



Universidad de Granada

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## Practical Process Mining (III)

Master CD&IC

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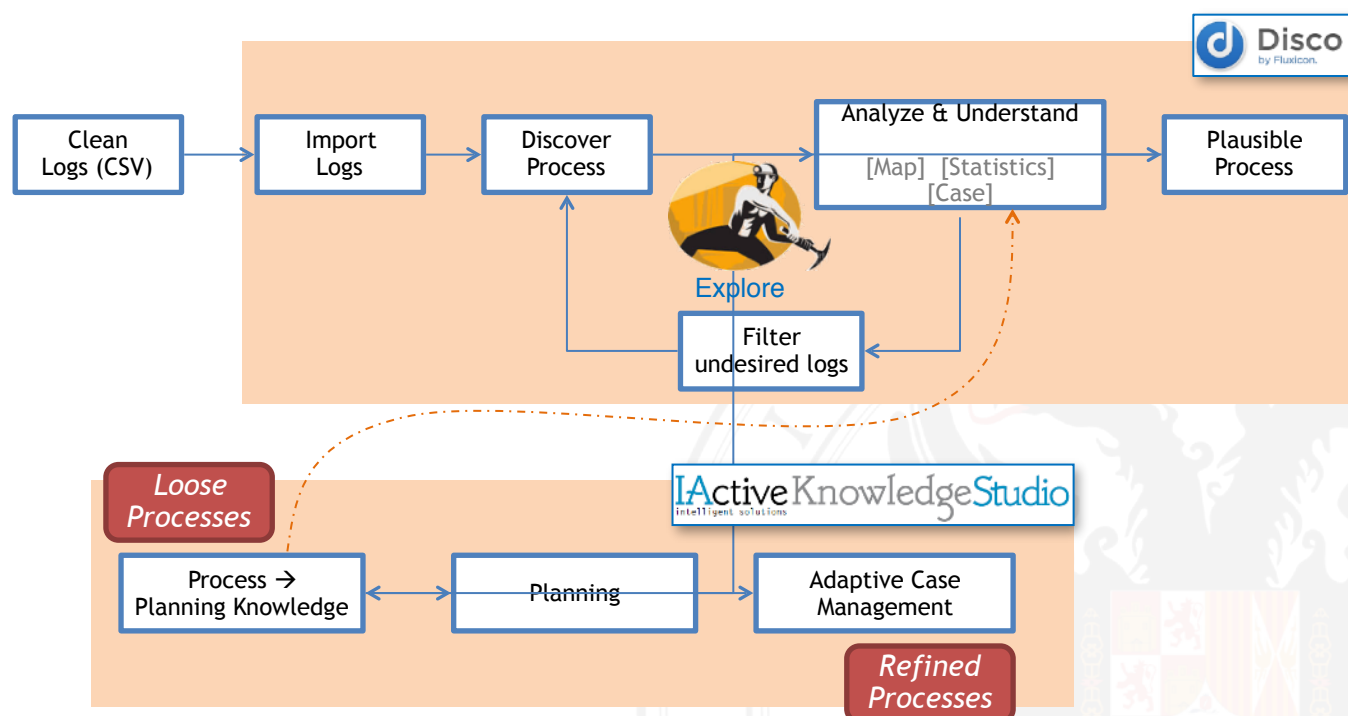
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**DECSAI**

**Departamento de Ciencias de la  
Computación e Inteligencia Artificial**

### 1. Feeding Knowledge Studio with mined processes for Adaptive Case Management



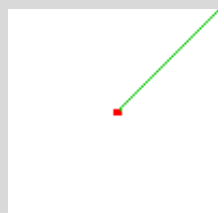
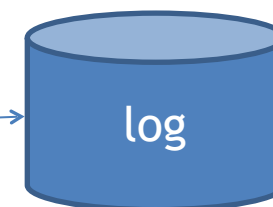
Dynamic  
Environment  
Unpredictable  
Behaviour

Real log of “Agent-Based Development” Course (4th year). 11.6M  
+ events. [Read more ...](#)

Log a drone into a virtual  
world and try to reach the  
red area avoiding running  
out of battery



