

DISCIPLE-COG



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**LEARNING AGENTS
LABORATORY**

GEORGE MASON UNIVERSITY

DISCIPLE-COG

Disciple-RKF/COG:

Agent Teaching by Subject Matter Experts

DISCIPLE-COG



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The Summary of the DEMO



▶ About Disciple-COG

▶ Students use of Disciple-COG as a learning assistant

- ▶ 1. Specifying a scenario
- ▶ 2. Viewing the solutions generated by Disciple
- ▶ 3. Generating a center of gravity analysis report

▶ Teaching Disciple-COG by a subject matter expert

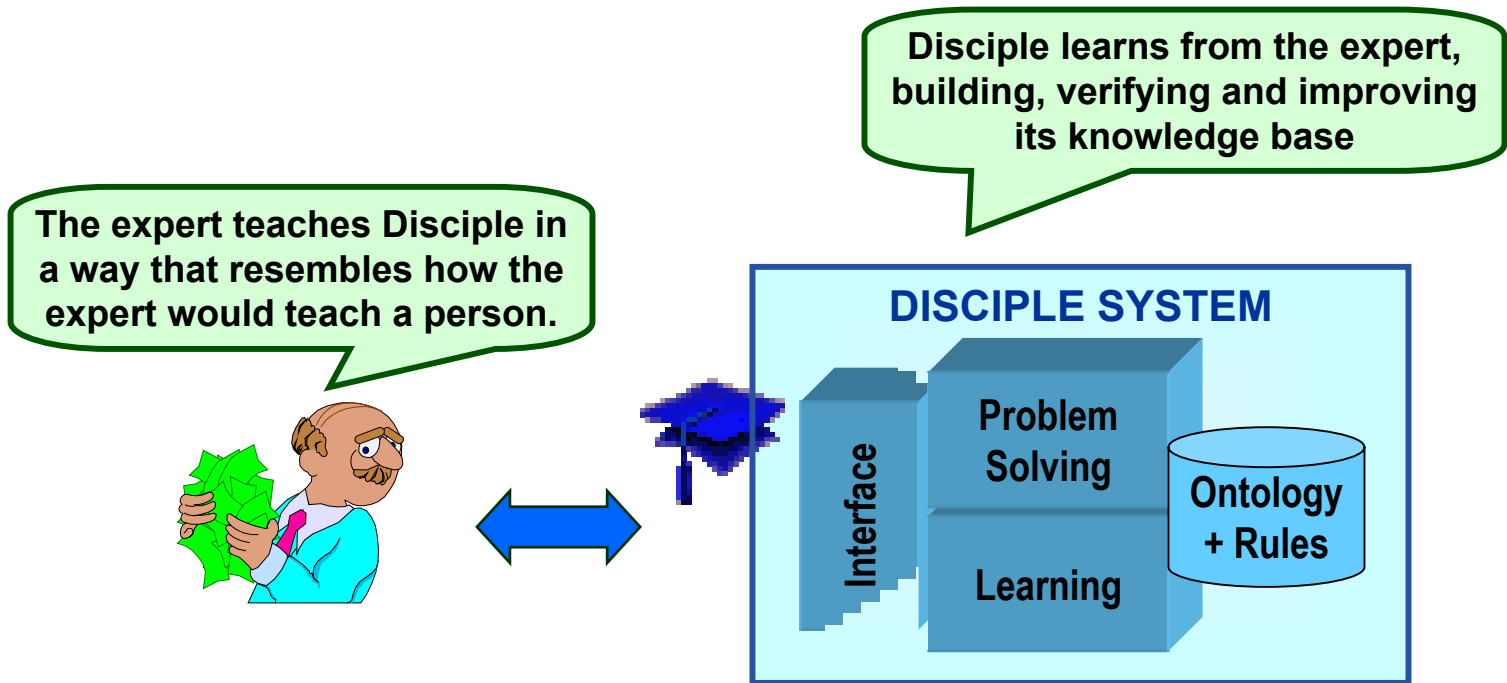
- ▶ 1. Specifying a training scenario
- ▶ 2. Modeling expert's reasoning
- ▶ 3. Task and rule learning
- ▶ 4. Rule refinement
- ▶ 5. Exception handling
- ▶ 6. Problem solving

▶ Tools for the knowledge engineer

- ▶ 1. Ontology development tools
- ▶ 2. Ontology import tools

About Disciple-COG

Disciple is a theory, methodology, and learning agent shell for rapid development of knowledge bases and agents, by subject matter experts, with limited assistance from knowledge engineers





Demo overview



First we will demonstrate how a developed Disciple agent helps the students at the US Army War College to learn about Center of Gravity analysis.

Then, in the main part of the demo, we will show how this Disciple agent was developed by being taught the problem solving method of a military expert.

Finally, we will demonstrate additional tools that are used by the knowledge engineer to perform knowledge base development tasks that are currently beyond the capabilities of a subject matter expert.



Students use of Disciple-COG as a learning assistant

In the “Case Studies in Center of Gravity Analysis” course students learn to identify the centers of gravity (COG) of the opposing forces in military conflicts. The COG of a force is its main source of strength, power, and resistance.

Each student has to study a historic scenario (such as the World War II invasion of the island of Sicily by the Allied Forces) and has to develop a center of gravity analysis report.

Disciple guides the students to specify the relevant aspects of the assigned war scenario. Then it identifies and tests the strategic center of gravity candidates for that scenario, and generates a center of gravity analysis report. The students study and critique the solutions generated by Disciple and finalize the report.



1. Scenario Elicitation

First the student is guided by the scenario elicitation tool to specify the relevant aspects of the war scenario.

The screenshot shows a software window titled "Workspace Manager" with a sub-tab "Scenario Elicitation Module". On the left is a tree view with a "Scenario" folder. The main area contains several input fields and buttons:

- Provide a name for the scenario to be analyzed:** A text box containing "new_scenario" and a "Help" button.
- What kind of scenario is new_scenario?** A "Clear" button and two radio buttons: "War scenario" (selected) and "Military operations other than war scenario".
- Provide a few words summarizing new_scenario:** A text box and a "Help" button.
- Provide a few paragraphs description of new_scenario:** A large text area.
- Name the opposing forces in new_scenario:** A list of text boxes with "Add", "Remove", and "Rename" buttons.

At the bottom of the window are "Close" and "Help" buttons.



1. Scenario Elicitation

The tool shows:

A table of contents that will be developed during scenario elicitation.

A list of questions that have to be answered by the student.

The screenshot shows a software window titled "Workspace Manager" with a sub-window "Scenario Elicitation Module". On the left, there is a tree view with a "Scenario" item. The main area contains several sections:

- Provide a name for the scenario to be analyzed:** A text input field containing "new_scenario" and a "Help" button.
- What kind of scenario:** Two radio button options: "War scenario" and "Military operations other than war scenario".
- Provide a few words summarizing the scenario:** A text input field containing "new_scenario".
- Provide a few paragraphs description of the scenario:** A large text area containing "new paragraphs description of new_scenario".
- Name the opposing forces in new_scenario:** A section with a "Help" button, an input field, and "Add" and "Remove" buttons.
- Bottom section:** An input field with a "Rename" button.

At the bottom of the window are "Close" and "Help" buttons.



1. Scenario Elicitation

Workspace Manager

Scenario Elicitation Module

Scenario

Provide a name for the scenario to be analyzed: [Help](#)

new_scenario

What kind of scenario is new_scenario? [Clear](#)

War scenario

Military operations other than war scenario

Provide a few words summarizing new_scenario: [Help](#)

Provide a few paragraphs description of new_scenario:

Name the opposing forces in new_scenario: [Help](#)

Add Remove

Rename

Close Help

The student is asked to provide a short English description of the scenario.



