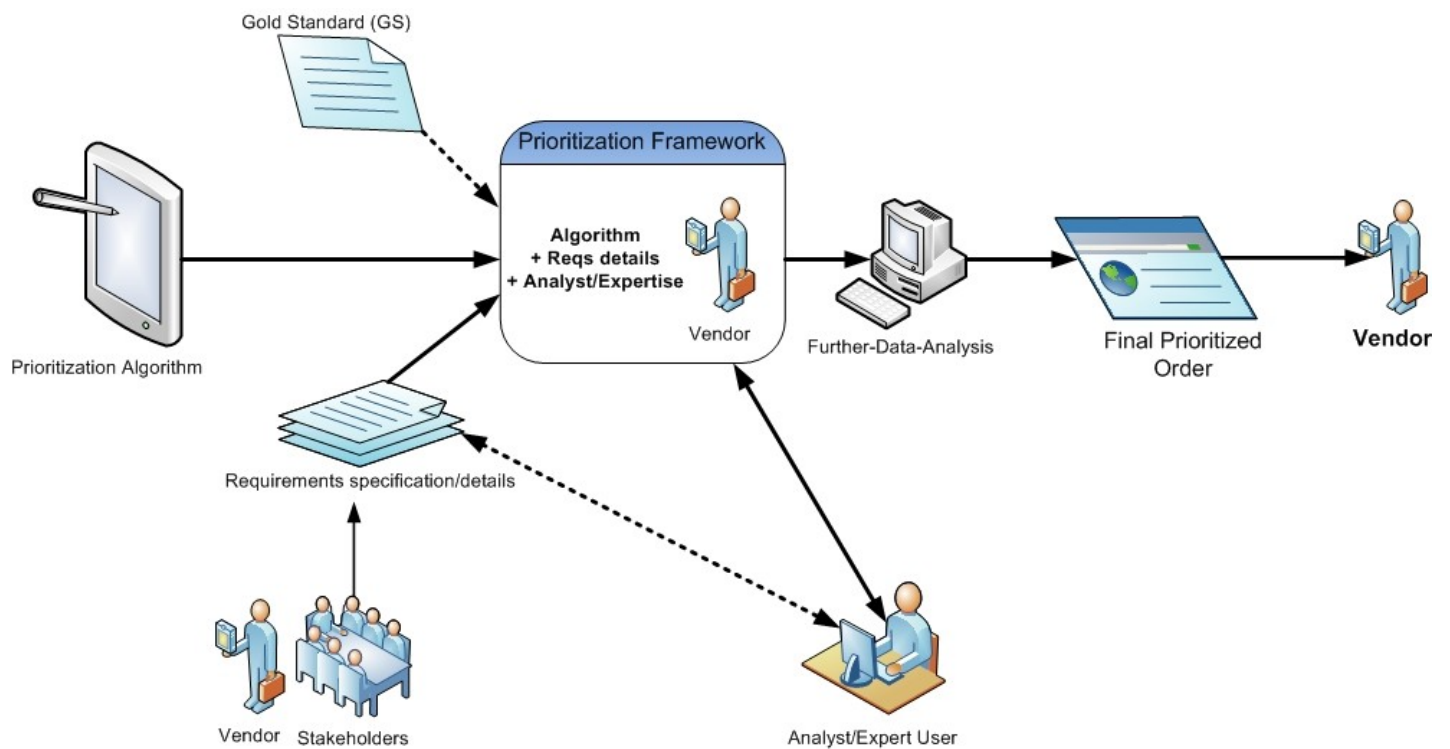


## Interactive Requirements Prioritization:

The overall prioritization framework can be summarized in the following way, the steps for [emp.study.gui.jar](http://emp.study.gui.jar) are defined hereafter.



Interactive Requirements Prioritization Framework

## Configuring the Configuration Files:

Users have to configure parameters to run the corresponding algorithm.

