAYER1
29: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
30: TURN-LEFT SOUTH PLAYER1
31: TURN-LEFT EAST PLAYER1
32: TAKE-OBJECT ORO PLAYER1 Z16
33: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
34: MOVE-FORWARD NORTH PLAYER1 Z11 Z6
35: MOVE-FORWARD NORTH PLAYER1 Z6 Z1
36: TURN-RIGHT NORTH PLAYER1
37: MOVE-FORWARD EAST PLAYER1 Z1 Z2
38: MOVE-FORWARD EAST PLAYER1 Z2 Z3
39: MOVE-FORWARD EAST PLAYER1 Z3 Z4
40: MOVE-FORWARD EAST PLAYER1 Z4 Z5
41: GIVE-OBJECT Z5 ORO PLAYER1 PRINCIPE
42: TURN-LEFT EAST PLAYER1
43: TURN-LEFT NORTH PLAYER1
44: MOVE-FORWARD WEST PLAYER1 Z5 Z4
45: TAKE-OBJECT ROSAS PLAYER1 Z4
46: MOVE-FORWARD WEST PLAYER1 Z4 Z3
47: MOVE-FORWARD WEST PLAYER1 Z3 Z2
48: MOVE-FORWARD WEST PLAYER1 Z2 Z1
49: GIVE-OBJECT Z1 ROSAS PLAYER1 PROFESOR
50: TURN-LEFT WEST PLAYER1
51: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
52: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
53: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
54: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
55: TAKE-OBJECT BIKINI PLAYER1 Z21
56: TURN-LEFT SOUTH PLAYER1
57: MOVE-FORWARD EAST PLAYER1 Z21 Z22
58: MOVE-FORWARD EAST PLAYER1 Z22 Z23
59: MOVE-FORWARD-WATER EAST PLAYER1 Z23 Z24
60: PUT-OBJECT-BAG BIKINI PLAYER1
61: MOVE-FORWARD EAST PLAYER1 Z24 Z25
62: TURN-LEFT EAST PLAYER1

63: TURN-LEFT NORTH PLAYER1
64: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
65: MOVE-FORWARD-WATER WEST PLAYER1 Z25 Z24
66: MOVE-FORWARD WEST PLAYER1 Z24 Z23
67: MOVE-FORWARD WEST PLAYER1 Z23 Z22
68: GIVE-OBJECT Z22 ALGORITMOS PLAYER1 PRINCESA

time spent: 0.01 seconds instantiating 2749 easy, 6 hard action templates
0.00 seconds reachability analysis, yielding 1412 facts and 399 actions
0.00 seconds creating final representation with 344 relevant facts, 12 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
0.11 seconds searching, evaluating 2212 states, to a max depth of 27
0.12 seconds total time

Ej5problema3:					
		23 Roca	24 Arena		
19 Arena	20 Roca	21 Precipicio	22 Arena Princesa		
18 Bosque	1 Arena Profesor	2 Roca Oscars	3 Arena Leonardo Bikini	4 Agua Rosas	5 Arena Principe
17 Arena		25 Agua Algoritmos			6 Roca
16 Arena Oro					7 Precipicio
15 Roca Bruja					8 Roca Manzanas
14 Arena Zapatillas	13 Arena	12 Roca Jugador (Norte)	11 Roca	10 Arena	9 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej5dominio.pddl -f Ej5problema3.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined

```
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.


no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.



checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then  best-first on 1*g(s) + 5*h(s) where
    metric is  plan length

Cueing down from goal distance:   23 into depth [1][2][3]
                                  22          [1]
                                  21          [1]
                                  20          [1][2]
                                  19          [1][2]
                                  18          [1]
                                  17          [1][2]
                                  16          [1][2][3][4]
                                  15          [1][2]
                                   9          [1]
                                   8          [1]
                                   7          [1]
                                   6          [1]
                                   5          [1][2][3][4]
                                   4
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51][52]
[53][54][55][56][57] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17]
                                   3          [1][2][3][4][5][6][7][8][9][10][11][12][13][14]
                                   2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51][52]
[53][54][55][56][57][58][59][60][61][62][63][64][65][66][67][68][69][70][71][72][73][74][75][76][7
7][78] --- pruning stopped ---
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24]
                                   1          [1]
                                   0
```

ff: found legal plan as follows

step 0: TURN-LEFT NORTH PLAYER1
1: MOVE-FORWARD WEST PLAYER1 Z12 Z13
2: MOVE-FORWARD WEST PLAYER1 Z13 Z14
3: TURN-LEFT WEST PLAYER1
4: TURN-LEFT SOUTH PLAYER1
5: TAKE-OBJECT ZAPATILLA PLAYER1 Z14
6: PUT-OBJECT-BAG ZAPATILLA PLAYER1
7: TURN-LEFT EAST PLAYER1
8: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
9: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
10: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
11: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
12: TURN-LEFT NORTH PLAYER1
13: TURN-LEFT WEST PLAYER1
14: TURN-LEFT SOUTH PLAYER1
15: MOVE-FORWARD EAST PLAYER1 Z18 Z1
16: MOVE-FORWARD EAST PLAYER1 Z1 Z2
17: TAKE-OBJECT OSCARS PLAYER1 Z2
18: MOVE-FORWARD EAST PLAYER1 Z2 Z3
19: TURN-LEFT EAST PLAYER1
20: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
21: TURN-LEFT NORTH PLAYER1
22: TURN-LEFT WEST PLAYER1
23: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
24: TURN-RIGHT SOUTH PLAYER1
25: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
26: MOVE-FORWARD WEST PLAYER1 Z3 Z2
27: TURN-LEFT WEST PLAYER1
28: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
29: TURN-LEFT SOUTH PLAYER1
30: DROP-OBJECT ZAPATILLA PLAYER1 Z2
31: MOVE-FORWARD EAST PLAYER1 Z2 Z3
32: TAKE-OBJECT BIKINI PLAYER1 Z3
33: MOVE-FORWARD-WATER EAST PLAYER1 Z3 Z4
34: TURN-LEFT EAST PLAYER1
35: PUT-OBJECT-BAG BIKINI PLAYER1
36: TURN-LEFT NORTH PLAYER1
37: TAKE-OBJECT ROSAS PLAYER1 Z4
38: MOVE-FORWARD WEST PLAYER1 Z4 Z3
39: TURN-RIGHT WEST PLAYER1
40: MOVE-FORWARD NORTH PLAYER1 Z3 Z22
41: GIVE-OBJECT Z22 ROSAS PLAYER1 PRINCESA
42: TURN-RIGHT NORTH PLAYER1
43: TURN-RIGHT EAST PLAYER1

44: MOVE-FORWARD SOUTH PLAYER1 Z22 Z3
45: TURN-RIGHT SOUTH PLAYER1
46: MOVE-FORWARD WEST PLAYER1 Z3 Z2
47: TURN-LEFT WEST PLAYER1
48: MOVE-FORWARD-WATER SOUTH PLAYER1 Z2 Z25
49: TURN-LEFT SOUTH PLAYER1
50: TURN-LEFT EAST PLAYER1
51: TAKE-OBJECT ALGORITMOS PLAYER1 Z25
52: MOVE-FORWARD NORTH PLAYER1 Z25 Z2
53: TURN-LEFT NORTH PLAYER1
54: MOVE-FORWARD WEST PLAYER1 Z2 Z1
55: TURN-LEFT WEST PLAYER1
56: TURN-LEFT SOUTH PLAYER1
57: GIVE-OBJECT Z1 ALGORITMOS PLAYER1 PROFESOR
58: EXTRACT-OBJECT-BAG BIKINI PLAYER1
59: DROP-OBJECT BIKINI PLAYER1 Z1
60: MOVE-FORWARD EAST PLAYER1 Z1 Z2
61: TURN-LEFT EAST PLAYER1
62: TAKE-OBJECT ZAPATILLA PLAYER1 Z2
63: TURN-LEFT NORTH PLAYER1
64: PUT-OBJECT-BAG ZAPATILLA PLAYER1
65: MOVE-FORWARD WEST PLAYER1 Z2 Z1
66: MOVE-FORWARD-FOREST WEST PLAYER1 Z1 Z18
67: TURN-LEFT WEST PLAYER1
68: MOVE-FORWARD SOUTH PLAYER1 Z18 Z17
69: MOVE-FORWARD SOUTH PLAYER1 Z17 Z16
70: TURN-LEFT SOUTH PLAYER1
71: TAKE-OBJECT ORO PLAYER1 Z16
72: TURN-LEFT EAST PLAYER1
73: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
74: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
75: TURN-RIGHT NORTH PLAYER1
76: MOVE-FORWARD EAST PLAYER1 Z18 Z1
77: MOVE-FORWARD EAST PLAYER1 Z1 Z2
78: MOVE-FORWARD EAST PLAYER1 Z2 Z3
79: GIVE-OBJECT Z3 ORO PLAYER1 LEONARDODICAPRIO