Login  
Move  
Refuel  
Success



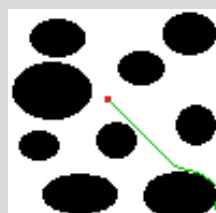
map1



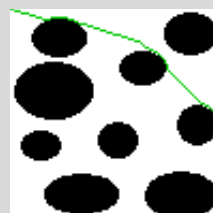
map2



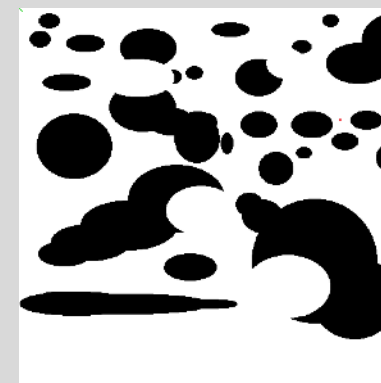
map3



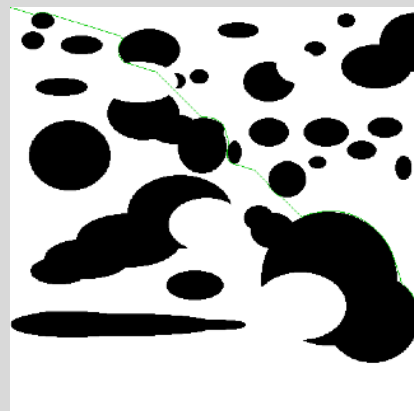
map4



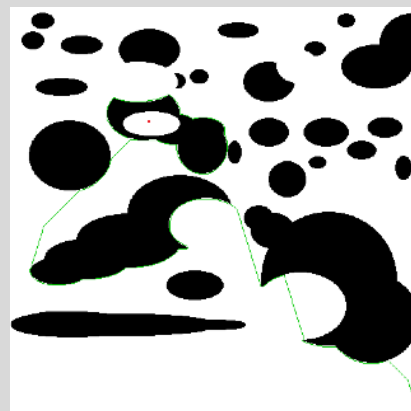
map5



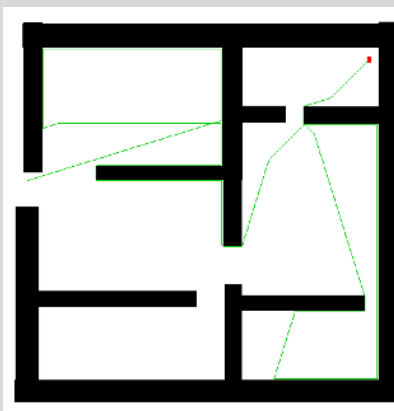
map7



map8



map9



map10

**Dynamic Environment**  
*Unpredictable Behaviour*

Log a drone into a virtual world and try to reach the red area avoiding running out of battery

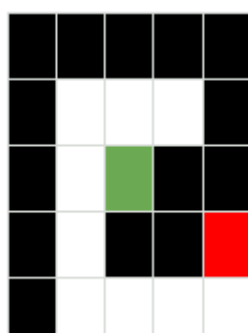


Login  
Move  
Refuel  
Success



1	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	1	2
1	0	0	0	0

RADAR



67.94	68.62	69.31	70.00	70.71
68.68	69.35	70.03	70.72	71.42
69.42	70.09	70.76	71.44	72.13
70.17	70.83	71.50	72.18	72.86
70.93	71.58	72.24	72.91	73.59

SCANNER

	NW	N	NE	
	W	D	E	
	SW	S	SE	

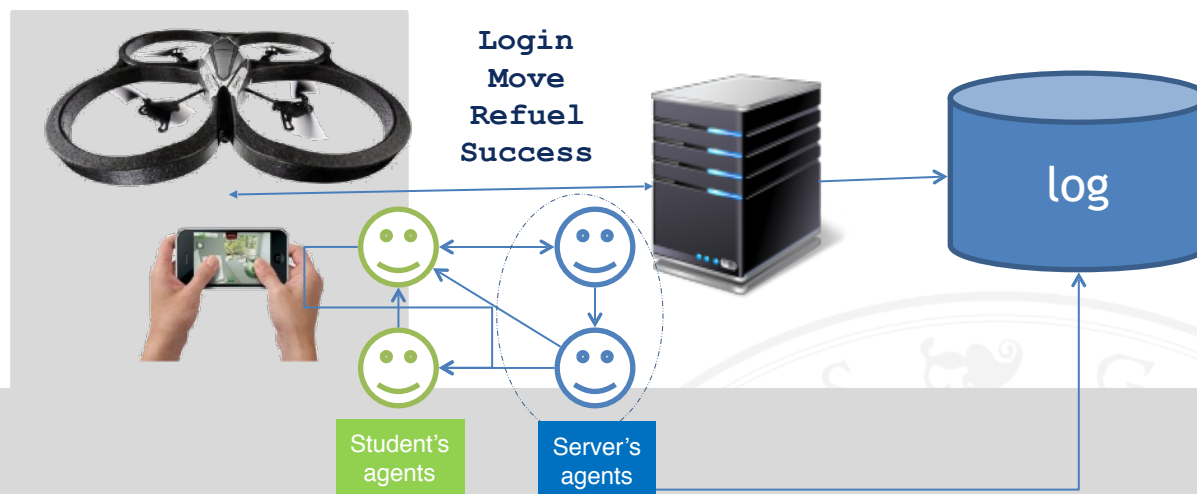
LEGAL MOVEMENTS

GPS

BATTERY LEVEL

**Dynamic Environment**  
*Unpredictable Behaviour*

Log a drone into a virtual world and try to reach the red area avoiding running out of battery



### 9 Different teams

	Average Score (out of 10)
Achernar	7,8
Bellatrix	8,8
Cerastes	10
Denebola	8,8
Elnath	8,8
Furud	9,2
Girtab	8,2
Haldus	9,6
Izar	9,12

**Dynamic  
Environment  
Unpredictable  
Behaviour**

Log a drone into a virtual world and try to reach the red area avoiding running out of battery