1. Scenario Elicitation

Workspace Manager

Scenario Elicitation Module

Scenario

Provide a name for the scenario to be analyzed: [Help](#)

Sicily_1943

What kind of scenario is Sicily_1943? [Clear](#)

War scenario
 Military operations other than war scenario

Provide a few words summarizing Sicily_1943: [Help](#)

World War II Allied invasion of Sicily in 1943

Provide a few paragraphs description of Sicily_1943:

The Allied decision to invade Sicily following the successful operation in North Africa was a critical element of World War II [WWII]. The commitment of such a large force to continue operations in the Mediterranean theater meant that the cross-channel invasion of Europe would be delayed.

American military leaders strongly favored the cross-channel invasion at the earliest possible opportunity. This meant giving this invasion force first priority for troops, shipping and equipment. The British favored an indirect approach that would see a major effort continue in the Mediterranean. The Allies settled on the Mediterranean approach at the Casablanca conference in January 1943 and began planning for Operation Husky, the invasion of Sicily.

Situated ninety miles off the north coast of Africa and two and one-half miles from the toe of the Italian peninsula, Sicily was

Name the opposing forces in Sicily_1943: [Help](#)

[Add](#) [Remove](#)

[Rename](#)

[Close](#) [Help](#)

The student is asked to provide a short English description of the scenario.



1. Scenario Elicitation



Workspace Manager

Scenario Elicitation Module

Scenario

Provide a name for the scenario to be analyzed: [Help](#)

Sicily_1943

What kind of scenario is Sicily_1943? [Clear](#)

War scenario
 Military operations other than war scenario

Provide a few words summarizing Sicily_1943:

World War II Allied invasion of Sicily in 1943

Provide a few paragraphs description of Sicily_1943:

The Allied decision to invade Sicily following the successful operations in North Africa [WWII]. The commitment of such a large force to continue operations in the cross-channel invasion of Europe would be delayed.

American military leaders strongly favored the cross-channel invasion at the earliest possible opportunity. This meant this invasion force first priority for troops, shipping and equipment. The British favored an indirect approach that would allow a major effort continue in the Mediterranean. The Allies settled on the Mediterranean approach at the Casablanca conference in January 1943 and began planning for Operation Husky, the invasion of Sicily.

Situated ninety miles off the north coast of Africa and two and one-half miles from the toe of the Italian peninsula, Sicily was

Name the opposing forces in Sicily_1943: [Help](#)

[Add](#) [Remove](#)

[Rename](#)

[Close](#) [Help](#)

Then the student has to name the opposing forces of the scenario.

Disciple assists by providing clarifications for each requested piece of information.



1. Scenario Elicitation

Each opposing force is automatically introduced into the table of contents

When the student selects one of these forces, Disciple asks more specific questions about it.

Workspace Manager

Scenario Elicitation Module

- Scenarios
 - Allied_Forces_1943
 - European_Axis_1943

What kind of scenario is Sicily_1943? [Help](#)

War scenario
 Military operations other than war scenario

Provide a few words summarizing Sicily_1943: [Help](#)

World War II Allied invasion of Sicily in 1943

Provide a few paragraphs description of Sicily_1943:

The Allied decision to invade Sicily following the successful operation in North Africa was a critical element of World War II [WWII]. The commitment of such a large force to continue operations in the Mediterranean theater meant that the cross-channel invasion of Europe would be delayed.

American military leaders strongly favored the cross-channel invasion at the earliest possible opportunity. This meant giving this invasion force first priority for troops, shipping and equipment. The British favored an indirect approach that would see a major effort continue in the Mediterranean. The Allies settled on the Mediterranean approach at the Casablanca conference in January 1943 and began planning for Operation Husky, the invasion of Sicily.

Situated ninety miles off the north coast of Africa and two and one-half miles from the toe of the Italian peninsula, Sicily was

Name the opposing forces in Sicily_1943: [Help](#)

Allied_Forces_1943
 European_Axis_1943



1. Scenario Elicitation

Workspace Manager

Scenario Elicitation Module

- Scenario
 - Allied_Forces_1943
 - Strategic goal
 - Theater-strategic goal
 - Operational goal
 - Political factors
 - Military factors
 - Economic factors
 - Historic factors
 - International factors
 - US_1943
 - Strategic goal
 - Theater-strategic goal
 - Operational goal
 - Political factors
 - Governing body
 - Other political factors
 - Military factors
 - Military contribution
 - Will and capability
 - Controlling elements
 - Type of force
 - Other military factors
 - Psychosocial factors
 - Information control
 - Other psychosocial factors
 - Economic factors
 - Type of economy
 - Commerce authority
 - Strategic raw material
 - Industrial authority
 - Industrial capacity
 - Other economic factors
 - Geographic factors
 - Geographic centers of power

What kind of force is Allied_Forces_1943?

Clear

- Single state force
- Multi state force
- Single group force
- Multi group force

Indicate the following members of Allied_

Help

First member: US_1943

Second member: Britain_1943

Third member: USSR_1943

Additional members:

What kind of force is Allied_Force members?

- Dominant partner multi state alliance
- Equal partners multi state alliance
- Dominant partner multi state coalition
- Equal partners multi state coalition

Close

Help

Because the student has characterized Allied_Forces_1943 as a multi state force, Disciple expands the table of contents with the aspects that are relevant for such a force.



1. Scenario Elicitation



Workspace Manager

Scenario Elicitation Module

- Scenario
 - Allied_Forces_1943
 - Strategic goal
 - Theater-strategic goal
 - Operational goal
 - Political goal
 - Military goal
 - Military factors
 - Military contribution
 - Will and capability
 - Controlling elements
 - Type of force
 - Other military factors
 - Psychosocial factors
 - Information control
 - Other psychosocial factors
 - Economic factors
 - Type of economy
 - Commerce authority
 - Strategic raw material
 - Industrial authority
 - Industrial capacity
 - Other economic factors
 - Geographic factors
 - Geographic centers of power

What kind of force is Allied_Forces_1943? Clear

Single state force

Multi state force

Single group force

Multi group force

es_1943: Help

Add Remove

Rename

What kind of force is Allied_Forces_1943 with respect to the nature of the relationship between its members? Clear Help

Dominant partner multi state alliance

Equal partners multi state alliance

Dominant partner multi state coalition

Equal partners multi state coalition

Close Help

When the student selects one of these aspects, Disciple asks more specific questions about it.



1. Scenario Elicitation

Workspace Manager

Scenario Elicitation Module

- Scenario
 - Allied_Forces_1943
 - Strategic goal**
 - Theater-strategic goal
 - Operational goal
 - Political factors
 - Military factors
 - Economic factors
 - Historic factors
 - International factors
 - US_1943
 - Strategic goal
 - Theater-strategic goal
 - Operational goal
 - Political factors
 - Governing body
 - Other political factors
 - Military factors
 - Military contribution
 - Will and capability
 - Controlling elements
 - Type of force
 - Other military factors
 - Psychosocial factors
 - Information control
 - Other psychosocial factors
 - Economic factors
 - Type of economy
 - Commerce authority
 - Strategic raw material
 - Industrial authority
 - Industrial capacity
 - Other economic factors
 - Geographic factors
 - Geographic centers of power

Which is the main strategic goal of Allied_Forces_1943? [Help](#)

Unconditional_surrender_of_European_Axis

Provide a few paragraphs describing Unconditional_surrender_of_European_Axis:

The strategic goals of the Allied Forces in 1943 were to defeat Germany first while containing Japan, to keep Russia in the war, and the eventual unconditional surrender of all Axis countries. To accomplish these goals, US leaders favored an early, direct attack into northern Europe. The British on the other hand were weary and cautious after four years of war. The British recognized the importance of applying pressure on the Germans, but they also recognized the scope of the challenge of an invasion of northern Europe and were determined to take an indirect approach.

The objectives of the Allies in WWII were seen as absolutely just and appropriate by the populations of the alliance, the people of the free world and the people living under the yoke of the Axis. The leaders and people of the Axis countries believed in their objectives too, but they stood apart from the rest of the international community.

In this way the student is guided to specify the relevant aspects of the scenario.