time spent: 0.01 seconds instantiating 2731 easy, 16 hard action templates
0.00 seconds reachability analysis, yielding 1428 facts and 423 actions
0.00 seconds creating final representation with 374 relevant facts, 12 relevant fluents
0.01 seconds computing LNF
0.00 seconds building connectivity graph
5.00 seconds searching, evaluating 82151 states, to a max depth of 78
5.02 seconds total time

Ejercicio 6

Ejercicio 6.a y 6.b:

- Para este ejercicio simplemente colocaremos dos jugadores que cooperan para conseguir una cantidad de puntos determinada y además cada uno tiene que entregar un mínimo. Crearemos nuevas funciones que nos servirán para indicar el mínimo que tienen que entregar cada uno de los jugadores y los puntos que llevan actualmente. Por supuesto modificaremos nuestra acción de dar objeto para que al determinado jugador se le sume los puntos que entrega además de sumar los puntos al cómputo global.

- Leonardo podrá coger hasta 2 objetos, la princesa 2, la bruja 1 el profesor 2 y el príncipe 3. El objetivo de estos problemas será llegar a un determinado número de puntos cada individuo, también se van sumando al cómputo global de puntos (J1 = 30 J2 = 20, J1 = 20 J2 = 30, J1 = 20 J2 = 30 y llegar a 60):

Ej6problema1:				
1 Agua Algoritmos	2 Arena Profesor Rosas	3 Arena Manzanas	4 Arena Jugador (Norte) Oscars	5 Arena Leonardo
6 Bosque	7 Bosque Oro	8 Arena Zapatillas	9 Arena Princesa	10 Precipicio
11 Roca Rosas	12 Arena Oro	13 Arena Bruja	14 Bosque	15 Precipicio
16 Agua	17 Agua	18 Arena Principe	19 Arena Jugador2 (Norte)	20 Arena
21 Roca Oscars	22 Arena	23 Bosque Bikini	24 Bosque	25 Agua

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej6dominio.pddl -f Ej6problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined

... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
   metric is plan length

Cueing down from goal distance: 28 into depth [1]
                                  22   [1]
                                  21   [1]
                                  20   [1][2]
                                  16   [1][2][3][4][5]
                                  15   [1]
                                  12   [1]
                                   9   [1][2][3][4][5][6][7][8][9][10][11][12]
                                   8   [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15]
                                   7
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25]
                                   6   [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16]
                                   5   [1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17]
                                   4   [1]
                                   3   [1]
                                   2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][2
8][29][30][31][32][33][34][35][36][37][38][39][40][41][42][43][44][45][46][47][48][49][50][51]
                                   1   [1]
                                   0

ff: found legal plan as follows

step   0: TURN-RIGHT NORTH PLAYER1
        1: TURN-RIGHT SOUTH PLAYER2
        2: MOVE-FORWARD WEST PLAYER2 Z19 Z18
        3: TAKE-OBJECT OSCARS PLAYER1 Z4
        4: MOVE-FORWARD EAST PLAYER1 Z4 Z5
        5: TURN-RIGHT WEST PLAYER2
        6: MOVE-FORWARD NORTH PLAYER2 Z18 Z13
        7: MOVE-FORWARD NORTH PLAYER2 Z13 Z8
        8: MOVE-FORWARD NORTH PLAYER2 Z8 Z3

9: TURN-RIGHT NORTH PLAYER2
10: MOVE-FORWARD EAST PLAYER2 Z3 Z4
11: MOVE-FORWARD EAST PLAYER2 Z4 Z5
12: PUT-OBJECT-BAG OSCARS PLAYER1
13: TURN-RIGHT EAST PLAYER2
14: TURN-RIGHT SOUTH PLAYER2
15: MOVE-FORWARD WEST PLAYER2 Z5 Z4
16: MOVE-FORWARD WEST PLAYER2 Z4 Z3
17: TURN-RIGHT WEST PLAYER2
18: TURN-RIGHT NORTH PLAYER2
19: TAKE-OBJECT MANZANAS PLAYER2 Z3
20: MOVE-FORWARD EAST PLAYER2 Z3 Z4
21: MOVE-FORWARD EAST PLAYER2 Z4 Z5
22: GIVE-OBJECT Z5 MANZANAS PLAYER2 LEONARDODICAPRIO
23: EXTRACT-OBJECT-BAG OSCARS PLAYER1
24: DROP-OBJECT OSCARS PLAYER1 Z5
25: TAKE-OBJECT OSCARS PLAYER2 Z5
26: TURN-LEFT EAST PLAYER1
27: TURN-LEFT NORTH PLAYER1
28: MOVE-FORWARD WEST PLAYER1 Z5 Z4
29: MOVE-FORWARD WEST PLAYER1 Z4 Z3
30: DROP-OBJECT OSCARS PLAYER2 Z5
31: MOVE-FORWARD WEST PLAYER1 Z3 Z2
32: TAKE-OBJECT ROSAS PLAYER1 Z2
33: GIVE-OBJECT Z2 ROSAS PLAYER1 PROFESOR
34: TURN-LEFT WEST PLAYER1
35: TURN-LEFT SOUTH PLAYER1
36: MOVE-FORWARD EAST PLAYER1 Z2 Z3
37: MOVE-FORWARD EAST PLAYER1 Z3 Z4
38: MOVE-FORWARD EAST PLAYER1 Z4 Z5
39: TAKE-OBJECT OSCARS PLAYER2 Z5
40: GIVE-OBJECT Z5 OSCARS PLAYER2 LEONARDODICAPRIO
41: TURN-LEFT EAST PLAYER1
42: TURN-LEFT NORTH PLAYER1
43: MOVE-FORWARD WEST PLAYER1 Z5 Z4
44: MOVE-FORWARD WEST PLAYER1 Z4 Z3
45: TURN-LEFT WEST PLAYER1
46: MOVE-FORWARD SOUTH PLAYER1 Z3 Z8
47: TURN-RIGHT EAST PLAYER2
48: TURN-RIGHT SOUTH PLAYER2
49: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
50: MOVE-FORWARD WEST PLAYER2 Z5 Z4
51: MOVE-FORWARD WEST PLAYER2 Z4 Z3
52: TURN-RIGHT SOUTH PLAYER1
53: MOVE-FORWARD WEST PLAYER1 Z13 Z12
54: TURN-LEFT WEST PLAYER2