**Login  
Move  
Refuel  
Success**



**The whole  
context is  
here!!!!**

### RAW LOG (≈ 2,2GB all)

```
"date":"30/10/2014_17:24:35", "value":{"agent":"Saggitta_satellite", "key":"41yaumv6", "content":"Esperando mensaje"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"41yaumv6", "content":
"command":"login","world":"plainworld","radar":"bot2","gps":"bot2"}}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"41yaumv6", "content":"Petición de login de bot2"}}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"41yaumv6", "content":"Abriendo sesión en mundo plainworld"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Sesión correcta"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Registrado bot2 como receptor del radar"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Receptor del scanner sin especificar"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Registrado bot2 como receptor del GPS"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Receptor del batería sin especificar"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Esperando acción"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta_satellite", "key":"wqpus119", "content":
1,1,1,1,1,1,1,1,1,0,0,0,1,1,0,0,0,1,1,0,0,0,1,1}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta_satellite", "key":"wqpus119", "content":"Enviando gps"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta_satellite", "key":"wqpus119", "content":"Esperando mensaje"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":{"command":"moveN","key":"wqpus119"}}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"bot2 CRASHED"}}
"date":"30/10/2014_17:25:05", "value":{"agent":"Saggitta", "key":"wqpus119", "content":"Logout de bot2"}}
```

### CLEAN LOG (≈ 76MB all)

```
41yaumv6,Saggitta,30/10/2014_17:25:05,LOGIN,plainworld
41yaumv6,Saggitta,30/10/2014_17:25:05,MOVE,plainworld
zadra8j5,Saggitta,30/10/2014_17:39:14,LOGIN,plainworld
```

Dynamic  
Environment  
Unpredictable  
Behaviour

Log a drone into a virtual world and try to reach the red area avoiding running out of battery



### Some “incidents”

- Dumb agents might have crashed on a wall and log stops
- There is an unsolvable world, it never ends with SUCCESS
- There are errors in the protocol/parameters between agents
- There are different exploratory tactics of each team
- There are incomplete cases (frozen agents, interrupted agents)
- There are sincronization problems (agent does not stop at SUCCESS)

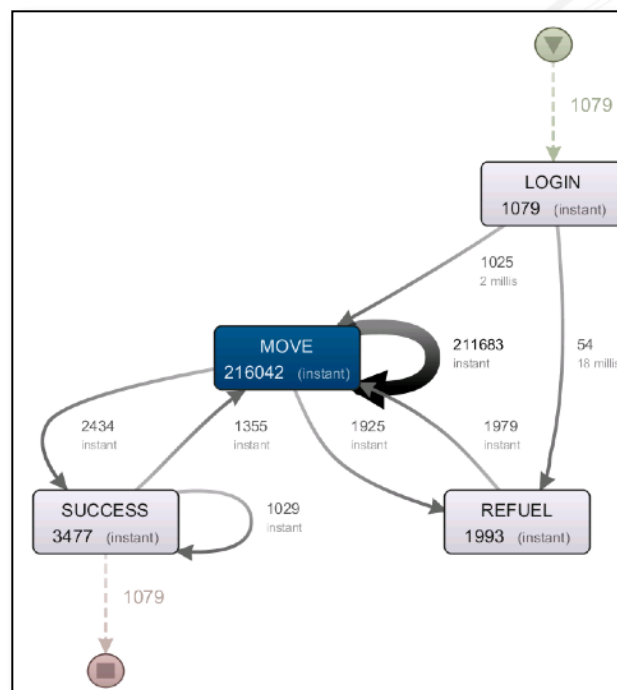
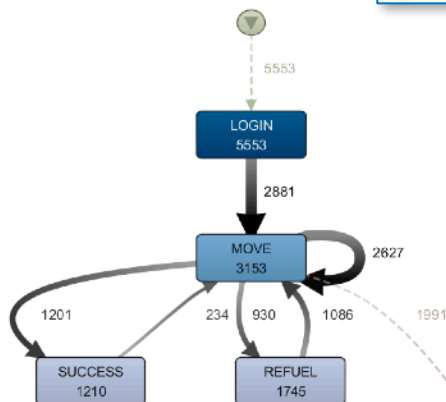


Dynamic Environment  
Unpredictable Behaviour

Log a drone into a virtual world and try to reach the red area avoiding running out of battery



Disco  
by Fluxicon





### Practice work with DISCO



1. Load the log dba1516p2logs
  1. Are there any errors or strange records? Filter them out (as much as possible).
    1. 23% cases & 21% events
  2. Find the most frequent process (activities 60% - paths 20%) and save it as “dba1\_60\_20.pdf”
  3. Did all groups follow the same process?
  4. Did any of them follow the rules exactly? (STOP at SUCCESS)
2. Load the log dba1516p2logs\_noargs. It is the same than the former one except that Activity and Resource fields have been concatenated.
  1. Find the most frequent process (activities 10% - paths 10%)
  2. Filter the same cases than before and save it as “dba2\_10\_10.pdf”
  3. Did all groups follow the same process? (sugg.: compare with group’s scores)
3. **Send both PDFs and your comments to the teacher**