Algorithm	Keys	Values	Descriptions
IGA, SMT, IAHP	total_elicit_pair	10 / 25 / 50 / 100	Total number of pairs elicited by the analyst/user during prioritization process
IGA	generation_number	100 / 500 / 1000 / 2000	Number of generations/cycles (applicable for Genetic operators i.e. how many times they will be applied for)
IGA	priority_graph_flag	1 / 0	Flag that refers the presence of prio graph
IGA	dependency_graph_flag	1 / 0	Flag that refers the presence of dep graph
IGA	weight_priority	1	Weight for the prio graph
IGA	weight_dependency	1	Weight for the dep graph
IGA	weight_elicited	1	Weight for the eli graph
IGA	minimum_disagreement	0	Threshold (min) disagreement
IGA	percentage_population	0.20	Percentage of population considered for checking ties and elicitation
IGA	total_run_number	1	Total number of run for the algorithm
SMT	MAXSIZE (pop size)	10 / 20 / 30	Number of ordered candidates with least equal mismatches with constraints.

### How to run:

Unzip the Project.zip file to anywhere in the PC.

From the command window for windows or terminal for Linux, run,

`java -jar emp.study.gui.jar` (use the appropriate **jar path**)

### Step 1:

- Select the Algorithm to run
- Select the user platform (mandatory for Constraints Solver (SMT))
- Put the full path of the Project JAR file
- Tick the *Include Gold Standard (GS)*, if you want to consider during prioritization process.

Interactive Requirements Prioritization...

Select Algorithm | Select Macro Scenario

☐ Interactive Genetic Algorithm (IGA)

☐ Incomplete Analytical Hierarchy Process (IAHP)

☒ Constraints Solver: Satisfiability Modulo Theories (SMT)

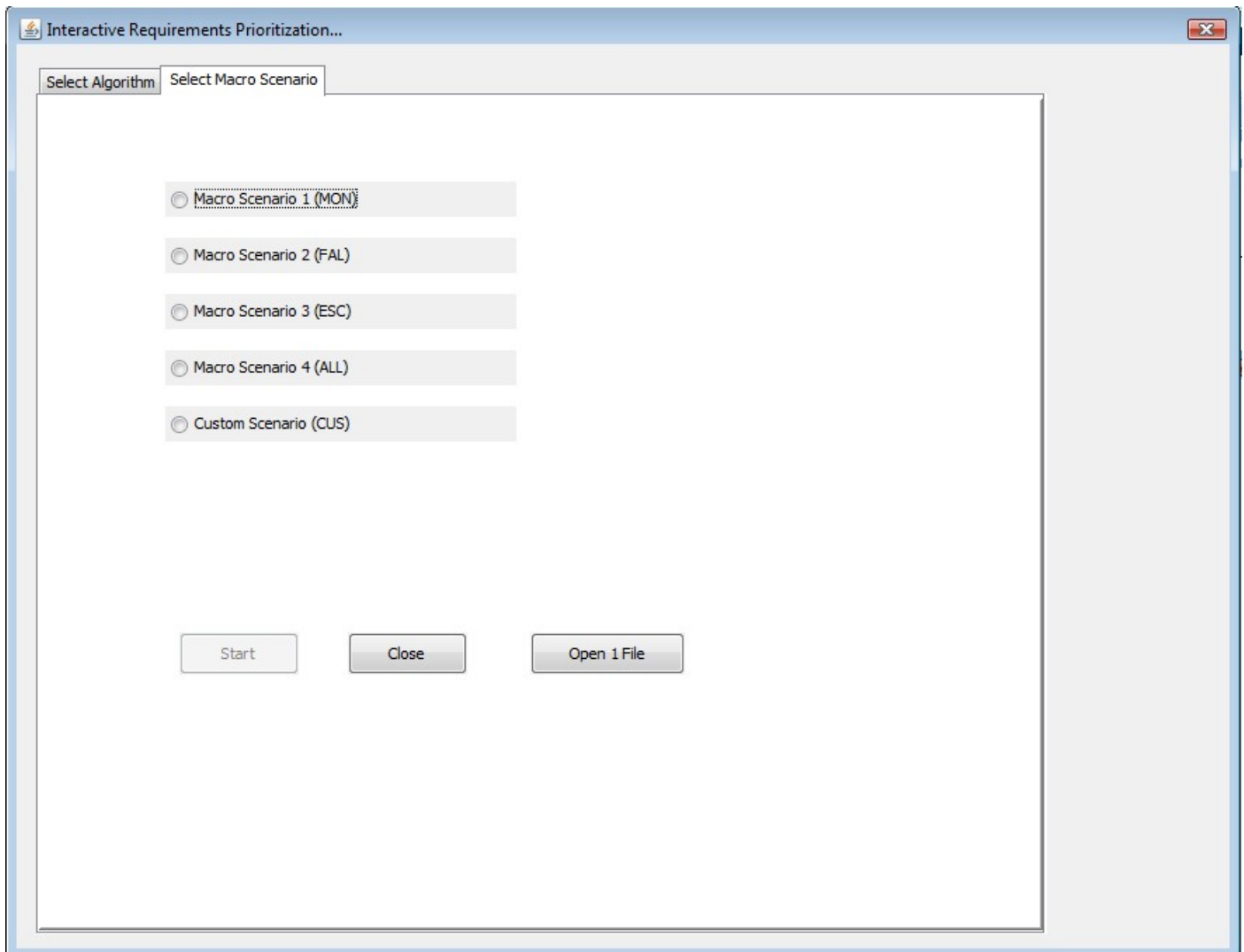
Select User Platform: [Dropdown Menu]