55: MOVE-FORWARD SOUTH PLAYER2 Z3 Z8
56: MOVE-FORWARD SOUTH PLAYER2 Z8 Z13
57: TURN-LEFT WEST PLAYER1
58: TURN-LEFT SOUTH PLAYER1
59: TAKE-OBJECT ORO PLAYER1 Z12
60: MOVE-FORWARD EAST PLAYER1 Z12 Z13
61: TURN-RIGHT EAST PLAYER1
62: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
63: MOVE-FORWARD SOUTH PLAYER2 Z13 Z18
64: GIVE-OBJECT Z18 ORO PLAYER1 PRINCIPE
65: TURN-RIGHT SOUTH PLAYER2
66: TURN-RIGHT WEST PLAYER2
67: MOVE-FORWARD NORTH PLAYER2 Z18 Z13
68: MOVE-FORWARD NORTH PLAYER2 Z13 Z8
69: TAKE-OBJECT ZAPATILLA PLAYER2 Z8
70: TURN-LEFT NORTH PLAYER2
71: MOVE-FORWARD-FOREST WEST PLAYER2 Z8 Z7
72: TURN-LEFT WEST PLAYER2
73: TURN-LEFT SOUTH PLAYER2
74: PUT-OBJECT-BAG ZAPATILLA PLAYER2
75: TAKE-OBJECT ORO PLAYER2 Z7
76: MOVE-FORWARD EAST PLAYER2 Z7 Z8
77: TURN-RIGHT EAST PLAYER2
78: MOVE-FORWARD SOUTH PLAYER2 Z8 Z13
79: MOVE-FORWARD SOUTH PLAYER2 Z13 Z18
80: GIVE-OBJECT Z18 ORO PLAYER2 PRINCIPE
81: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER2
82: DROP-OBJECT ZAPATILLA PLAYER2 Z18
83: TURN-LEFT SOUTH PLAYER1
84: TAKE-OBJECT ZAPATILLA PLAYER1 Z18
85: TURN-LEFT EAST PLAYER1
86: PUT-OBJECT-BAG ZAPATILLA PLAYER1
87: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
88: TURN-LEFT NORTH PLAYER1
89: MOVE-FORWARD WEST PLAYER1 Z13 Z12
90: MOVE-FORWARD WEST PLAYER1 Z12 Z11
91: TURN-LEFT WEST PLAYER1
92: TURN-LEFT SOUTH PLAYER1
93: TAKE-OBJECT ROSAS PLAYER1 Z11
94: MOVE-FORWARD EAST PLAYER1 Z11 Z12
95: MOVE-FORWARD EAST PLAYER1 Z12 Z13
96: MOVE-FORWARD-FOREST EAST PLAYER1 Z13 Z14
97: TURN-LEFT EAST PLAYER1
98: MOVE-FORWARD NORTH PLAYER1 Z14 Z9
99: GIVE-OBJECT Z9 ROSAS PLAYER1 PRINCESA
100: TURN-LEFT NORTH PLAYER1

101: MOVE-FORWARD WEST PLAYER1 Z9 Z8
102: TURN-LEFT WEST PLAYER1
103: MOVE-FORWARD SOUTH PLAYER1 Z8 Z13
104: MOVE-FORWARD SOUTH PLAYER1 Z13 Z18
105: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z18 Z23
106: TURN-RIGHT SOUTH PLAYER1
107: MOVE-FORWARD WEST PLAYER1 Z23 Z22
108: MOVE-FORWARD WEST PLAYER1 Z22 Z21
109: TURN-LEFT WEST PLAYER1
110: TURN-LEFT SOUTH PLAYER1
111: TAKE-OBJECT OSCARS PLAYER1 Z21
112: MOVE-FORWARD EAST PLAYER1 Z21 Z22
113: MOVE-FORWARD-FOREST EAST PLAYER1 Z22 Z23
114: MOVE-FORWARD-FOREST EAST PLAYER1 Z23 Z24
115: TURN-LEFT EAST PLAYER1
116: MOVE-FORWARD NORTH PLAYER1 Z24 Z19
117: TURN-LEFT NORTH PLAYER1
118: MOVE-FORWARD WEST PLAYER1 Z19 Z18
119: GIVE-OBJECT Z18 OSCARS PLAYER1 PRINCIPE
120: TURN-LEFT WEST PLAYER1
121: MOVE-FORWARD-FOREST SOUTH PLAYER1 Z18 Z23
122: TURN-LEFT SOUTH PLAYER1
123: TURN-LEFT EAST PLAYER1
124: TAKE-OBJECT BIKINI PLAYER1 Z23
125: MOVE-FORWARD NORTH PLAYER1 Z23 Z18
126: DROP-OBJECT BIKINI PLAYER1 Z18
127: MOVE-FORWARD NORTH PLAYER1 Z18 Z13
128: MOVE-FORWARD NORTH PLAYER1 Z13 Z8
129: MOVE-FORWARD NORTH PLAYER1 Z8 Z3
130: TURN-LEFT SOUTH PLAYER2
131: TURN-LEFT EAST PLAYER2
132: EXTRACT-OBJECT-BAG ZAPATILLA PLAYER1
133: TURN-LEFT NORTH PLAYER1
134: DROP-OBJECT ZAPATILLA PLAYER1 Z3
135: TAKE-OBJECT BIKINI PLAYER2 Z18
136: MOVE-FORWARD NORTH PLAYER2 Z18 Z13
137: MOVE-FORWARD NORTH PLAYER2 Z13 Z8
138: PUT-OBJECT-BAG BIKINI PLAYER2
139: MOVE-FORWARD NORTH PLAYER2 Z8 Z3
140: MOVE-FORWARD WEST PLAYER1 Z3 Z2
141: TURN-LEFT NORTH PLAYER2
142: MOVE-FORWARD WEST PLAYER2 Z3 Z2
143: MOVE-FORWARD-WATER WEST PLAYER2 Z2 Z1
144: TURN-RIGHT WEST PLAYER2
145: TURN-RIGHT NORTH PLAYER2
146: TAKE-OBJECT ALGORITMOS PLAYER2 Z1

147: MOVE-FORWARD EAST PLAYER2 Z1 Z2
148: DROP-OBJECT ALGORITMOS PLAYER2 Z2
149: TAKE-OBJECT ALGORITMOS PLAYER1 Z2
150: GIVE-OBJECT Z2 ALGORITMOS PLAYER1 PROFESOR

time spent: 0.01 seconds instantiating 5580 easy, 112 hard action templates
0.00 seconds reachability analysis, yielding 1543 facts and 932 actions
0.00 seconds creating final representation with 422 relevant facts, 14 relevant fluents
0.01 seconds computing LNF
0.00 seconds building connectivity graph
43.55 seconds searching, evaluating 264339 states, to a max depth of 51
43.57 seconds total time

Ej6problema2:				
1 Arena Profesor Oscar	2 Arena Oscars	3 Arena Leonardo	4 Arena Rosas	5 Arena Principe Rosas
6 Arena Zapatilla	7 Arena Algoritmos	8 Arena Manzanas	9 Arena Algoritmos	10 Arena
11 Arena Manzanas	12 Arena Jugador (Norte)	13 Arena	14 Arena	15 Arena Bruja
16 Arena Oro	17 Precipicio	18 Precipicio	19 Precipicio	20 Precipicio
21 Arena Bikini	22 Arena Princesa Oro	23 Arena Jugador2 (Norte)	24 Agua Oro	25 Arena Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej6dominio.pddl -f Ej6problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
   metric is plan length

Cueing down from goal distance: 39 into depth [1]
                              34   [1]
                              33   [1]
                              32   [1][2]
                              31   [1]
                              30   [1]
                              28   [1][2]
                              27   [1][2]
                              22   [1]
                              21   [1][2]
                              20   [1][2]
                              19   [1]
                              18   [1]
                              17   [1]
                              12   [1]
                              11   [1]
                              10   [1][2][3][4][5][6][7]
                               8   [1][2][3][4][5][6][7]
                               7   [1][2][3][4][5][6][7][8][9]
                               6   [1][2][3][4][5][6][7][8][9][10][11][12][13][14]
                               5   [1][2][3][4][5][6][7][8][9][10][11][12]
                               4   [1]
                               3   [1]
                               2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26]
                               1   [1]
                               0

ff: found legal plan as follows

step   0: MOVE-FORWARD NORTH PLAYER1 Z12 Z7
        1: TURN-LEFT SOUTH PLAYER2
        2: MOVE-FORWARD NORTH PLAYER1 Z7 Z2
        3: TURN-LEFT EAST PLAYER2
        4: TURN-LEFT NORTH PLAYER1