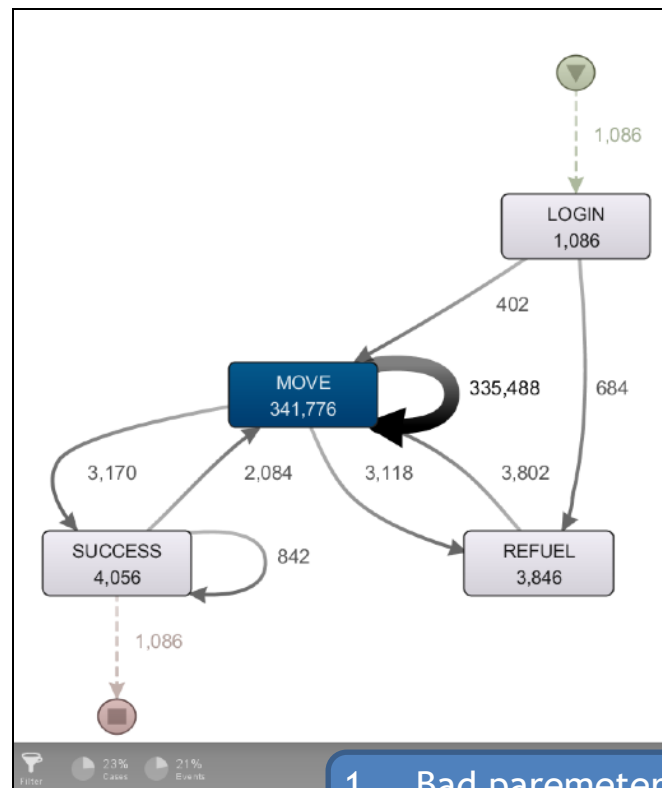
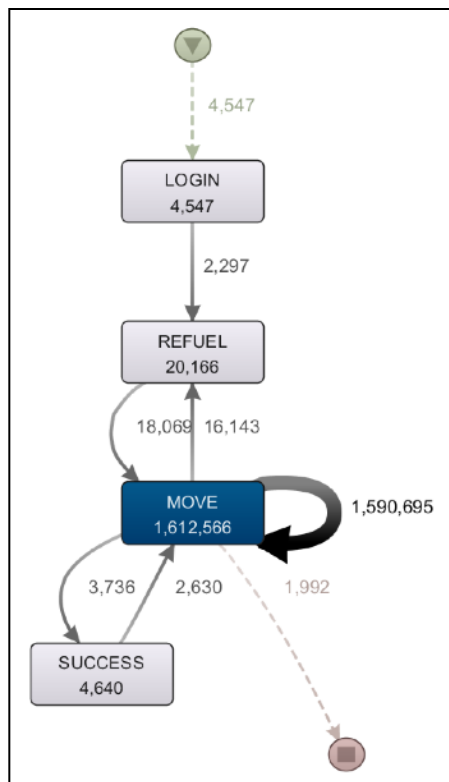
dba1516p2logs.csv					
1	Case,	Agent,	Timestamp,	Activity,	Resource
2	v170xpay,	Achernar,	16/10/2015_10:33:00,	LOGIN,	map1
3	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE,	map1
4	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE,	map1
5	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE,	map1
6	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE,	map1
7	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE,	map1
8	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE,	map1

dba1516p2logs_noargs.csv				
1	Case,	Agent,	Timestamp,	Activity
2	v170xpay,	Achernar,	16/10/2015_10:33:00,	LOGIN_map1
3	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE_map1
4	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE_map1
5	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE_map1
6	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE_map1
7	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE_map1
8	v170xpay,	Achernar,	16/10/2015_10:33:00,	MOVE_map1