Project Path: [Text Field: ---Show the project jar path here---] [Browse Button]

☒ Include Gold Standard (GS)

## Step 2:

- Select a predefined Macro Scenario or any Custom Scenario defined by the user (in this case the input folder should be put in the */Project/in/scenario\_name* folder).
- Click **Start** to begin the prioritization process.
- (Optional) Click **Open 1 File** if you want to open any particular constraint file.



### Step 3:

- Configure the selected Algorithm according to the **Configuration Matrix** shown in the Page 2.

Parametric Configuration...

Select Max Number of Elicited Pairs:

Select Total Number of Generations (for IGA only):

Select Population Size (for SMT only):

☒ Include the Priority Graphs, PRIOs:  
[tick = yes] default 'yes'

☒ Include the Dependency Graphs, DEPs:  
[tick = yes] default 'yes'

> Weight for Prio:  default '1'

> Weight for Dep:  default '1'

> Weight for Eli:  default '1'

> Threshold Disagreement (Min):  default '0'

> Top Population Percentage:  default '0.20'

> Total Number of Run:  default '1'

DONE

#### Step 4:

- For IGA, (after several iterations) users may have been asked to elicit pairs (eliciting a pair refers to differentiate between two candidate orderings which have the same disagreements with constraints.)
- Users try to have a comparable view between the requirements in that pair to decide for a better understanding of importance.

The screenshot shows a window titled "Elicitation between RT004 and RT021". It contains two side-by-side panels for requirements RT004 and RT021.

**RT004 Panel:**

- RT004** (header)
- User Priority/Value:
- Depends on:
- Depends on this.
- Requirement text description:  
`The system identifies the exact position of a person with respect to some given points`

**RT021 Panel:**

- RT021** (header)
- User Priority/Value:
- Depends on:
- Depends on this.
- Requirement text description:  
`The system can monitor the biological parameters of the patient`

**Bottom Panel:**

Three buttons for comparison:

- 
-

#### Step 4.1:

- For IGA and SMT Solver,

The elicitation processes are same; users just have to decide importance of one requirement over the other. i.e. *RT004 is more important than RT008* or vice versa.

**Elicitation between RT004 and RT008**

RT004	RT008
User Priority/Value: 20	User Priority/Value: 10
Depends on: <input type="text"/>	Depends on: <input type="text"/>
RT005 RT006 Depends on this.	RT009 Depends on this.
Requirement text description: The system identifies the exact position of a person with respect to some given points	Requirement text description: The system identifies the differences in the posture of the patient