5: TURN-LEFT NORTH PLAYER2
6: MOVE-FORWARD WEST PLAYER2 Z23 Z22
7: MOVE-FORWARD WEST PLAYER2 Z22 Z21
8: TURN-RIGHT WEST PLAYER2
9: MOVE-FORWARD NORTH PLAYER2 Z21 Z16
10: MOVE-FORWARD NORTH PLAYER2 Z16 Z11
11: MOVE-FORWARD NORTH PLAYER2 Z11 Z6
12: TURN-LEFT WEST PLAYER1
13: MOVE-FORWARD NORTH PLAYER2 Z6 Z1
14: TURN-LEFT SOUTH PLAYER1
15: TURN-LEFT EAST PLAYER1
16: TURN-RIGHT NORTH PLAYER2
17: TAKE-OBJECT OSCARS PLAYER2 Z1
18: GIVE-OBJECT Z1 OSCARS PLAYER2 PROFESOR
19: TURN-RIGHT NORTH PLAYER1
20: MOVE-FORWARD EAST PLAYER2 Z1 Z2
21: TAKE-OBJECT OSCARS PLAYER1 Z2
22: MOVE-FORWARD EAST PLAYER1 Z2 Z3
23: MOVE-FORWARD EAST PLAYER2 Z2 Z3
24: MOVE-FORWARD EAST PLAYER2 Z3 Z4
25: TURN-RIGHT EAST PLAYER2
26: TURN-RIGHT SOUTH PLAYER2
27: MOVE-FORWARD WEST PLAYER2 Z4 Z3
28: DROP-OBJECT OSCARS PLAYER1 Z3
29: MOVE-FORWARD EAST PLAYER1 Z3 Z4
30: TURN-LEFT EAST PLAYER1
31: TURN-LEFT NORTH PLAYER1
32: TAKE-OBJECT ROSAS PLAYER1 Z4
33: MOVE-FORWARD WEST PLAYER1 Z4 Z3
34: GIVE-OBJECT Z3 ROSAS PLAYER1 LEONARDODICAPRIO
35: TAKE-OBJECT OSCARS PLAYER1 Z3
36: PUT-OBJECT-BAG OSCARS PLAYER1
37: TURN-LEFT WEST PLAYER2
38: MOVE-FORWARD SOUTH PLAYER2 Z3 Z8
39: TAKE-OBJECT MANZANAS PLAYER2 Z8
40: MOVE-FORWARD SOUTH PLAYER2 Z8 Z13
41: TURN-LEFT SOUTH PLAYER2
42: MOVE-FORWARD EAST PLAYER2 Z13 Z14
43: MOVE-FORWARD EAST PLAYER2 Z14 Z15
44: GIVE-OBJECT Z15 MANZANAS PLAYER2 BRUJA
45: TURN-RIGHT EAST PLAYER2
46: TURN-RIGHT SOUTH PLAYER2
47: MOVE-FORWARD WEST PLAYER2 Z15 Z14
48: MOVE-FORWARD WEST PLAYER2 Z14 Z13
49: MOVE-FORWARD WEST PLAYER2 Z13 Z12
50: MOVE-FORWARD WEST PLAYER2 Z12 Z11

51: TURN-LEFT WEST PLAYER2
52: TAKE-OBJECT MANZANAS PLAYER2 Z11
53: TURN-LEFT SOUTH PLAYER2
54: MOVE-FORWARD EAST PLAYER2 Z11 Z12
55: MOVE-FORWARD EAST PLAYER2 Z12 Z13
56: MOVE-FORWARD EAST PLAYER2 Z13 Z14
57: MOVE-FORWARD EAST PLAYER2 Z14 Z15
58: GIVE-OBJECT Z15 MANZANAS PLAYER2 BRUJA
59: TURN-RIGHT EAST PLAYER2
60: TURN-RIGHT SOUTH PLAYER2
61: MOVE-FORWARD WEST PLAYER2 Z15 Z14
62: TURN-RIGHT WEST PLAYER2
63: MOVE-FORWARD NORTH PLAYER2 Z14 Z9
64: TAKE-OBJECT ALGORITMOS PLAYER2 Z9
65: MOVE-FORWARD NORTH PLAYER2 Z9 Z4
66: TURN-RIGHT NORTH PLAYER2
67: MOVE-FORWARD EAST PLAYER2 Z4 Z5
68: GIVE-OBJECT Z5 ALGORITMOS PLAYER2 PRINCIPE
69: TAKE-OBJECT ROSAS PLAYER2 Z5
70: GIVE-OBJECT Z5 ROSAS PLAYER2 PRINCIPE
71: EXTRACT-OBJECT-BAG OSCARS PLAYER1
72: GIVE-OBJECT Z3 OSCARS PLAYER1 LEONARDODICAPRIO
73: MOVE-FORWARD WEST PLAYER1 Z3 Z2
74: MOVE-FORWARD WEST PLAYER1 Z2 Z1
75: TURN-LEFT WEST PLAYER1
76: MOVE-FORWARD SOUTH PLAYER1 Z1 Z6
77: MOVE-FORWARD SOUTH PLAYER1 Z6 Z11
78: MOVE-FORWARD SOUTH PLAYER1 Z11 Z16
79: MOVE-FORWARD SOUTH PLAYER1 Z16 Z21
80: TURN-LEFT SOUTH PLAYER1
81: MOVE-FORWARD EAST PLAYER1 Z21 Z22
82: TAKE-OBJECT ORO PLAYER1 Z22
83: GIVE-OBJECT Z22 ORO PLAYER1 PRINCESA
84: TURN-LEFT EAST PLAYER1
85: TURN-LEFT NORTH PLAYER1
86: MOVE-FORWARD WEST PLAYER1 Z22 Z21
87: TURN-RIGHT WEST PLAYER1
88: MOVE-FORWARD NORTH PLAYER1 Z21 Z16
89: TAKE-OBJECT ORO PLAYER1 Z16
90: MOVE-FORWARD NORTH PLAYER1 Z16 Z11
91: MOVE-FORWARD NORTH PLAYER1 Z11 Z6
92: MOVE-FORWARD NORTH PLAYER1 Z6 Z1
93: TURN-RIGHT NORTH PLAYER1
94: MOVE-FORWARD EAST PLAYER1 Z1 Z2
95: MOVE-FORWARD EAST PLAYER1 Z2 Z3
96: MOVE-FORWARD EAST PLAYER1 Z3 Z4

97: MOVE-FORWARD EAST PLAYER1 Z4 Z5
98: GIVE-OBJECT Z5 ORO PLAYER1 PRINCIPE

time spent: 0.01 seconds instantiating 5612 easy, 12 hard action templates
0.01 seconds reachability analysis, yielding 1525 facts and 798 actions
0.00 seconds creating final representation with 390 relevant facts, 14 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
5.02 seconds searching, evaluating 49272 states, to a max depth of 26
5.04 seconds total time

Ej6problema3:					
		23 Roca	24 Arena		
19 Arena Oro	20 Roca	21 Precipicio	22 Arena Princesa		
18 Bosque	1 Arena Profesor Oscars	2 Roca Oscars	3 Arena Leonardo Bikini	4 Agua Rosas	5 Arena Principe Rosas
17 Arena		25 Agua Algoritmos			6 Roca Algoritmos
16 Arena Oro					7 Precipicio
15 Roca Bruja					8 Roca Manzanas
14 Arena Zapatillas	13 Arena Oro	12 Roca Jugador (Norte)	11 Roca Manzanas	10 Arena	9 Agua Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej6dominio.pddl -f Ej6problema3.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
   metric is plan length