Close Help



2. Viewing the solutions generated by Disciple



Workspace Manager

COG Solutions Viewer

Sicily_1943 COG candidates

- Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
 - War_cabinet
 - Military_of_Britain_1943
 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin
 - Military_of_USSR_1943
 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
- European_Axis_1943 COG candidates
 - Adolph_Hitler
 - Military_of_Germany_1943
 - Industrial_capacity_of_Germany_1943
 - King_Emanuele_II
 - Military_of_Italy_1943
 - Industrial_capacity_of_Italy_1943
 - Will_of_European_Axis_1943
 - Industrial_capacity_of_European_Axis_1943

Solutions | COG Identification | Strategic COG Testing | Theater Strategic COG Testing | All

Summary of Will_of_the_People_of_US_1943 identification

The Will of the People of US 1943 is a strategic COG candidate with respect to the people of US 1943

Summary of Will_of_the_People_of_US_1943 testing as strategic COG

The Will of the People of US 1943 is a strategic COG candidate that cannot be eliminated

**After the scenario is specified
Disciple can identify and test the
corresponding strategic center of
gravity candidates**

Abstract Justification Detailed Justification



2. Viewing the solutions generated by Disciple



The tool shows:

Workspace Manager
COG Solutions Viewer

Sicily_1943 COG candidates

- Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
 - War_cabinet
 - Military_of_Britain_1943
 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin

Solutions | COG Identification | Strategic COG Testing | Theater Strategic COG Testing | All

Summary of Will_of_the_People_of_US_1943 identification

The Will of the People of US 1943 is a strategic COG candidate with respect to the people of US 1943

Summary of Will_of_the_People_of_US_1943 testing as strategic COG

The Will of the People of US 1943 is the strategic center of gravity that cannot be eliminated

Abstract Justification Detailed Justification

A description of the selected candidate and the rationale for its identification and testing

The strategic center of gravity candidates for each of the opposing forces



2. Viewing the solutions generated by Disciple



The screenshot shows the 'Workspace Manager' application with the 'COG Solutions Viewer' window. The window title is 'Sicity_1943 COG candidates'. The left pane shows a tree view of candidates under 'Allied_Forces_1943 COG candidates' and 'European_Axis_1943 COG candidates'. The 'Will_of_the_People_of_US_1943' candidate is selected. The right pane shows the solution summary for this candidate, including identification and testing results. A callout bubble points to the right pane with the text: 'The solution includes a summary of the specific candidate's solution.'

Workspace Manager
COG Solutions Viewer

Sicity_1943 COG candidates

- Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
 - War_cabinet
 - Military_of_Britain_1943
 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin
 - Military_of_USSR_1943
 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
- European_Axis_1943 COG candidates
 - Adolph_Hitler
 - Military_of_Germany_1943
 - Industrial_capacity_of_Germany_1943
 - King_Emanuele_II
 - Military_of_Italy_1943
 - Industrial_capacity_of_Italy_1943
 - Will_of_European_Axis_1943
 - Industrial_capacity_of_European_Axis_1943

Solutions COG Id

Summary of Will_of_the_People_of_US_1943 identification

The Will of the People of US 1943 is a strategic COG candidate with respect to the people of US 1943

Summary of Will_of_the_People_of_US_1943 testing as strategic COG

The Will of the People of US 1943 is a strategic COG candidate that cannot be eliminated

Abstract Justification Detailed Justification



2. Viewing the solutions generated by Disciple



Workspace Manager
COG Solutions Viewer

Sicity_1943 COG candidates

- Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
 - War_cabinet
 - Military_of_Britain_1943
 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin
 - Military_of_USSR_1943
 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
- European_Axis_1943 COG candidates
 - Adolph_Hitler
 - Military_of_Germany_1943
 - Industrial_capacity_of_Germany_1943
 - King_Emanuele_II
 - Military_of_Italy_1943
 - Industrial_capacity_of_Italy_1943
 - Will_of_European_Axis_1943
 - Industrial_capacity_of_European_Axis_1943

Solutions COG Identification Strateg

A justification for the entities selection as a candidate.

Justification of identification for Will_of_the_People_of_US_1943 as COG candidate

- Is *Allied Forces 1943* a single-member force or a multi-member force?
- *Allied Forces 1943* is a multi-member force
- What type of strategic COG candidate should I consider for this multi-member force?
- I consider a candidate corresponding to a member of the multi-member force
- Which is a member of *Allied Forces 1943*?
- *US 1943*
- Is *US 1943* a single-member force or a multi-member force?
- *US 1943* is a single-member force
- What type of strategic COG candidate should I consider for this single-member force?
- I consider a strategic COG candidate with respect to the people of *US 1943*
- Is the *Will of the People of US 1943* a major controlling element of *US 1943*?
- Yes, because *US 1943* is a representative democracy
- Is the *Will of the People of US 1943* a legitimate candidate?
- Yes

The Will of the People of US 1943 is a strategic COG candidate with respect to the people of US 1943

Abstract Justification Detailed Justification



2. Viewing the solutions generated by Disciple



Workspace Manager

COG Solutions View

Sicily_1943 COG candidates

Strategic COG Testing Theater Strategic COG Testing All

And a summary of the candidates testing.

Allied_Forces_1943 COG candidates

- Will_of_the_People_of_US_1943
- President_Roosevelt
- Military_of_US_1943
- Industrial_capacity_of_US_1943
- Will_of_the_People_of_Britain_1943
- Winston_Churchill
- War_cabinet
- Military_of_Britain_1943
- Industrial_capacity_of_Britain_1943
- Joseph_Stalin
- Military_of_USSR_1943
- Industrial_capacity_of_USSR_1943
- Will_of_Allied_Forces_1943
- Industrial_capacity_of_Allied_Forces_1943

European_Axis_1943 COG candidates

- Adolph_Hitler
- Military_of_Germany_1943
- Industrial_capacity_of_Germany_1943
- King_Emanuele_II
- Military_of_Italy_1943
- Industrial_capacity_of_Italy_1943
- Will_of_European_Axis_1943
- Industrial_capacity_of_European_Axis_1943

Justification of testing for Will_of_the_People_of_US_1943 as a strategic COG candidate

- What is the strategic goal of *European Axis 1943*?
- *Dominance of Europe by European Axis*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Government of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Government of US 1943* reflects the *Will of the People of US 1943*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Military of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Will of the Military of US 1943* reflects the *Will of the People of US 1943*

The *Will of the People of US 1943* is a strategic COG candidate that cannot be eliminated

Abstract Justification Detailed Justification

Update Close



2. Viewing the solutions generated by Disciple



Workspace Manager

COG Solutions Viewer

Sicily_1943 COG candidates

- Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
 - War_cabinet
 - Military_of_Britain_1943
 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin
 - Military_of_USSR_1943
 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
- European_Axis_1943 COG candidates
 - Adolph_Hitler
 - Military_of_Germany_1943
 - Industrial_capacity_of_Germany_1943
 - King_Emanuel_II

Solutions | COG Identification | Strategic COG Testing | Theater Strategic COG Testing | All

Justification of testing for Will_of_the_People_of_US_1943 as a strategic COG candidate

- What is the strategic goal of *European Axis 1943*?
- *Dominance of Europe by European Axis*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Government of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Government of US 1943* reflects the *Will of the People of US 1943*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Military of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Will of the Military of US 1943* reflects the *Will of the People of US 1943*

The *Will of the People of US 1943* is a strategic COG candidate that cannot be eliminated

Abstract Justification Detailed Justification Update Close

The justification may be presented in a more abstract form



2. Viewing the solutions generated by Disciple



Workspace Manager

COG Solutions Viewer

Sicily_1943 COG candidates

- ☐ Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
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 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin
 - Military_of_USSR_1943
 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
- ☐ European_Axis_1943 COG candidates
 - Adolph_Hitler
 - Military_of_Germany_1943
 - Industrial_capacity_of_Germany_1943
 - King_Emanuele_II
 - Military_of_Italy_1943
 - Industrial_capacity_of_Italy_1943
 - Will_of_European_Axis_1943
 - Industrial_capacity_of_European_Axis_1943