**Message**  
Eliciting pair [ RT008, RT004 ]  
OK

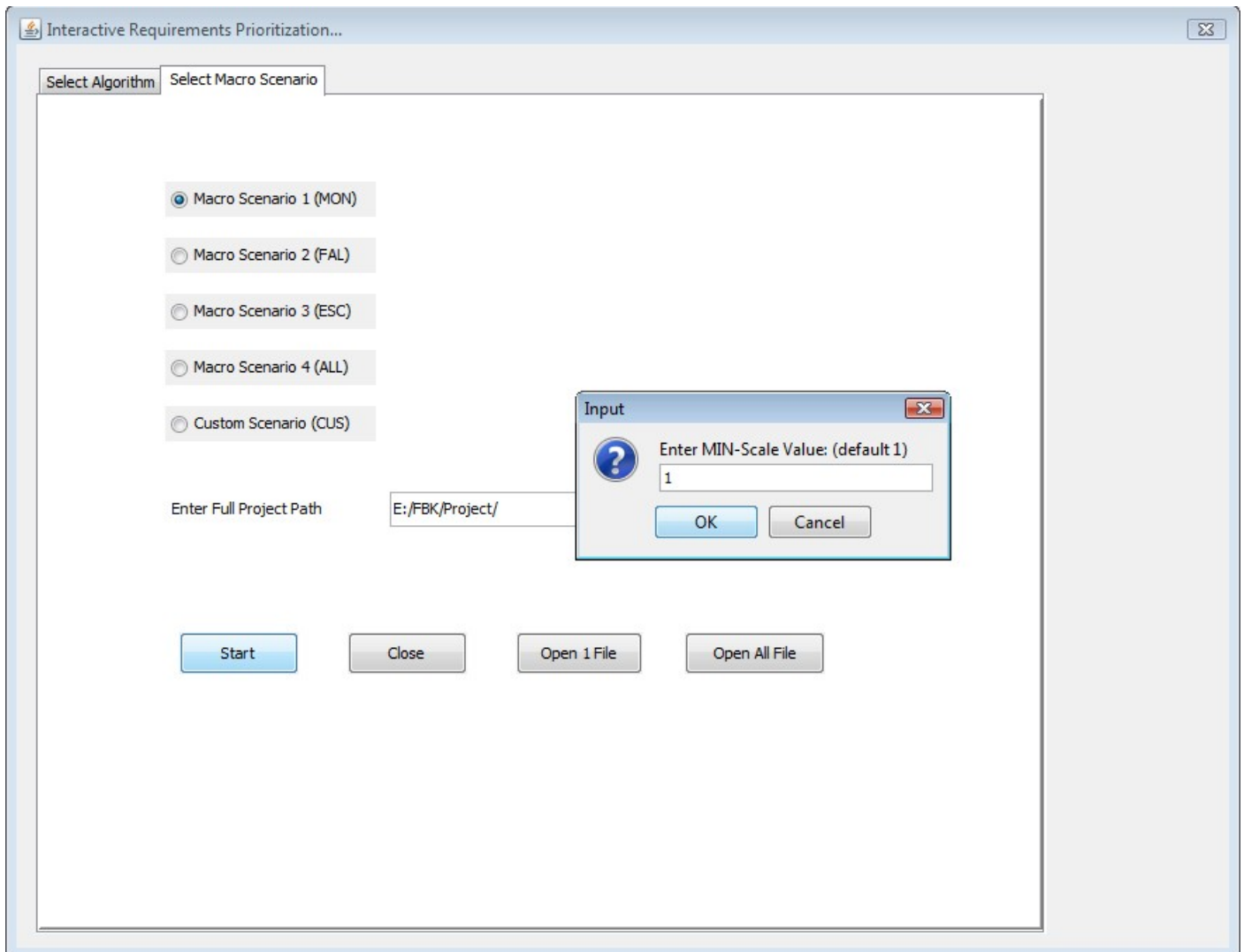
RT004 is More Important than RT008    Do not know...    RT008 is More Important than RT004

## Step 4.2

- For IAHP,

Users not only have to decide the importance of one requirement over the other, but also to what extent. So, there could be a ratio scale by which importance can be measured.