Cueing down from goal distance: 28 into depth [1][2]
                                  27   [1][2][3][4]
                                  26   [1][2]
                                  25   [1]
                                  24   [1]
                                  21   [1][2]
                                  20   [1][2]
                                  15   [1]
                                  13   [1][2][3][4][5][6][7]
                                  12   [1][2][3][4][5][6][7][8]
                                  11   [1][2][3][4][5][6][7][8][9][10][11]
                                   9   [1][2][3][4][5][6][7][8][9][10][11][12]
                                   8   [1][2][3][4][5][6][7]
                                   7   [1][2][3][4][5][6][7]
                                   5   [1]
                                   4
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][28][29][30][31]
                                   3   [1]
                                   2   [1]
                                   1   [1]
                                   0

ff: found legal plan as follows

step   0: MOVE-FORWARD SOUTH PLAYER2 Z24 Z22
        1: TURN-LEFT SOUTH PLAYER2
        2: TURN-RIGHT NORTH PLAYER1
        3: MOVE-FORWARD EAST PLAYER1 Z12 Z11
        4: TURN-LEFT EAST PLAYER1
        5: TURN-LEFT NORTH PLAYER1
        6: TAKE-OBJECT MANZANAS PLAYER1 Z11
        7: MOVE-FORWARD WEST PLAYER1 Z11 Z12

8: MOVE-FORWARD WEST PLAYER1 Z12 Z13
9: MOVE-FORWARD WEST PLAYER1 Z13 Z14
10: TURN-RIGHT WEST PLAYER1
11: TURN-RIGHT EAST PLAYER2
12: MOVE-FORWARD SOUTH PLAYER2 Z22 Z3
13: TURN-RIGHT SOUTH PLAYER2
14: MOVE-FORWARD NORTH PLAYER1 Z14 Z15
15: GIVE-OBJECT Z15 MANZANAS PLAYER1 BRUJA
16: MOVE-FORWARD WEST PLAYER2 Z3 Z2
17: TURN-RIGHT WEST PLAYER2
18: TURN-RIGHT NORTH PLAYER2
19: TAKE-OBJECT OSCARS PLAYER2 Z2
20: MOVE-FORWARD EAST PLAYER2 Z2 Z3
21: TURN-LEFT EAST PLAYER2
22: PUT-OBJECT-BAG OSCARS PLAYER2
23: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
24: TURN-LEFT NORTH PLAYER1
25: TURN-LEFT WEST PLAYER1
26: TAKE-OBJECT ORO PLAYER1 Z16
27: MOVE-FORWARD SOUTH PLAYER1 Z16 Z15
28: DROP-OBJECT ORO PLAYER1 Z15
29: EXTRACT-OBJECT-BAG OSCARS PLAYER2
30: GIVE-OBJECT Z3 OSCARS PLAYER2 LEONARDODICAPRIO
31: TAKE-OBJECT BIKINI PLAYER2 Z3
32: TURN-RIGHT NORTH PLAYER2
33: MOVE-FORWARD-WATER EAST PLAYER2 Z3 Z4
34: TURN-RIGHT EAST PLAYER2
35: PUT-OBJECT-BAG BIKINI PLAYER2
36: TURN-RIGHT SOUTH PLAYER2
37: TAKE-OBJECT ROSAS PLAYER2 Z4
38: MOVE-FORWARD WEST PLAYER2 Z4 Z3
39: TURN-RIGHT WEST PLAYER2
40: MOVE-FORWARD NORTH PLAYER2 Z3 Z22
41: GIVE-OBJECT Z22 ROSAS PLAYER2 PRINCESA
42: TURN-RIGHT NORTH PLAYER2
43: TURN-RIGHT EAST PLAYER2
44: MOVE-FORWARD SOUTH PLAYER2 Z22 Z3
45: TURN-RIGHT SOUTH PLAYER2
46: MOVE-FORWARD WEST PLAYER2 Z3 Z2
47: MOVE-FORWARD WEST PLAYER2 Z2 Z1
48: TURN-RIGHT WEST PLAYER2
49: TURN-RIGHT NORTH PLAYER2
50: TAKE-OBJECT OSCARS PLAYER2 Z1
51: MOVE-FORWARD EAST PLAYER2 Z1 Z2
52: MOVE-FORWARD EAST PLAYER2 Z2 Z3
53: GIVE-OBJECT Z3 OSCARS PLAYER2 LEONARDODICAPRIO

54: MOVE-FORWARD-WATER EAST PLAYER2 Z3 Z4
55: MOVE-FORWARD EAST PLAYER2 Z4 Z5
56: TURN-RIGHT EAST PLAYER2
57: TAKE-OBJECT ROSAS PLAYER2 Z5
58: GIVE-OBJECT Z5 ROSAS PLAYER2 PRINCIPE
59: MOVE-FORWARD SOUTH PLAYER2 Z5 Z6
60: TURN-LEFT SOUTH PLAYER2
61: TURN-LEFT EAST PLAYER2
62: TAKE-OBJECT ALGORITMOS PLAYER2 Z6
63: MOVE-FORWARD NORTH PLAYER2 Z6 Z5
64: GIVE-OBJECT Z5 ALGORITMOS PLAYER2 PRINCIPE
65: TAKE-OBJECT ORO PLAYER1 Z15
66: GIVE-OBJECT Z15 ORO PLAYER1 BRUJA
67: TURN-LEFT NORTH PLAYER2
68: MOVE-FORWARD-WATER WEST PLAYER2 Z5 Z4
69: MOVE-FORWARD WEST PLAYER2 Z4 Z3
70: MOVE-FORWARD WEST PLAYER2 Z3 Z2
71: TURN-LEFT WEST PLAYER2
72: MOVE-FORWARD-WATER SOUTH PLAYER2 Z2 Z25
73: TURN-LEFT SOUTH PLAYER2
74: TURN-LEFT EAST PLAYER2
75: TAKE-OBJECT ALGORITMOS PLAYER2 Z25
76: MOVE-FORWARD NORTH PLAYER2 Z25 Z2
77: TURN-LEFT NORTH PLAYER2
78: MOVE-FORWARD WEST PLAYER2 Z2 Z1
79: TURN-RIGHT WEST PLAYER2
80: DROP-OBJECT ALGORITMOS PLAYER2 Z1
81: MOVE-FORWARD NORTH PLAYER2 Z1 Z20
82: TURN-LEFT NORTH PLAYER2
83: TAKE-OBJECT ZAPATILLA PLAYER2 Z20
84: MOVE-FORWARD WEST PLAYER2 Z20 Z19
85: TURN-LEFT WEST PLAYER2
86: MOVE-FORWARD-FOREST SOUTH PLAYER2 Z19 Z18
87: MOVE-FORWARD SOUTH PLAYER2 Z18 Z17
88: TURN-LEFT SOUTH PLAYER1
89: TURN-LEFT EAST PLAYER1
90: MOVE-FORWARD NORTH PLAYER1 Z15 Z16
91: DROP-OBJECT ZAPATILLA PLAYER2 Z17
92: MOVE-FORWARD NORTH PLAYER1 Z16 Z17
93: TAKE-OBJECT ZAPATILLA PLAYER1 Z17
94: MOVE-FORWARD-FOREST NORTH PLAYER1 Z17 Z18
95: TURN-RIGHT NORTH PLAYER1
96: DROP-OBJECT ZAPATILLA PLAYER1 Z18
97: MOVE-FORWARD EAST PLAYER1 Z18 Z1
98: TAKE-OBJECT ALGORITMOS PLAYER1 Z1
99: GIVE-OBJECT Z1 ALGORITMOS PLAYER1 PROFESOR

time spent: 0.01 seconds instantiating 5576 easy, 32 hard action templates
0.01 seconds reachability analysis, yielding 1543 facts and 846 actions
0.00 seconds creating final representation with 422 relevant facts, 14 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
51.36 seconds searching, evaluating 270716 states, to a max depth of 31
51.38 seconds total time

Ejercicio 7

Ejercicio 7.a y 7.b:

- Ahora debemos de cambiar nuestro jugador 2 por un tipo nuevo de jugador que sólo cooperará con el jugador main que también es un nuevo tipo. Como indica el ejercicio el cooperante hace solo las acciones que se indican en el ejercicio y el main solo las que se indican para el. Para hacer este ejercicio hemos tenido que modificar gran parte de las acciones (exceptuando giros aunque hemos tenido que duplicarlos pues los tipos de jugador son diferentes) pues cada uno puede hacer un determinado número. Para hacer esta modificación básicamente nos hemos basado en las restricciones impuestas y en varios casos hemos tenido que duplicar acciones tanto para el main como para el cooperante. La idea es algo como el ejercicio 6 pero ahora los jugadores están restringidos.
- Los problemas creados para comprobar ponen a prueba este nuevo dominio con situaciones complicadas en los que tiene que haber muchos cambios de objetos entre otras cosas.