Solutions | **COG Identification** | **Strategic COG Testing** | Theater Strategic COG Testing | All

Justification of testing for Will_of_the_People_of_US_1943 as a strategic COG candidate

- What is the strategic goal of *European Axis 1943*?
- *Dominance of Europe by European Axis*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Government of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Government of US 1943* reflects the *Will of the People of US 1943*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Military of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Will of the Military of US 1943* reflects the *Will of the People of US 1943*

The *Will of the People of US 1943* is a strategic COG candidate that cannot be eliminated

Abstract Justification Detailed Justification **Update** **Close**

Or it may be presented in a more detailed form



2. Viewing the solutions generated by Disciple



Workspace Manager

COG Solutions Viewer

Sicily_1943 COG candidates

- Allied_Forces_1943 COG candidates
 - Will_of_the_People_of_US_1943
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 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
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 - Military_of_Britain_1943
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 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
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 - King_Emanuele_II
 - Military_of_Italy_1943
 - Industrial_capacity_of_Italy_1943
 - Will_of_European_Axis_1943
 - Industrial_capacity_of_European_Axis_1943

Solutions | **COG Identification** | **Strategic COG Testing** | Theater Strategic COG Testing | All

Justification of testing for Will_of_the_People_of_US_1943 as a strategic COG candidate

Test whether the *Will of the People of US 1943* is a viable strategic COG candidate with respect to the people of *US 1943*

- What is the strategic goal of *European Axis 1943*?
- *Dominance of Europe by European Axis*

Test whether the *Will of the People of US 1943* can cause *US 1943* to accept the strategic goal of *European Axis 1943* which is *Dominance of Europe by European Axis*

- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Government of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Government of US 1943* reflects the *Will of the People of US 1943*

Test whether the *Will of the People of US 1943* which controls the *Government of US 1943* can cause *US 1943* to accept the strategic goal of *European Axis 1943* which is *Dominance of Europe by European Axis*

- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Military of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Will of the Military of US 1943* reflects the *Will of the People of US 1943*

Will of the People of US 1943 is a strategic COG candidate that cannot be eliminated

Abstract Justification Detailed Justification

Or it may be presented in a more detailed form



3. Generating a center of gravity analysis report



Then Disciple generates a draft center of gravity analysis report.

DEPARTMENT OF THE ARMY
United States Army War College
Carlisle, Pennsylvania 17013

Spring 2002

MEMORANDUM FOR Whom It May Concern
SUBJECT: Center of Gravity Determination for World War II Allied invasion of Sicily in 1943

1 Purpose

The purpose of this memorandum is to present, with justification, the strategic center of gravity for each opposing force in the above named scenario.

2 Description of the scenario

The Allied decision to invade Sicily following the successful operation in North Africa was a critical element of World War II [WWII]. The commitment of such a large force to continue operations in the Mediterranean theater meant that the cross-channel invasion of Europe would be delayed.

American military leaders strongly favored the cross-channel invasion at the earliest possible opportunity. This meant giving this invasion force first priority for troops, shipping and equipment. The British favored an indirect approach that would see a major effort continue in the Mediterranean. The Allies settled on the Mediterranean approach at the Casablanca conference in January 1943 and began planning for Operation Husky, the invasion of Sicily.

Situated ninety miles off the north coast of Africa and two and one-half miles from the toe of the Italian peninsula, Sicily was both a natural bridge between Africa and Europe and a barrier dividing the Mediterranean Sea. It was an unsinkable air and naval fortress from which Axis forces interdicted Allied sea lines of communications through the Mediterranean.

Operation Husky was the largest amphibious operation ever conducted up to that time. The operation encountered numerous difficulties and gained the allies valuable experience that would be critical for the successful invasion of Europe. Operation Husky was the last U.S. and British combined operation of WWII in which roughly equal numbers of British and US ground forces would be committed. British ground forces would initially be the main effort of the operation but by its conclusion US ground forces would have the lead. After Sicily, US forces would constitute the largest element of Allied combat power for the remainder of the war.

The German defense of Sicily is one of the finest examples of defensive warfare in modern history. The bulk of the Axis forces available for the campaign were Italian, but despite competent leadership and decision-making at the General Officer level, the Italian

forces were mostly ineffective. Greatly outnumbered and out gunned, the Germans effectively delayed the allied advance for weeks, allowing German units to reinforce Italy. The campaign ended with a brilliant evacuation of German forces and equipment from Sicily despite Allied air and naval superiority.

3 Allied Forces 1943

Allied Forces 1943 is a Multi state force.

Allied Forces 1943 is an Equal partners multi state alliance.

3.1 Strategic goal

The main strategic goal of Allied Forces 1943 could be summarized as 'Unconditional surrender of European Axis.'

The strategic goals of the Allied Forces in 1943 were to defeat Germany first while containing Japan, to keep Russia in the war, and the eventual unconditional surrender of all Axis countries. To accomplish these goals, US leaders favored an early, direct attack into northern Europe. The British on the other hand were weary and cautious after four years of war. The British recognized the importance of applying pressure on the Germans, but they also recognized the scope of the challenge of an invasion of northern Europe and were determined to take an indirect approach.

The objectives of the Allies in WWII were seen as absolutely just and appropriate by the populations of the alliance, the people of the free world and the people living under the yoke of the Axis. The leaders and people of the Axis countries believed in their objectives too, but they stood apart from the rest of the international community.

3.2 Theater-strategic goal

The main theater-strategic goal of Allied Forces 1943 could be summarized as 'Taking Italy out of war against Allies and keeping USSR in war alongside Allies.'

3.3 Operational goal

The main operational goal of Allied Forces 1943 could be summarized as 'Capturing of the island of Sicily.'

3.4 Political factors

Allied Forces 1943 has an Ad hoc governing body.

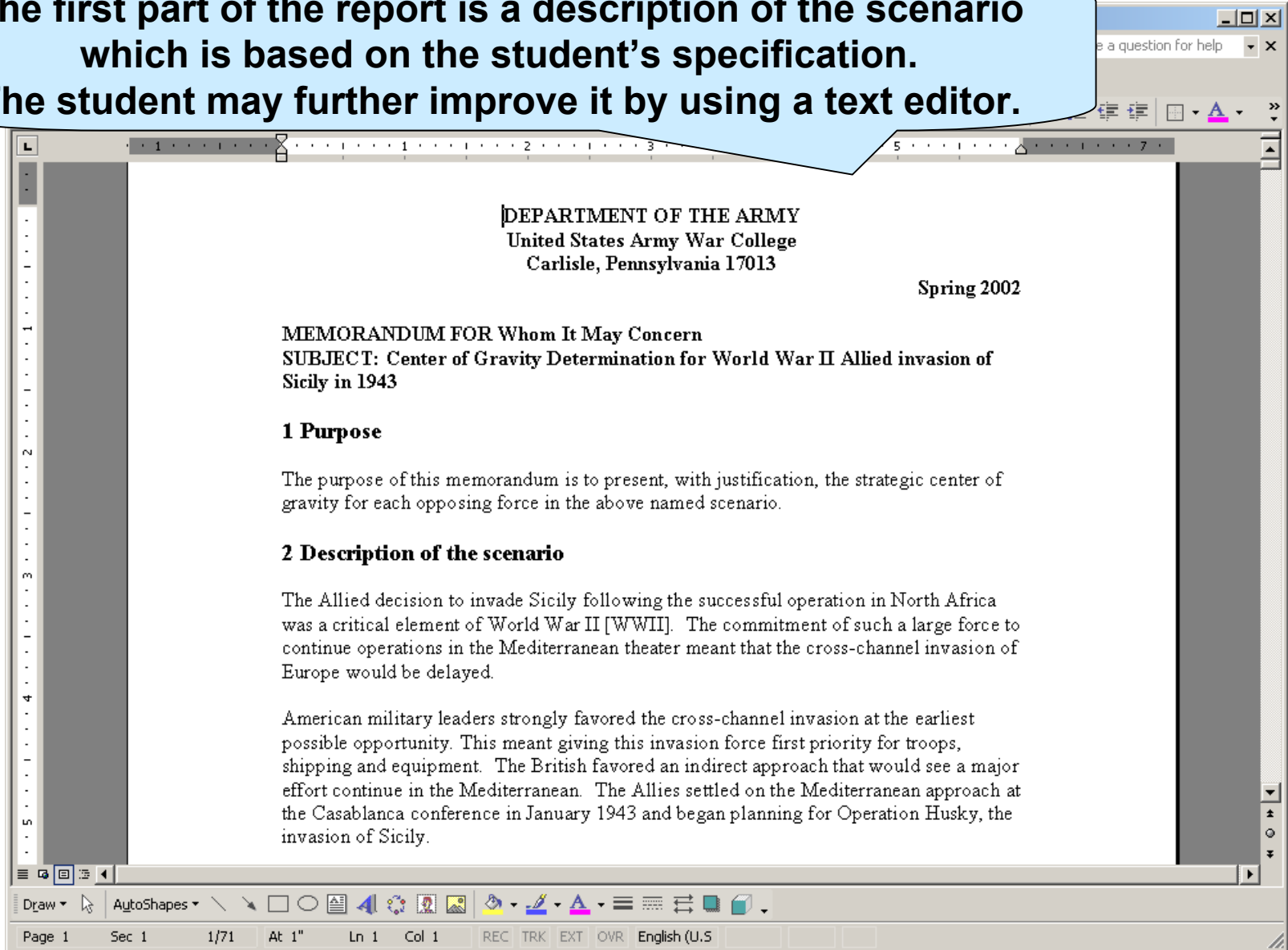
Page 1 Sec 1 1/73 At 1" Ln 1 Col 1 REC TRK EXT OVR English (U.S.)