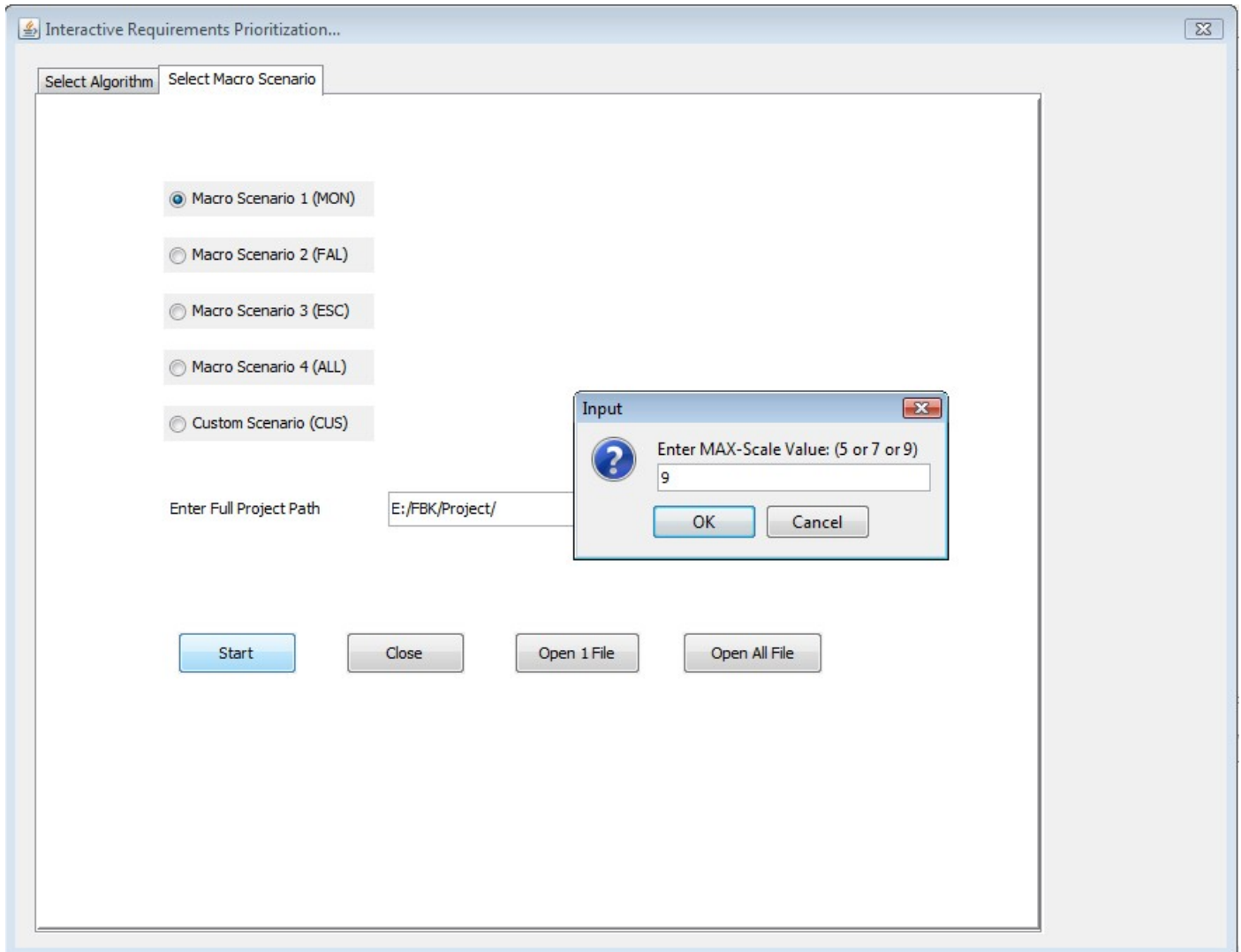
- Users have to give the min value for the scale (i.e. 1 by default)





And,

- Users have to give the max value for the scale too (i.e. 5 or 7 or 9 by default)



Then,

- during the elicitation process (for IAHP), users have to decide the importance as well as the ration to which one preceeds another. i.e. RT013:RT001 can be either of rationally important by 5:1 or 1:5; which refers that RT013 is 5 times important than RT001 or RT001 is 5 times important than RT013.

Elicitation between RT013 and RT001

RT013

User Priority/Value40

Depends onRT012

Depends on this.

Requirement Desc. The system minimizes the inte  
rsection between the areas mo  
nitored by the operators

RT001

User Priority/Value30

Depends on

Depends on this.