- El objetivo de estos problemas es obtener un determinado número de puntos o más (30, 30, 15), en caso de colocar un umbral más alto el tiempo hasta obtener un plan es bastante largo por lo que no lo hemos colocado ya que si resuelve estos problemas resolverá cualquiera:

Ej7problema1:				
1 Agua Princesa	2 Arena	3 Arena Principe	4 Arena Main (Norte)	5 Arena Zapatillas
6 Bosque Manzanas	7 Bosque	8 Roca	9 Arena	10 Bosque Oscars
11 Roca Oro	12 Precipicio	13 Bosque Bruja	14 Arena	15 Arena Profesor
16 Agua Oro	17 Arena Rosas	18 Arena	19 Arena Cooperante (Sur) Bikini	20 Arena
21 Roca Leonardo	22 Arena	23 Bosque Rosas	24 Bosque	25 Agua Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej7dominio.pddl -f Ej7problema1.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 29 into depth [1]
                                  28   [1]
                                  18   [1]
                                  17   [1][2]

```
                    16          [1][2]
                    11          [1][2]
                    10          [1]
                     9          [1]
                     8          [1]
                     7          [1][2][3][4]
                     6          [1]
                     5          [1][2][3][4]
                     4          [1]
                     3
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22]
                     2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25]
                     1          [1]
                     0

ff: found legal plan as follows

step    0: TURN-LEFT-MAIN NORTH MAIN1
        1: TURN-LEFT-COOPERANT SOUTH COOPERANT1
        2: TURN-LEFT-MAIN WEST MAIN1
        3: TAKE-OBJECT-COOPERANT BIKINI COOPERANT1 Z19
        4: PUT-OBJECT-BAG-COOPERANT BIKINI COOPERANT1
        5: MOVE-FORWARD-MAIN SOUTH MAIN1 Z4 Z9
        6: MOVE-FORWARD-MAIN SOUTH MAIN1 Z9 Z14
        7: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z19 Z20
        8: TURN-RIGHT-COOPERANT EAST COOPERANT1
        9: TURN-LEFT-MAIN SOUTH MAIN1
       10: MOVE-FORWARD-MAIN EAST MAIN1 Z14 Z15
       11: TURN-RIGHT-MAIN EAST MAIN1
       12: MOVE-FORWARD-WATER-COOPERANT SOUTH COOPERANT1 Z20 Z25
       13: TURN-LEFT-COOPERANT SOUTH COOPERANT1
       14: TURN-LEFT-COOPERANT EAST COOPERANT1
       15: TAKE-OBJECT-COOPERANT ALGORITMOS COOPERANT1 Z25
       16: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z25 Z20
       17: MOVE-FORWARD-MAIN SOUTH MAIN1 Z15 Z20
       18: TURN-LEFT-MAIN SOUTH MAIN1
       19: TURN-LEFT-MAIN EAST MAIN1
       20: GIVE-OBJECT-COOPERANT Z20 ALGORITMOS COOPERANT1 MAIN1
       21: MOVE-FORWARD-MAIN NORTH MAIN1 Z20 Z15
       22: GIVE-OBJECT-MAIN Z15 ALGORITMOS MAIN1 PROFESOR
       23: TURN-LEFT-COOPERANT NORTH COOPERANT1
       24: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z20 Z19
       25: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z19 Z18
       26: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z18 Z17
       27: MOVE-FORWARD-WATER-COOPERANT WEST COOPERANT1 Z17 Z16
```

28: TURN-RIGHT-COOPERANT WEST COOPERANT1
29: TURN-RIGHT-COOPERANT NORTH COOPERANT1
30: TURN-LEFT-MAIN NORTH MAIN1
31: MOVE-FORWARD-MAIN WEST MAIN1 Z15 Z14
32: TURN-RIGHT-MAIN WEST MAIN1
33: TAKE-OBJECT-COOPERANT ORO COOPERANT1 Z16
34: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z16 Z17
35: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z17 Z18
36: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z18 Z19
37: TURN-LEFT-COOPERANT EAST COOPERANT1
38: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z19 Z14
39: GIVE-OBJECT-COOPERANT Z14 ORO COOPERANT1 MAIN1
40: MOVE-FORWARD-MAIN NORTH MAIN1 Z14 Z9
41: MOVE-FORWARD-MAIN NORTH MAIN1 Z9 Z4
42: TURN-LEFT-MAIN NORTH MAIN1
43: MOVE-FORWARD-MAIN WEST MAIN1 Z4 Z3
44: GIVE-OBJECT-MAIN Z3 ORO MAIN1 PRINCIPE
45: TURN-RIGHT-COOPERANT NORTH COOPERANT1
46: TURN-RIGHT-COOPERANT EAST COOPERANT1
47: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z14 Z19
48: TURN-RIGHT-COOPERANT SOUTH COOPERANT1
49: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z19 Z18
50: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z18 Z17
51: MOVE-FORWARD-WATER-COOPERANT WEST COOPERANT1 Z17 Z16
52: TURN-RIGHT-COOPERANT WEST COOPERANT1
53: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z16 Z11
54: TURN-RIGHT-COOPERANT NORTH COOPERANT1
55: TURN-RIGHT-COOPERANT EAST COOPERANT1
56: TAKE-OBJECT-COOPERANT ORO COOPERANT1 Z11
57: MOVE-FORWARD-WATER-COOPERANT SOUTH COOPERANT1 Z11 Z16
58: TURN-LEFT-COOPERANT SOUTH COOPERANT1
59: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z16 Z17
60: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z17 Z18
61: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z18 Z19
62: TURN-LEFT-COOPERANT EAST COOPERANT1
63: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z19 Z14
64: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z14 Z9
65: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z9 Z4
66: TURN-LEFT-COOPERANT NORTH COOPERANT1
67: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z4 Z3
68: GIVE-OBJECT-COOPERANT Z3 ORO COOPERANT1 MAIN1
69: GIVE-OBJECT-MAIN Z3 ORO MAIN1 PRINCIPE

time spent: 0.01 seconds instantiating 5346 easy, 108 hard action templates
0.01 seconds reachability analysis, yielding 1556 facts and 935 actions

0.00 seconds creating final representation with 442 relevant facts, 12 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
57.66 seconds searching, evaluating 296790 states, to a max depth of 25
57.68 seconds total time

Ej7problema2:				
1 Arena Profesor	2 Arena Oscars	3 Arena Leonardo	4 Arena Rosas	5 Arena Principe
6 Arena Zapatilla	7 Arena	8 Arena Manzanas	9 Arena	10 Arena
11 Arena	12 Arena Main (Norte)	13 Arena	14 Arena	15 Arena Bruja
16 Arena Oro	17 Precipicio	18 Precipicio	19 Precipicio	20 Precipicio
21 Arena Bikini	22 Arena Princesa	23 Arena Cooperante (Sur)	24 Agua	25 Arena Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej7dominio.pddl -f Ej7problema2.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 30 into depth [1]