### Practice work with DISCO



#### 1. dba1516p2logs

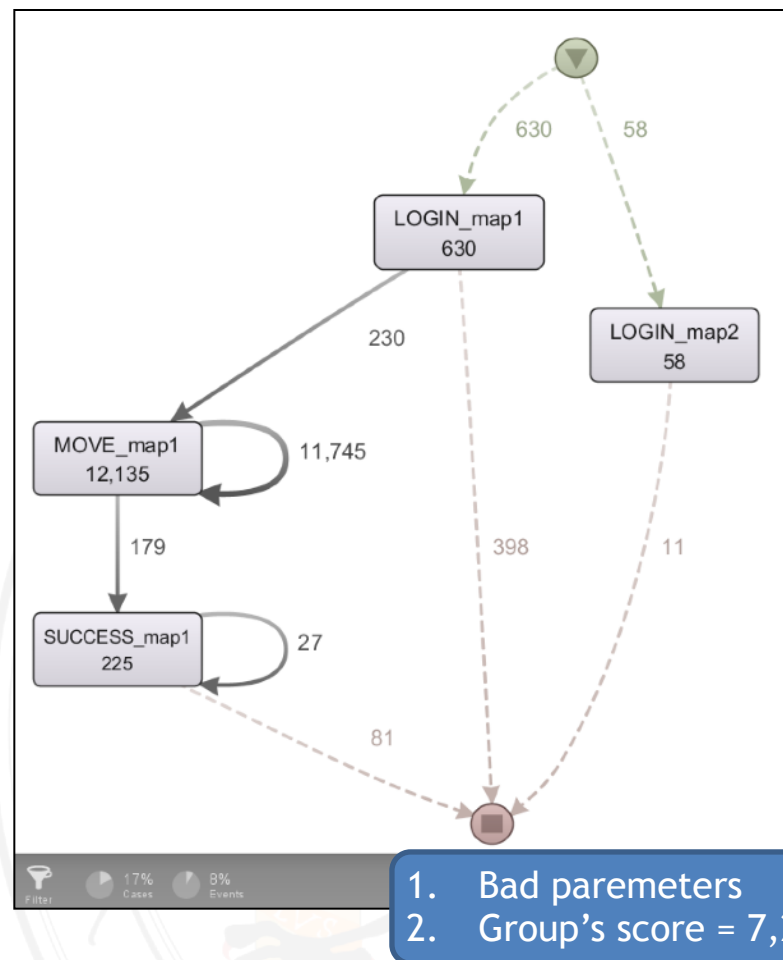
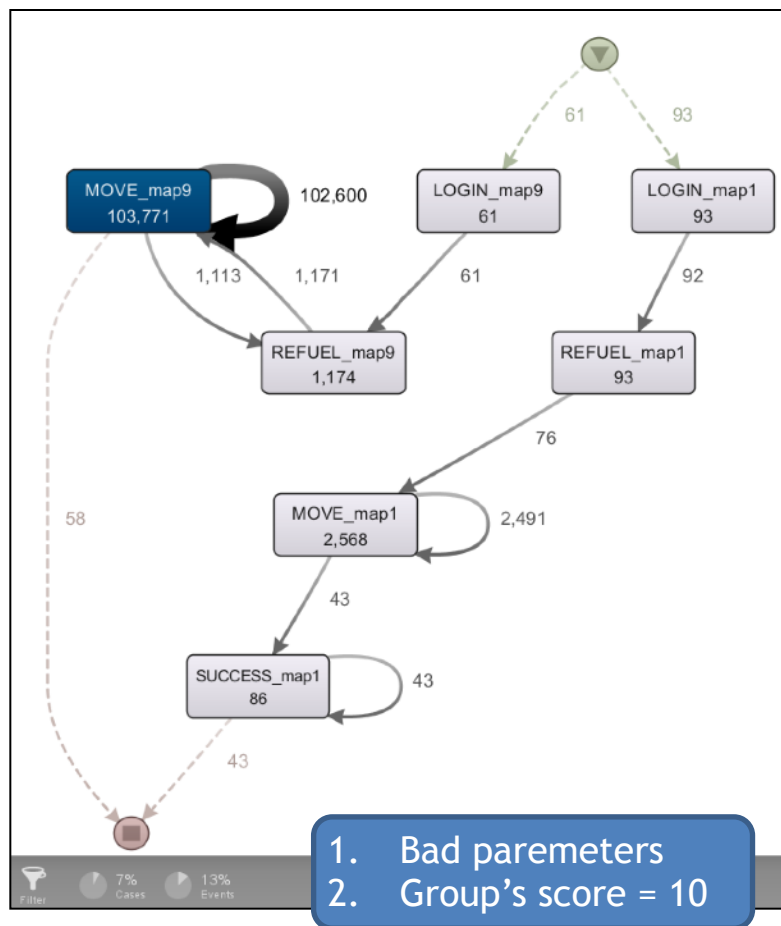