Requirement Desc. The system identifies the rol  
e of the persons in the scene  
(healthcare operator, doctor  
, patient)

9:17:15:13:11:11:31:51:71:9

Scale between 1 and 9

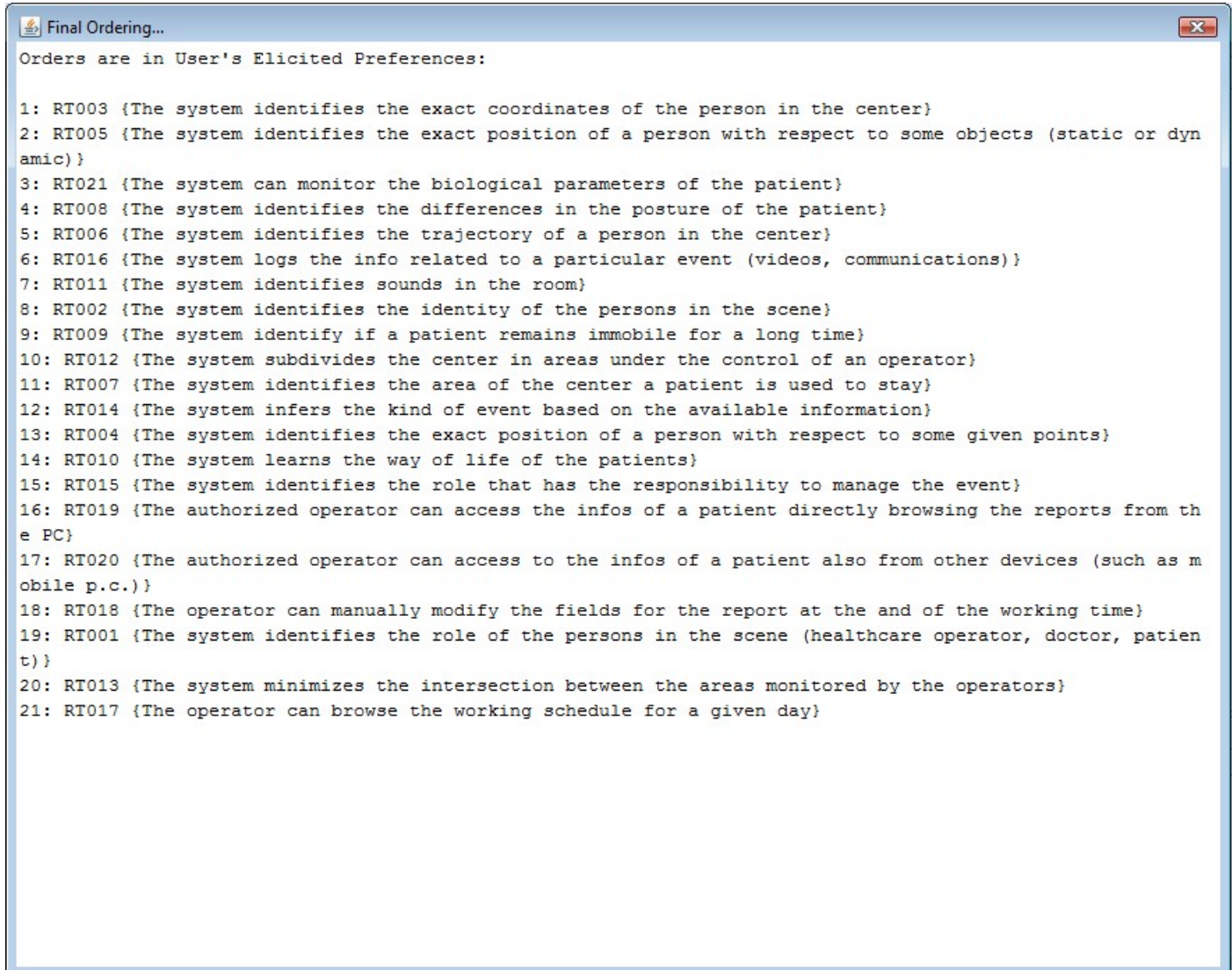
1: Ri == Rj Ri Equally important to Rj  
3: Ri > Rj Ri Moderately MI than Rj  
5: Ri >> Rj Ri Strongly MI than Rj  
7: Ri >>> Rj Ri Very strongly MI than Rj  
9: Ri >>>> Rj Ri Extremely MI than Rj  
  
MI = More Important

RT013 : RT001

Elicit!

## Step 5:

After eliciting (all) the total number of elicited pairs, specified in the configuration file, the framework will conclude a final requirements ordering with the minimum disagreement (with GS if there exists a GS) or simply a ordering of requirements with no extended information.



---END---