28	[1]
20	[1]
19	[1]
18	[1]
16	[1]
15	[1]
14	[1][2][3]
13	[1][2]
12	[1][2]
10	[1]
8	[1]
7	[1]
5	[1]
4	[1]
3	[1][2][3][4][5][6]
2	[1][2][3][4][5][6][7][8][9][10][11]
1	[1]
0	

ff: found legal plan as follows

step   0: TURN-RIGHT-COOPERANT SOUTH COOPERANT1
        1: MOVE-FORWARD-MAIN NORTH MAIN1 Z12 Z7
        2: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z23 Z22
        3: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z22 Z21
        4: TURN-RIGHT-COOPERANT WEST COOPERANT1
        5: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z21 Z16
        6: TAKE-OBJECT-COOPERANT ORO COOPERANT1 Z16
        7: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z16 Z11
        8: MOVE-FORWARD-MAIN NORTH MAIN1 Z7 Z2
        9: TURN-RIGHT-MAIN NORTH MAIN1
       10: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z11 Z6
       11: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z6 Z1
       12: TURN-RIGHT-COOPERANT NORTH COOPERANT1
       13: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z1 Z2
       14: GIVE-OBJECT-COOPERANT Z2 ORO COOPERANT1 MAIN1
       15: TAKE-OBJECT-COOPERANT OSCARS COOPERANT1 Z2
       16: DROP-OBJECT-MAIN ORO MAIN1 Z2
       17: GIVE-OBJECT-COOPERANT Z2 OSCARS COOPERANT1 MAIN1
       18: MOVE-FORWARD-MAIN EAST MAIN1 Z2 Z3
       19: GIVE-OBJECT-MAIN Z3 OSCARS MAIN1 LEONARDODICAPRIO
       20: TAKE-OBJECT-COOPERANT ORO COOPERANT1 Z2

21: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z2 Z3
22: GIVE-OBJECT-COOPERANT Z3 ORO COOPERANT1 MAIN1
23: MOVE-FORWARD-MAIN EAST MAIN1 Z3 Z4
24: MOVE-FORWARD-MAIN EAST MAIN1 Z4 Z5
25: GIVE-OBJECT-MAIN Z5 ORO MAIN1 PRINCIPE
26: TURN-RIGHT-COOPERANT EAST COOPERANT1
27: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z3 Z8
28: TURN-LEFT-COOPERANT SOUTH COOPERANT1
29: TAKE-OBJECT-COOPERANT MANZANAS COOPERANT1 Z8
30: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z8 Z9
31: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z9 Z10
32: TURN-RIGHT-MAIN EAST MAIN1
33: MOVE-FORWARD-MAIN SOUTH MAIN1 Z5 Z10
34: GIVE-OBJECT-COOPERANT Z10 MANZANAS COOPERANT1 MAIN1
35: MOVE-FORWARD-MAIN SOUTH MAIN1 Z10 Z15
36: GIVE-OBJECT-MAIN Z15 MANZANAS MAIN1 BRUJA

time spent: 0.00 seconds instantiating 5372 easy, 12 hard action templates
0.01 seconds reachability analysis, yielding 1529 facts and 773 actions
0.00 seconds creating final representation with 394 relevant facts, 12 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
0.08 seconds searching, evaluating 1007 states, to a max depth of 11
0.09 seconds total time

Ej7problema3:					
		23 Roca	24 Cooperante (Norte) Arena		
19 Arena Oro	20 Roca Zapatillas	21 Precipicio	22 Arena Princesa		
18 Bosque	1 Arena Profesor Oscars	2 Roca Oscars	3 Arena Leonardo Bikini	4 Agua Rosas	5 Arena Principe Rosas
17 Arena		25 Agua Algoritmos			6 Roca Algoritmos
16 Arena Oro					7 Precipicio
15 Roca Bruja					8 Roca Manzanas
14 Arena	13 Arena Oro	12 Roca Main (Norte)	11 Roca Manzanas	10 Arena	9 Agua Algoritmos

./ff -p /home/adrianprodri/3-Computacion_y_sistemas_inteligentes/TSI/Practicas/Practica2/Ejercicios/ -o Ej7dominio.pddl -f Ej7problema3.pddl

ff: parsing domain file
domain 'EJERCICIO1-DOMAIN' defined
 ... done.
ff: parsing problem file
problem 'EJERCICIO1' defined
 ... done.

no metric specified. plan length assumed.

task contains conditional effects. turning off state domination.

checking for cyclic := effects --- OK.

ff: search configuration is EHC, if that fails then best-first on 1*g(s) + 5*h(s) where
    metric is plan length

Cueing down from goal distance: 30 into depth [1]
                                  29   [1]

28 [1][2]
27 [1][2]
26 [1]
25 [1]
24 [1]
23 [1][2][3][4]
22 [1][2]
21 [1][2][3][4][5][6][7]
20
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21]
16 [1]
13 [1]
12 [1][2][3]
8 [1]
7 [1][2][3][4]
6 [1]
5
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26]
3
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][28][29][30][31]
2
[1][2][3][4][5][6][7][8][9][10][11][12][13][14][15][16][17][18][19][20][21][22][23][24][25][26][27][28][29][30][31][32][33]
1 [1]
0

ff: found legal plan as follows

step 0: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z24 Z22
1: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z22 Z3
2: TAKE-OBJECT-COOPERANT BIKINI COOPERANT1 Z3
3: PUT-OBJECT-BAG-COOPERANT BIKINI COOPERANT1
4: TURN-LEFT-MAIN NORTH MAIN1
5: MOVE-FORWARD-MAIN WEST MAIN1 Z12 Z13
6: MOVE-FORWARD-MAIN WEST MAIN1 Z13 Z14
7: TURN-RIGHT-MAIN WEST MAIN1
8: MOVE-FORWARD-MAIN NORTH MAIN1 Z14 Z15
9: TURN-LEFT-COOPERANT SOUTH COOPERANT1
10: MOVE-FORWARD-WATER-COOPERANT EAST COOPERANT1 Z3 Z4
11: TURN-LEFT-COOPERANT EAST COOPERANT1
12: TURN-LEFT-COOPERANT NORTH COOPERANT1
13: TAKE-OBJECT-COOPERANT ROSAS COOPERANT1 Z4
14: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z4 Z3
15: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z3 Z2
16: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z2 Z1

17: TURN-RIGHT-COOPERANT WEST COOPERANT1
18: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z1 Z20
19: TURN-LEFT-COOPERANT NORTH COOPERANT1
20: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z20 Z19
21: TURN-LEFT-COOPERANT WEST COOPERANT1
22: TURN-LEFT-COOPERANT SOUTH COOPERANT1
23: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z19 Z20
24: TURN-RIGHT-COOPERANT EAST COOPERANT1
25: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z20 Z1
26: TURN-LEFT-COOPERANT SOUTH COOPERANT1
27: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z1 Z2
28: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z2 Z3
29: TURN-LEFT-COOPERANT EAST COOPERANT1
30: TURN-LEFT-COOPERANT NORTH COOPERANT1
31: DROP-OBJECT-COOPERANT ROSAS COOPERANT1 Z3
32: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z3 Z2
33: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z2 Z1
34: TURN-RIGHT-COOPERANT WEST COOPERANT1
35: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z1 Z20
36: TURN-LEFT-COOPERANT NORTH COOPERANT1
37: TAKE-OBJECT-COOPERANT ZAPATILLA COOPERANT1 Z20
38: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z20 Z19
39: TURN-LEFT-COOPERANT WEST COOPERANT1
40: MOVE-FORWARD-FOREST-COOPERANT SOUTH COOPERANT1 Z19 Z18
41: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z18 Z17
42: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z17 Z16
43: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z16 Z15
44: DROP-OBJECT-COOPERANT ZAPATILLA COOPERANT1 Z15
45: TURN-LEFT-COOPERANT SOUTH COOPERANT1
46: TURN-LEFT-COOPERANT EAST COOPERANT1
47: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z15 Z16
48: TAKE-OBJECT-COOPERANT ORO COOPERANT1 Z16
49: MOVE-FORWARD-MAIN NORTH MAIN1 Z15 Z16
50: TURN-LEFT-MAIN NORTH MAIN1
51: TURN-LEFT-MAIN WEST MAIN1
52: GIVE-OBJECT-COOPERANT Z16 ORO COOPERANT1 MAIN1
53: MOVE-FORWARD-MAIN SOUTH MAIN1 Z16 Z15
54: GIVE-OBJECT-MAIN Z15 ORO MAIN1 BRUJA
55: TURN-RIGHT-COOPERANT NORTH COOPERANT1
56: TURN-RIGHT-COOPERANT EAST COOPERANT1
57: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z16 Z15
58: TAKE-OBJECT-COOPERANT ZAPATILLA COOPERANT1 Z15
59: GIVE-OBJECT-COOPERANT Z15 ZAPATILLA COOPERANT1 MAIN1
60: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z15 Z14
61: TURN-LEFT-COOPERANT SOUTH COOPERANT1
62: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z14 Z13