1. Bad paremeters
2. LOGIN-SUCCESS

### Practice work with DISCO



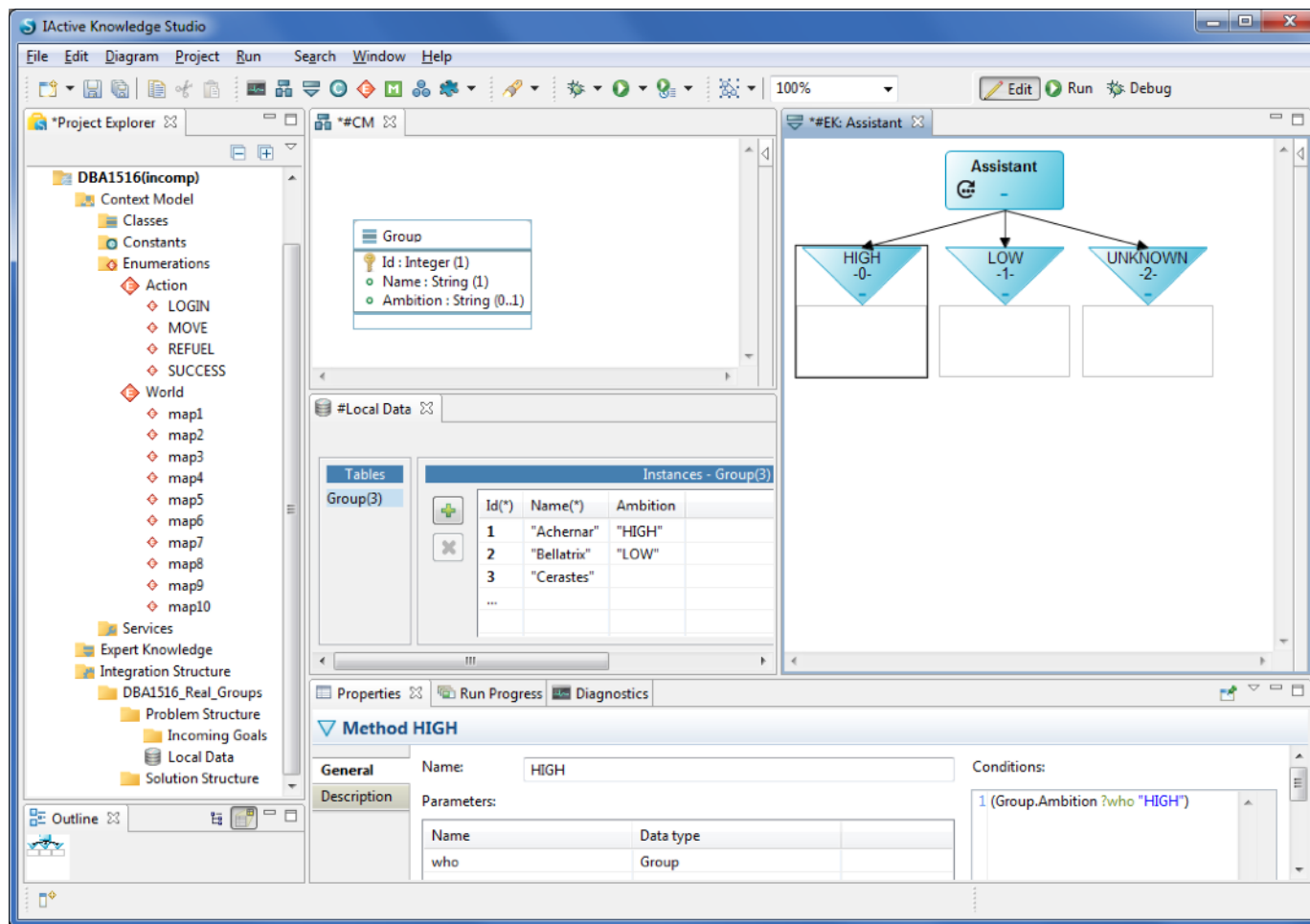
#### 1. dba1516p2logs\_noargs



### Practice work with



- Download KS project DBA1516(incomp) and import it into KS. It is the basis of an intelligent assistant that will guide the students on how to complete their work based on what their companions are already doing or did.



The screenshot displays the IAActive Knowledge Studio interface. The left pane shows the project structure for DBA1516(incomp), including Context Model, Classes, Constants, Enumerations, Action (LOGIN, MOVE, REFUEL, SUCCESS), World (map1 to map10), Services, Expert Knowledge, Integration Structure, DBA1516\_Real\_Groups, Problem Structure, Incoming Goals, Local Data, and Solution Structure.

The central pane shows the context model for Group, with attributes: Id : Integer (1), Name : String (1), and Ambition : String (0..1).

The right pane shows the Assistant diagram, which is a tree structure with a root node 'Assistant' and three child nodes: HIGH -0-, LOW -1-, and UNKNOWN -2-.

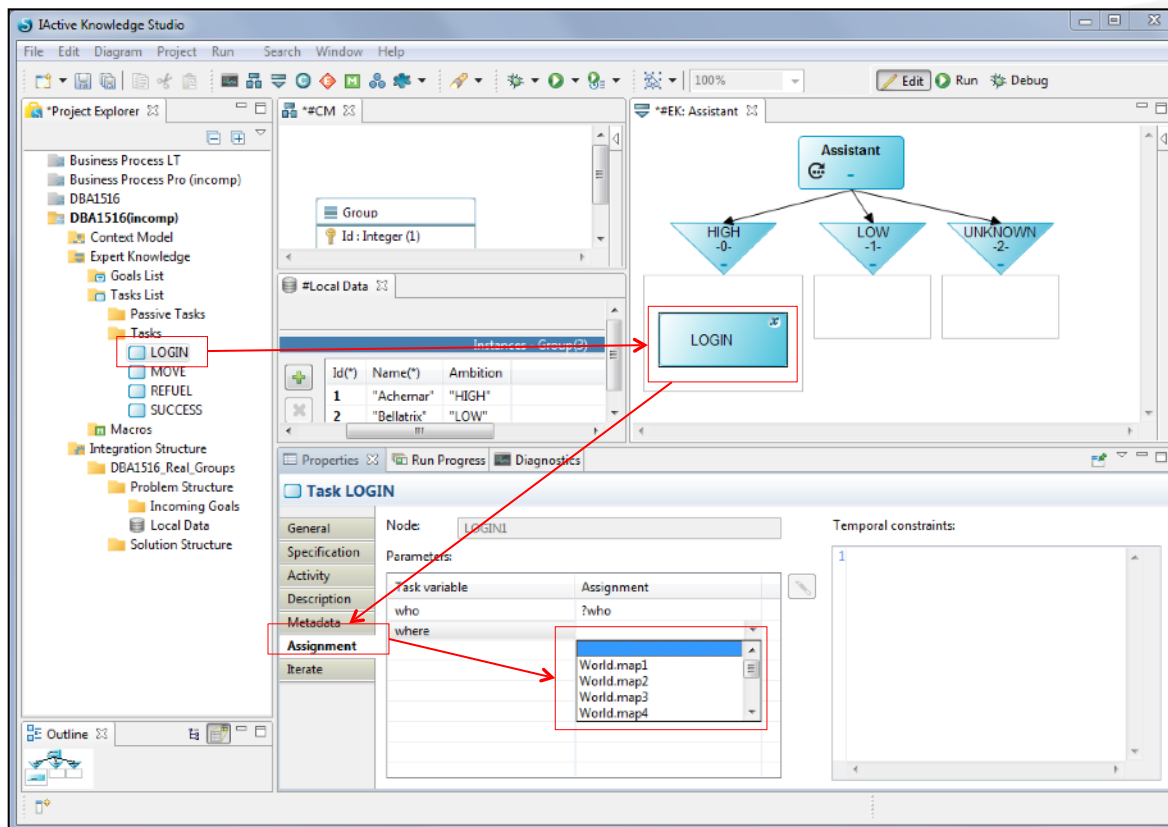
The bottom pane shows the Properties window for the Method HIGH. It includes a General tab with Name: HIGH and a Description tab with Parameters: who (Name) and Group (Data type). The Conditions section shows a rule: 1 (Group.Ambition ?who "HIGH").