3. Generating a center of gravity analysis report



The first part of the report is a description of the scenario which is based on the student's specification. The student may further improve it by using a text editor.





3. Generating a center of gravity analysis report



The second part of the report is a list of COG candidates and their justifications. The student has to critique Disciple's reasoning and specify his own justification when in disagreement with Disciple.

7.9 Will of the People of US 1943

Is Will of the People of US 1943 a legitimate candidate?
Yes.
No, because...

Justification of identification

Identify and test a strategic COG candidate for *Allied Forces 1943*

- Is *Allied Forces 1943* a single-member force or a multi-member force?
- *Allied Forces 1943* is a multi-member force

Identify and test a strategic COG candidate for *Allied Forces 1943* which is a multi-member force

- What type of strategic COG candidate should I consider for a multi-member force?
- I consider a candidate corresponding to a member of the multi-member force

Identify and test a strategic COG candidate corresponding to a member of the *Allied Forces 1943*

- Which is a member of *Allied Forces 1943* ?
- *US 1943*

Identify and test a strategic COG candidate for *US 1943*

- Is *US 1943* a single-member force or a multi-member force?
- *US 1943* is a single-member force

Identify and test a strategic COG candidate for *US 1943* which is a single-member force

- What type of strategic COG candidate should I consider for a single-member force?
- I consider a strategic COG candidate with respect to the people of *US 1943*

Page 56 Sec 1 56/71 At 3.8" Ln 11 Col 32 REC TRK EXT OVR English (U.S)

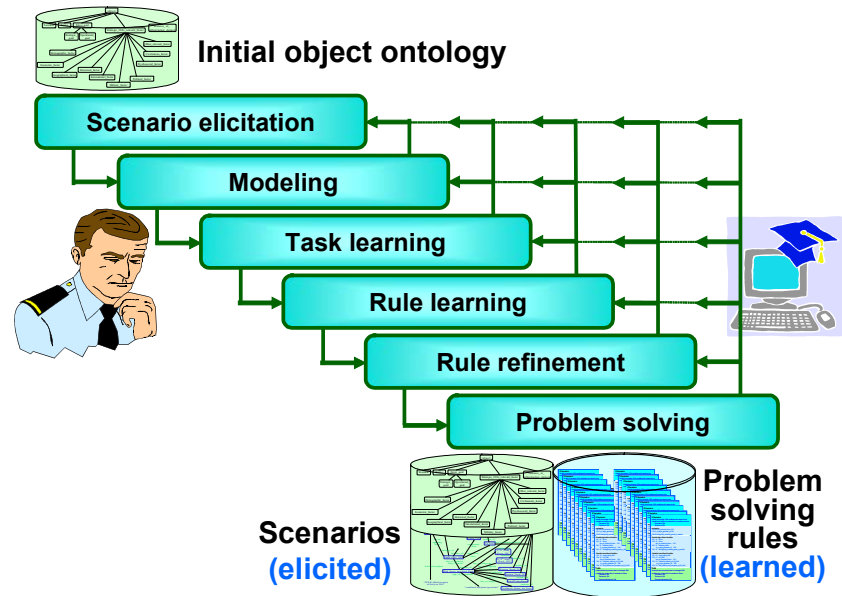


Teaching Disciple-COG by a subject matter expert

Now we will discuss how this Disciple agent was developed.

First a knowledge engineer has used the tools of Disciple to build an object ontology that represents the concepts from the COG analysis domain. He has also defined elicitation scripts to guide the user in defining a specific scenario.

After that an expert can teach Disciple his own reasoning in center of gravity analysis, with only limited assistance from the knowledge engineer. The teaching process consists of the sequence of displayed steps and results in a set of problem solving rules learned by Disciple. In the following we will demonstrate this teaching process.





1. Specifying a training scenario



First the expert has to specify a training scenario, by using the Scenario Elicitation tool, as has been illustrated before.

In this illustration we will use the World War II invasion of the island of Okinawa by the US forces.

The screenshot shows the 'Scenario Elicitation tool' interface. On the left, a tree view shows a 'Scenario' folder containing 'Japan_1945' and 'US_1945'. The main panel is titled 'Provide a name for the scenario to be analyzed:' and contains the following fields and options:

- Scenario name: Okinawa_1945
- What kind of scenario is Okinawa_1945?:
 - War scenario
 - Military operations other than war scenario
- Provide a few words summarizing Okinawa_1945: US invasion of the island of Okinawa in 1945 during World War II
- Provide a few paragraphs description of Okinawa_1945:

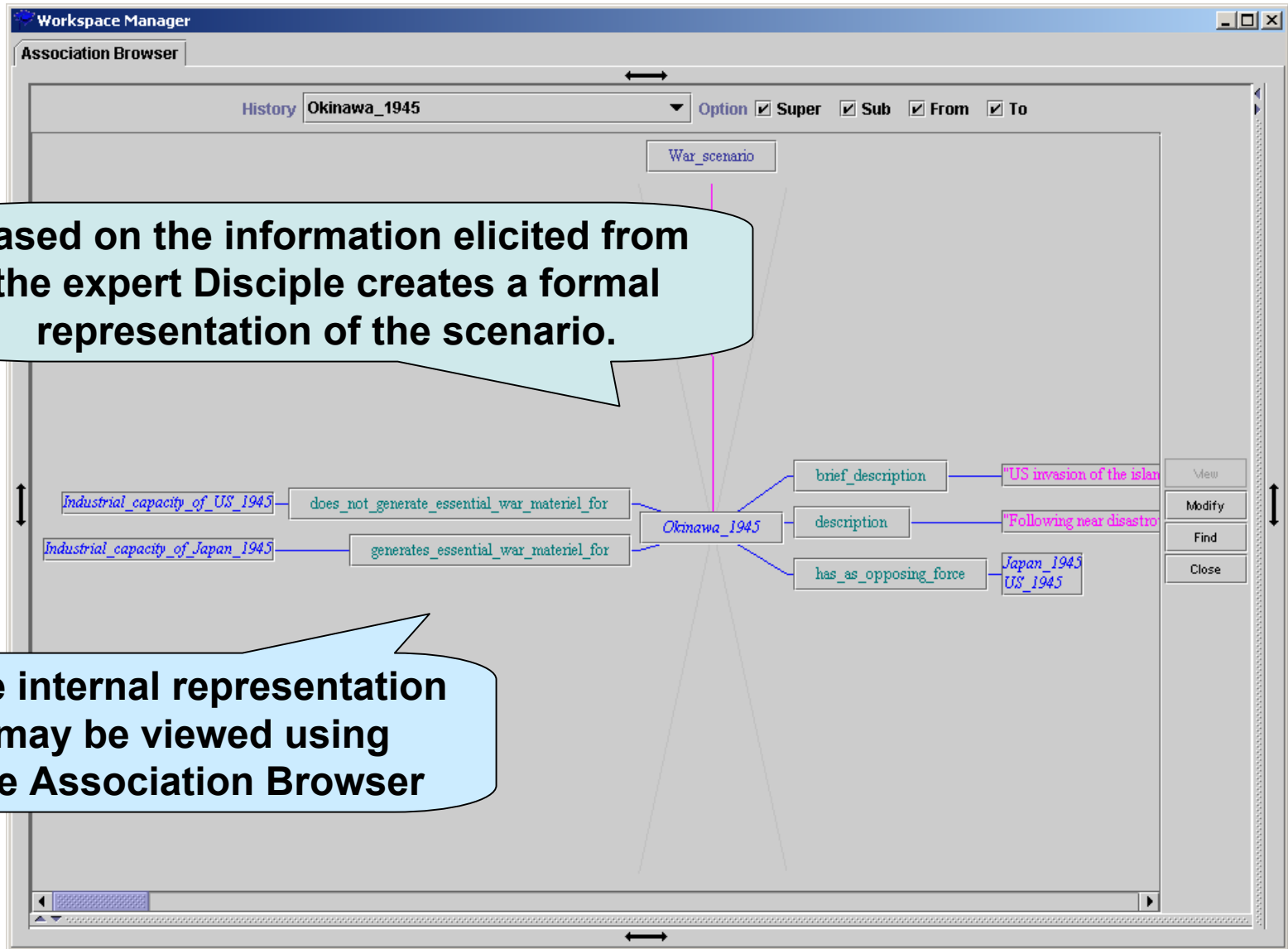
Following near disastrous operations in Leyte, the US forces decided to conduct combined and joint operations intended to take the island of Okinawa away from Japanese Imperial forces and to secure the use of the island as a platform for the invasion of the Japanese homeland. This was a combined operation because British forces (TF-57) were part of the Fifth Fleet Pacific Central Task Force. The Fifth Fleet Pacific Central Task Force consisted of TF 51, TF 52, ..., TF 58 so TF-57 was a component of a much larger unified command and is not considered a separate force for this report.

By 1945, both US and Japanese military leaders had learned valuable lessons from previous island invasions and both were determined not to repeat the mistakes of the past. The US leadership established clear lines of command with a focus on a single set of objectives. They achieved a high degree of synchronization in joint and combined operations. They met every enemy attack with overwhelming combat power. The Japanese defenders, on the other hand, literally had their backs against
- Name the opposing forces in Okinawa_1945:
 - Japan_1945
 - US_1945

Buttons for 'Close' and 'Help' are visible at the bottom of the window.



1. Specifying a training scenario



Based on the information elicited from the expert Disciple creates a formal representation of the scenario.

The internal representation may be viewed using the Association Browser

2. Modeling expert's reasoning

Then the expert has to express his reasoning in center of gravity identification and testing for the Okinawa scenario, by using the task reduction paradigm.



I need to

Identify and test a strategic COG candidate for the Okinawa_1945 scenario

What kind of scenario is Okinawa_1945?

Okinawa_1945 is a major theater of war scenario

Therefore I need to

Identify and test a strategic COG candidate for Okinawa_1945 which is a major theater of war scenario

Which is an opposing force in the Okinawa_1945 scenario?

Japan_1945

Therefore I need to

Identify and test a strategic COG candidate for Japan_1945

...



2. Modeling expert's reasoning

The expert expresses his reasoning process in English, using the Modeling tool of Disciple:

The modeling tool shows:

The description of the node selected from the reasoning tree.

The entire reasoning tree.

The screenshot displays the Disciple modeling tool interface. The main window is titled "Workspace Manager" and contains a "Reduction Tree" on the left and a "Solution Viewer" on the right. The "Reduction Tree" shows a hierarchical structure of reasoning nodes, with the selected node being "Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945". The "Solution Viewer" displays the corresponding task description: "Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945". The interface also includes a "Reduction Step" tab, a "Question" field, and a "New Answer" button. At the bottom, there are navigation buttons for "Modeling", "Formalization", and "Refining", along with "Previous", "Next", "Modeling", "Reports", "Rules", and "Close" buttons.



2. Modeling expert's reasoning



The first steps of the reasoning process show how the expert has identified Emperor Hirohito as a strategic center of gravity candidate for Japan. We will now show how the expert uses the Modeling tool to express his reasoning of testing whether Emperor Hirohito is a viable candidate.

The screenshot displays a modeling tool interface with two main panels:

- Reduction Tree (Left Panel):** A hierarchical tree of tasks. The current task is "Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945". The tree shows the reasoning process starting from "Identify and test a strategic COG candidate for the Okinawa_1945 scenario" and narrowing down to "Japan_1945" and then "Emperor_Hirohito".
- Solution Viewer (Right Panel):** A window titled "Reduction Step" and "Solution Viewer". It shows the current task: "Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*". Below the task is a "Question" field with a "New Answer" button.

At the bottom of the interface, there are navigation buttons: "Modeling" (selected), "Formalization", "Refining", "Previous", "Next", "Modeling" (dropdown), "Reports", "Rules", and "Close".

To reduce the current task the expert needs some information that is identified by asking a question.



2. Modeling expert's reasoning



The screenshot displays a software interface with a 'Workspace Manager' window. The 'Reduction Tree' pane on the left contains a hierarchical list of tasks. The current task is 'What is the strategic goal of US_1945?'. A callout bubble points to this task with the text: 'Then the expert must provide an answer to this question'. Another callout bubble points to the question box on the right with the text: 'To reduce the current task the expert needs some information that is identified by asking a question.' The question box contains the text: 'What is the strategic goal of US_1945?'. The interface also shows a 'Domain Modeling Module' and a 'Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa' window.

Then the expert must provide an answer to this question

To reduce the current task the expert needs some information that is identified by asking a question.

Question: What is the strategic goal of *US_1945*?

Modeling Formalization Refining

Previous Next Modeling

Reports Rules Close



2. Modeling expert's reasoning



The screenshot displays a software interface with a 'Workspace Manager' window on the left and a dialog box on the right. The workspace manager shows a 'Reduction Tree' with a series of nodes representing reasoning steps. The dialog box contains a 'Question' field with the text 'What is the strategic goal of US_1945?' and an 'Answer' field. A blue speech bubble points to the dialog box with the text 'Then the expert must provide an answer to this question'. The bottom of the workspace manager has a status bar with 'Modeling' selected, and buttons for 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', and 'Close'.

Workspace Manager

Domain Modeling Module | Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
- Okinawa_1945 is a war scenario
- Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
- Which is an opposing force in the Okinawa_1945 scenario?
- Japan_1945
- Identify and test a strategic COG candidate for Japan_1945
- Is Japan_1945 a single-member force or a multi-member force?
- Japan_1945 is a single-member force
- Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
- What type of strategic COG candidate should I consider for this single-member force?
- I consider a strategic COG candidate with respect to the government of Japan_1945
- Identify and test a strategic COG candidate with respect to the government of Japan_1945
- Who or what is a main controlling element of the government of Japan_1945?
- Emperor_Hirohito that has a critical role in setting objectives and making decisions
- Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
- Is Emperor_Hirohito a legitimate candidate?
- Yes
- Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
- Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
- What is the strategic goal of US_1945?