63: PUT-OBJECT-BAG-MAIN ZAPATILLA MAIN1
64: TURN-LEFT-MAIN SOUTH MAIN1
65: TURN-LEFT-MAIN EAST MAIN1
66: TURN-RIGHT-COOPERANT EAST COOPERANT1
67: TURN-RIGHT-COOPERANT SOUTH COOPERANT1
68: TAKE-OBJECT-COOPERANT ORO COOPERANT1 Z13
69: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z13 Z14
70: TURN-RIGHT-COOPERANT WEST COOPERANT1
71: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z14 Z15
72: GIVE-OBJECT-COOPERANT Z15 ORO COOPERANT1 MAIN1
73: MOVE-FORWARD-MAIN NORTH MAIN1 Z15 Z16
74: MOVE-FORWARD-MAIN NORTH MAIN1 Z16 Z17
75: MOVE-FORWARD-FOREST-MAIN NORTH MAIN1 Z17 Z18
76: TURN-RIGHT-MAIN NORTH MAIN1
77: MOVE-FORWARD-MAIN EAST MAIN1 Z18 Z1
78: MOVE-FORWARD-MAIN EAST MAIN1 Z1 Z2
79: MOVE-FORWARD-MAIN EAST MAIN1 Z2 Z3
80: GIVE-OBJECT-MAIN Z3 ORO MAIN1 LEONARDODICAPRIO
81: TURN-LEFT-MAIN EAST MAIN1
82: TURN-LEFT-MAIN NORTH MAIN1
83: MOVE-FORWARD-MAIN WEST MAIN1 Z3 Z2
84: TURN-RIGHT-COOPERANT NORTH COOPERANT1
85: TURN-RIGHT-COOPERANT EAST COOPERANT1
86: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z15 Z14
87: TURN-LEFT-COOPERANT SOUTH COOPERANT1
88: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z14 Z13
89: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z13 Z12
90: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z12 Z11
91: TURN-RIGHT-COOPERANT EAST COOPERANT1
92: TURN-RIGHT-COOPERANT SOUTH COOPERANT1
93: MOVE-FORWARD-MAIN WEST MAIN1 Z2 Z1
94: MOVE-FORWARD-FOREST-MAIN WEST MAIN1 Z1 Z18
95: TURN-LEFT-MAIN WEST MAIN1
96: MOVE-FORWARD-MAIN SOUTH MAIN1 Z18 Z17
97: TAKE-OBJECT-COOPERANT MANZANAS COOPERANT1 Z11
98: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z11 Z12
99: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z12 Z13
100: MOVE-FORWARD-COOPERANT WEST COOPERANT1 Z13 Z14
101: TURN-RIGHT-COOPERANT WEST COOPERANT1
102: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z14 Z15
103: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z15 Z16
104: MOVE-FORWARD-COOPERANT NORTH COOPERANT1 Z16 Z17
105: TURN-LEFT-MAIN SOUTH MAIN1
106: TURN-LEFT-MAIN EAST MAIN1
107: GIVE-OBJECT-COOPERANT Z17 MANZANAS COOPERANT1 MAIN1
108: MOVE-FORWARD-FOREST-MAIN NORTH MAIN1 Z17 Z18

109: TURN-RIGHT-MAIN NORTH MAIN1
110: MOVE-FORWARD-MAIN EAST MAIN1 Z18 Z1
111: GIVE-OBJECT-MAIN Z1 MANZANAS MAIN1 PROFESOR
112: TURN-LEFT-MAIN EAST MAIN1
113: TURN-LEFT-MAIN NORTH MAIN1
114: MOVE-FORWARD-FOREST-MAIN WEST MAIN1 Z1 Z18
115: TURN-LEFT-MAIN WEST MAIN1
116: EXTRACT-OBJECT-BAG-MAIN ZAPATILLA MAIN1
117: EXTRACT-OBJECT-BAG-COOPERANT BIKINI COOPERANT1
118: MOVE-FORWARD-MAIN SOUTH MAIN1 Z18 Z17
119: DROP-OBJECT-MAIN ZAPATILLA MAIN1 Z17
120: GIVE-OBJECT-COOPERANT Z17 BIKINI COOPERANT1 MAIN1
121: TAKE-OBJECT-COOPERANT ZAPATILLA COOPERANT1 Z17
122: MOVE-FORWARD-FOREST-COOPERANT NORTH COOPERANT1 Z17 Z18
123: TURN-RIGHT-COOPERANT NORTH COOPERANT1
124: MOVE-FORWARD-COOPERANT EAST COOPERANT1 Z18 Z1
125: PUT-OBJECT-BAG-COOPERANT ZAPATILLA COOPERANT1
126: TURN-RIGHT-COOPERANT EAST COOPERANT1
127: TURN-RIGHT-COOPERANT SOUTH COOPERANT1
128: TAKE-OBJECT-COOPERANT OSCARS COOPERANT1 Z1
129: MOVE-FORWARD-FOREST-COOPERANT WEST COOPERANT1 Z1 Z18
130: TURN-LEFT-COOPERANT WEST COOPERANT1
131: MOVE-FORWARD-COOPERANT SOUTH COOPERANT1 Z18 Z17
132: DROP-OBJECT-MAIN BIKINI MAIN1 Z17
133: GIVE-OBJECT-COOPERANT Z17 OSCARS COOPERANT1 MAIN1
134: EXTRACT-OBJECT-BAG-COOPERANT ZAPATILLA COOPERANT1
135: PUT-OBJECT-BAG-MAIN OSCARS MAIN1
136: GIVE-OBJECT-COOPERANT Z17 ZAPATILLA COOPERANT1 MAIN1
137: TURN-LEFT-MAIN SOUTH MAIN1
138: TURN-LEFT-MAIN EAST MAIN1
139: MOVE-FORWARD-FOREST-MAIN NORTH MAIN1 Z17 Z18
140: DROP-OBJECT-MAIN ZAPATILLA MAIN1 Z18
141: TURN-RIGHT-MAIN NORTH MAIN1
142: EXTRACT-OBJECT-BAG-MAIN OSCARS MAIN1
143: MOVE-FORWARD-MAIN EAST MAIN1 Z18 Z1
144: GIVE-OBJECT-MAIN Z1 OSCARS MAIN1 PROFESOR

time spent: 0.01 seconds instantiating 5336 easy, 32 hard action templates
0.01 seconds reachability analysis, yielding 1547 facts and 821 actions
0.00 seconds creating final representation with 426 relevant facts, 12 relevant fluents
0.00 seconds computing LNF
0.00 seconds building connectivity graph
42.93 seconds searching, evaluating 313670 states, to a max depth of 33
42.95 seconds total time