Id(*)	Name(*)	Ambition
1	"Achernar"	"HIGH"
2	"Bellatrix"	"LOW"
3	"Ceres"	

### Practice work with



- Download KS project DBA1516(incomp) and import it into KS. It is the basis of an intelligent assistant that will guide the students on how to complete their work based on what their companions are already doing or did.
- Under Goal “Assistant” fill in the process found with Disco by using the goal “Perform” and assign the appropriate constants to the variables depending on the expected outcome of the group (HIGH, LOW)



The screenshot shows the IAActive Knowledge Studio interface with the following components:

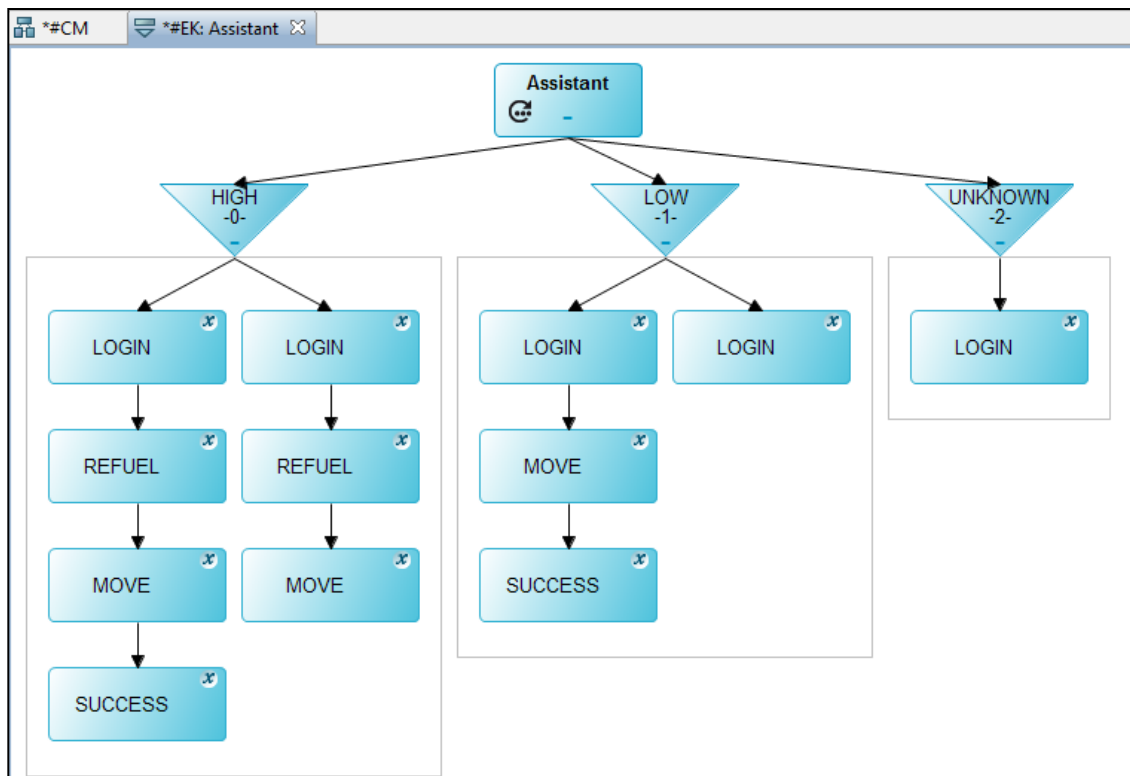
- Project Explorer:** Shows the project structure for DBA1516(incomp), including Context Model, Expert Knowledge, Goals List, Tasks List, Passive Tasks, Tasks, and Macros.
- Diagram:** Displays a goal tree for the "Assistant" goal. The tree has three branches: "HIGH -0-", "LOW -1-", and "UNKNOWN -2-". The "LOGIN" task is highlighted in the "HIGH" branch.
- Local Data:** A table showing data for the "LOGIN" task.
 