Question

What is the strategic goal of *US_1945*?

Answer

Modeling | Formalization | Refining

Previous | Next | Modeling | Reports | Rules | Close

Then the expert must provide an answer to this question



2. Modeling expert's reasoning



Workspace Manager

Domain Modeling Module Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
- Okinawa_1945 is a war scenario
 - Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
 - Which is an opposing force in the Okinawa_1945 scenario?
 - Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and making decisions
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan

Then the expert must provide an answer to this question

Question: What is the strategic goal of US_1945?

Answer: unconditional_surrender_of_Japan

Modeling Formalization Refining

Previous Next Modeling

Reports Rules Close



2. Modeling expert's reasoning



Workspace Manager

Domain Modeling Module Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
 - What kind of scenario is Okinawa_1945?
 - Okinawa_1945 is a war scenario
 - Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
 - Which is an opposing force in the Okinawa_1945 scenario?
 - Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and making decisions
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan

Reduction Step Solution Viewer

Task

Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question

What is the strategic goal of *US_1945*?

Answer

unconditional_surrender_of_Japan

Modeling Formalization Refining

Previous Next Modeling

Reports Rules Close



2. Modeling expert's reasoning



Workspace Manager

Domain Modeling Module **Domain Modeling Module**

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
- Okinawa_1945 is a war scenario
- Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
- Which is an opposing force in the Okinawa_1945 scenario?
- Japan_1945
- Identify and test a strategic COG candidate for Japan_1945
- Is Japan_1945 a single-member force or a multi-member force?
- Japan_1945 is a single-member force
- Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
- What type of strategic COG candidate should I consider for this single-member force?
- I consider a strategic COG candidate with respect to the government of Japan_1945
- Identify and test a strategic COG candidate with respect to the government of Japan_1945
- Who or what is a main controlling element of the government of Japan_1945?
- Emperor_Hirohito that has a critical role in setting objectives and making decisions
- Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
- Is Emperor_Hirohito a legitimate candidate?
- Yes
- Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
- Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
- What is the strategic goal of US_1945?
- unconditional_surrender_of_Japan

Reduction Step **Solution Viewer**

Task Parent

Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer New Subtask

unconditional_surrender_of_Japan

Subtask Reduce Copy Parent Remove

The question and its answer lead to this reduction of the top task.

● Modeling ○ Formalization ○ Refining



2. Modeling expert's reasoning



The screenshot displays the 'Workspace Manager' interface. The 'Reduction Tree' on the left shows a hierarchical list of tasks: 'Identify and test a strategic COG candidate for the Okinawa_1945 scenario' is the root task. It branches into 'What kind of scenario is Okinawa_1945?' and 'Okinawa_1945 is a war scenario'. The latter further branches into 'Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario' and 'Which is an opposing force in the Okinawa_1945 scenario?'. This continues down to 'Japan_1945' and 'Japan_1945 is a single-member force'. The tree highlights several tasks in blue, including those related to 'Japan_1945' and 'Emperor_Hirohito'. At the bottom, radio buttons for 'Modeling', 'Formalization', and 'Refining' are visible, with 'Modeling' selected.

The 'Solution Viewer' on the right is divided into three sections: 'Task', 'Question', and 'Answer'. The 'Task' section displays: 'Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*'. The 'Question' section displays: 'What is the strategic goal of *US_1945*?'. The 'Answer' section displays: '*unconditional_surrender_of_Japan*'. A 'Subtask' section at the bottom of the viewer displays: 'Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*'. A callout bubble points to this subtask.

The question and its answer lead to this reduction of the top task.

At the bottom of the interface, there are buttons for 'Previous', 'Next', and 'Modeling' (with a dropdown arrow), and buttons for 'Reports', 'Rules', and 'Close'.



2. Modeling expert's reasoning



Workspace Manager

Domain Modeling Module | Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
- Okinawa_1945 is a war scenario
 - Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
 - Which is an opposing force in the Okinawa_1945 scenario?
 - Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and making decisions
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is un...

Reduction Step Solution Viewer

- Task (Parent) -
- Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*
- Question (New Answer) -

Modeling Formalization Refining

Previous Next Modeling

Reports Rules Close



2. Modeling expert's reasoning



Workspace Manager
_ □ ×

Domain Modeling Module Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
 - Okinawa_1945 is a war scenario
 - Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
 - Which is an opposing force in the Okinawa_1945 scenario?
 - Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and making decisions
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is un...
 - Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of_...

Reduction Step Solution Viewer

Parent -

- Task

Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

New Answer

- Question

Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is *unconditional_surrender_of_Japan*, could *Emperor_Hirohito* make the *Military_of_Japan_1945* accept it?

Continue Remove -

- Answer

Modeling
 Formalization
 Refining

Previous Next Modeling ▾

Reports Rules Close



2. Modeling expert's reasoning



The screenshot shows a 'Workspace Manager' window with a 'Reduction Tree' on the left and a 'Solution Viewer' on the right.

Reduction Tree: A hierarchical tree of reasoning steps. The root is 'Identify and test a strategic COG candidate for the Okinawa_1945 scenario'. The tree branches down to 'Identify and test a strategic COG candidate for Japan_1945 which is a single-member force', then 'Identify and test a strategic COG candidate with respect to the government of Japan_1945', and finally 'Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945'. The final step is 'Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'.

Solution Viewer: A panel showing the current step in the reduction process. It displays a 'Task' (Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan), a 'Question' (Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept it?), and an 'Answer' (Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945).

Bottom Panel: Contains navigation and control elements: 'Modeling' (selected), 'Formalization', 'Refining', 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', 'Close'.



2. Modeling expert's reasoning



Workspace Manager

Domain Modeling Module | Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
 - What kind of scenario is Okinawa_1945?
 - Okinawa_1945 is a war scenario
 - Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
 - Which is an opposing force in the Okinawa_1945 scenario?
 - Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and making decisions
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is un...
 - Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of...
 - Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945

Reduction Step | Solution Viewer

Task Parent

Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Question All Answers

Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is *unconditional_surrender_of_Japan*, could *Emperor_Hirohito* make the *Military_of_Japan_1945* accept it?

Answer New Subtask Result

Yes, because *Emperor_Hirohito* is the commander in chief of the *Military_of_Japan_1945*



2. Modeling expert's reasoning



This process continues in the same way until the expert has enough information to either eliminate or not eliminate the COG candidate.

The screenshot displays the Workspace Manager interface, which is used for modeling expert reasoning. The main window is titled "Workspace Manager" and contains two tabs: "Domain Modeling Module" and "Domain Modeling Module". The current view is "Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa".

The left pane shows a "Reduction Tree" with a hierarchical structure of tasks and questions. The tasks are represented by blue circles, and the questions by light blue circles. The tree starts with the task "Identify and test a strategic COG candidate for the Okinawa_1945 scenario" and branches into several sub-tasks and questions, eventually leading to the task "Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan".

The right pane is titled "Reduction Step" and "Solution Viewer". It displays the current task: "Test whether *Emperor_Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*". Below the task, there is a "Question" field with a "New Answer" button.

At the bottom of the interface, there are navigation buttons: "Modeling" (selected), "Formalization", and "Refining". There are also "Previous", "Next", and "Modeling" buttons, and "Reports", "Rules", and "Close" buttons.



2. Modeling expert's reasoning



Workspace Manager
_ □ ×

Domain Modeling Module
Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
 - Okinawa_1945 is a war scenario
 - Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
 - Which is an opposing force in the Okinawa_1945 scenario?
 - Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and making decisions
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is un
 - Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of
 - Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945
 - Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945
 - Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surren
 - Yes
 - Emperor_Hirohito is a strategic COG candidate that cannot be eliminated

Reduction Step
Solution Viewer

Task
Parent -

Test whether *Emperor_Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Question
All Answers -

Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is *unconditional_surrender_of_Japan*, could *Emperor_Hirohito* make the *People_of_Japan_1945* accept it?