Id(*)	Name(*)	Ambition
1	"Achemar"	"HIGH"
2	"Bellatrix"	"LOW"
- Task LOGIN Properties:**
  - General:** Node: LOGIN1
  - Specification:** Parameters: Task variable: who, Assignment: ?who
  - Metadata:** where: World.map1, World.map2, World.map3, World.map4
  - Temporal constraints:** 1

### Practice work with



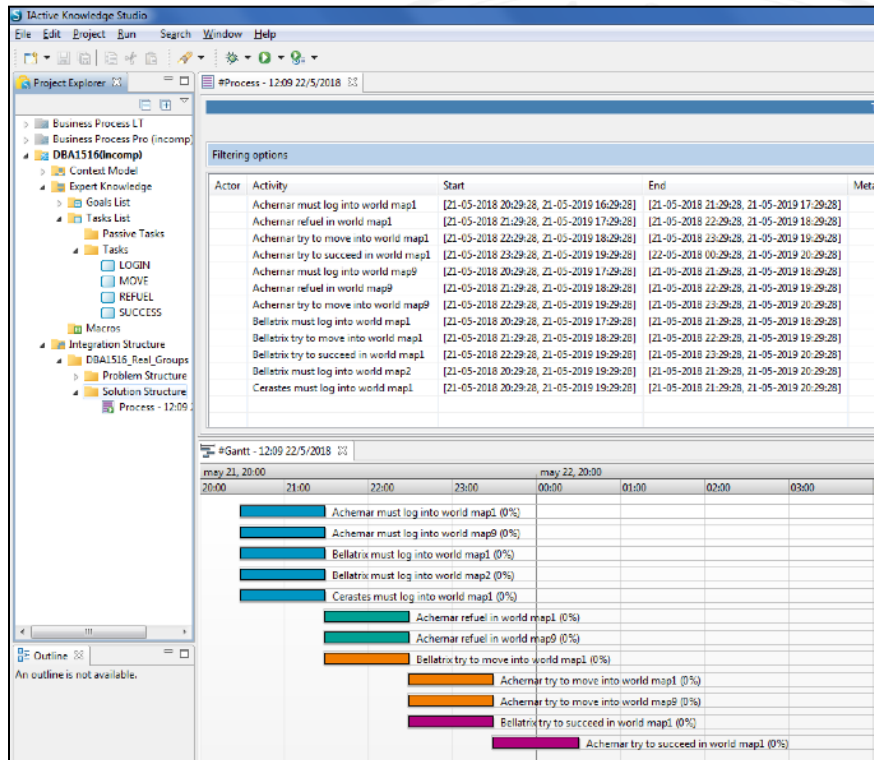
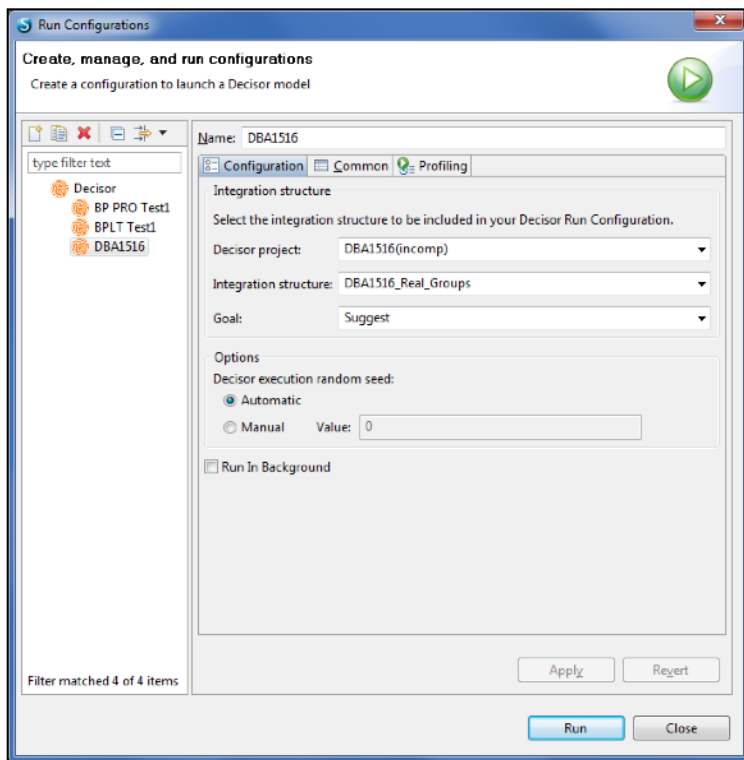
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### Practice work with



- Download KS project DBA1516(incomp) and import it into KS. It is the basis of an intelligent assistant that will guide the students on how to complete their work based on what their companions are already doing or did.
- Under Goal “Assistant” fill in the process found with Disco by using the goal “Perform” and assign the appropriate constants to the variables
- Create a Run Environment for this new project
- Take a screenshot of the first process found





### Practice work with



- Download KS project DBA1516(incomp) and import it into KS. It is the basis of an intelligent assistant that will guide the students on how to complete their work based on what their companions are already doing or did.
- Under Goal “Assistant” fill in the process found with Disco by using the goal “Perform” and assign the appropriate constants to the variables
- Create a Run Environment for this new project
- Take a screenshot of the first process found
- Export the project as DBA.zip
- **Send both the snapshot and the project to the teacher**

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