Answer
New Subtask
Result -

Yes

Result
Remove -

Emperor_Hirohito is a strategic COG candidate that cannot be eliminated

● Modeling
○ Formalization
○ Refining

Previous
Next
Modeling ▼

Reports
Rules
Close



3. Task and Rule Learning



In the formalization mode the tool shows:

The screenshot shows the 'Workspace Manager' interface with two main panes:

- Reduction Tree (Left):** A hierarchical tree of tasks. The root task is 'Identify and test a strategic COG candidate for the Okinawa_1945 scenario'. It branches into 'Okinawa_1945 is a war scenario', which leads to 'Japan_1945'. From 'Japan_1945', it further branches into 'Identify and test a strategic COG candidate for Japan_1945', 'Is Japan_1945 a single-member force or a multi-member force?', and 'Japan_1945 is a single-member force'. The tree continues to specify the controlling element as 'Emperor_Hirohito' and the strategic goal as 'unconditional_surrender_of_Japan'.
- Formalization (Right):** A pane showing the formalized version of the selected task. It displays the task in English: 'Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945'. Below this, it shows the formalized subtask: 'Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'.

At the bottom of the interface, there are navigation buttons: 'Modeling', 'Formalization', 'Refining', 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', 'Close', 'Learn Rule', and 'View Rule'.

The modeling in English

The formalized tasks



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module | Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
- Okinawa_1945 is a war scenario
- Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
- Which is an opposing force in the Okinawa_1945 scenario?
- Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and m...
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945
 - Assuming that Emperor_Hirohito would accept the strategic goal of US_1945
 - Yes, because Emperor_Hirohito is the commander in chief of the Japanese military
 - Test whether Emperor_Hirohito who controls the Japanese military can cause Japan_1945 to accept the strategic goal of US_1945
 - Assuming that Emperor_Hirohito would accept the strategic goal of US_1945
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945

More...

More...

Formalization | Solution Viewer

Task (Parent)

Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to government of *Japan_1945*

Question

What is the strategic goal of *US_1945*?

Answer (New Subtask | Result)

unconditional_surrender_of_Japan

Formal Subtask (Formalize)

Test whether a controlling element can cause a force to accept the strategic goal of a second force which is a strategic goal

| | | | | |
|---|-----|---|---|---|
| The controlling element is | ... | ▲ | ▼ | ✗ |
| <i>Emperor Hirohito</i> | | | | |
| The force is | ... | ▲ | ▼ | ✗ |
| <i>Japan_1945</i> | | | | |
| The second force is | ... | ▲ | ▼ | ✗ |
| <i>US_1945</i> | | | | |
| The strategic goal is | ... | ▲ | ▼ | ✗ |
| <i>unconditional surrender of Japan</i> | | | | |

Learn Rule | View Rule

○ Modeling ● Formalization ○ Refining

Previous | Next | Modeling

Reports | Rules | Close

Disciple will propose a formalization of the task

The expert may accept it or he may edit it



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Teaching for COG-ISD-2002-formalization-learning/KB-With-Ontology/Okinawa

Reduction Tree

Identify and test a strategic COG candidate for the Okinawa_1945 scenario
 What kind of scenario is Okinawa_1945?
 Okinawa_1945 is a war scenario

- Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
- Which is an opposing force in the Okinawa_1945 scenario?
- Japan_1945
 - Identify and test a strategic COG candidate for Japan_1945
 - Is Japan_1945 a single-member force or a multi-member force?
 - Japan_1945 is a single-member force
 - Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
 - What type of strategic COG candidate should I consider for this single-member force?
 - I consider a strategic COG candidate with respect to the government of Japan_1945
 - Identify and test a strategic COG candidate with respect to the government of Japan_1945
 - Who or what is a main controlling element of the government of Japan_1945?
 - Emperor_Hirohito that has a critical role in setting objectives and managing the government of Japan_1945
 - Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
 - Is Emperor_Hirohito a legitimate candidate?
 - Yes
 - Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
 - Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
 - What is the strategic goal of US_1945?
 - unconditional_surrender_of_Japan
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945
 - Assuming that Emperor_Hirohito would accept the goal of US_1945
 - Yes, because Emperor_Hirohito is the commander in chief of the Japanese military

More...

Formalization Solution Viewer

Task Parent

Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer New Subtask Result

unconditional_surrender_of_Japan

Subtask Reduce Copy Parent Remove

Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Formal Task

Test whether a controlling element is a viable strategic COG candidate with respect to the government of a single-member force

The controlling element is *Emperor_Hirohito*

The force is *Japan_1945*

Formal Subtask Formalize

Test whether a controlling element can cause a force to accept the strategic goal of the opposing force

The controlling element is *Emperor_Hirohito*

The force is *Japan_1945*

The opposing force is *US_1945*

The strategic goal is *unconditional_surrender_of_Japan*

After the tasks are formalized the expert may explain the example to Disciple, which will learn a rule from it

Learn Rule View Rule

Modeling Formalization Refining

Previous Next Modeling

Reports Rules Close



3. Task and Rule Learning



The Rule Learning tool helps the expert to explain the example to Disciple

Works

Domain Modeling Module

Formalization Solution Viewer

Task Parent

Test whether *Emperor Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer

unconditional_surrender_of_Japan

Subtask Reduce

Test whether *Emperor Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

Remove

Proposed Explanations

Generate

Accept

Expand

Default

Advanced

End Learning Cancel Learning View Rule

The tool shows the English form of the example

Disciple uses analogical reasoning and other heuristics to propose plausible explanations pieces that justify the task reduction step.



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Formalization | **Solution Viewer**

Task Parent

Test whether *Emperor Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer

unconditional_surrender_of_Japan

Subtask Reduce

Test whether *Emperor Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

Proposed Explanations

- US_1945* -- is_opposed_to --> *Japan_1945*
- Japan_1945* -- is_opposed_to --> *US_1945*
- US_1945* -- has_as_strategic_goal --> *unconditional_surrender_of_Japan*
- US_1945* <-- has_as_opposing_force -- *Okinawa_1945* -- has_as_opposing_force --> *Jap*

Accept

Expand

Default

Advanced

End Learning **Cancel Learning** **View Rule**

The expert selects those explanation pieces that correspond to the meaning of the question-answer pair from the task reduction example



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Formalization | **Solution Viewer**

Task Parent

Test whether *Emperor Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer

unconditional_surrender_of_Japan

Subtask Reduce

Test whether *Emperor Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

US_1945 -- has_as_strategic_goal --> unconditional_surrender_of_Japan Remove

Proposed Explanations

... ... Generate

- US_1945 -- is_opposed_to --> Japan_1945*
- Japan_1945 -- is_opposed_to --> US_1945*
- US_1945 -- has_as_strategic_goal --> unconditional_surrender_of_Japan*
- US_1945 <-- has_as_opposing_force -- Okinawa_1945 -- has_as_opposing_force --> Jap*

Accept Expand Default Advanced

The expert selects those explanation pieces that correspond to the meaning of the question-answer pair from the task reduction example

End Learning Cancel Learning View Rule



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Formalization | **Solution Viewer**

Task Parent

Test whether *Emperor Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer

unconditional_surrender_of_Japan

Subtask Reduce

Test whether *Emperor Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

US_1945 -- has_as_strategic_goal --> *unconditional_surrender_of_Japan* Remove

Proposed Explanations

US_1945 -- is_opposed_to --> *Japan_1945*
Japan_1945 -- is_opposed_to --> *US_1945* Accept
US_1945 -- is_opposed_to --> *unconditional_surrender_of_Japan*
US_1945 <-- has_as_opposing_force -- *Okinawa_1945* -- has_as_opposing_force --> *Jap*

Generate Expand Default Advanced

End Learning Cancel Learning View Rule



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Formalization | **Solution Viewer**

Task Parent

Test whether *Emperor Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*

Question All Answers

What is the strategic goal of *US_1945*?

Answer

unconditional_surrender_of_Japan

Subtask Reduce

Test whether *Emperor Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

US_1945 -- has_as_strategic_goal --> *unconditional_surrender_of_Japan*
Japan_1945 -- is_opposed_to --> *US_1945*

Proposed Explanations

US_1945 -- is_opposed_to --> *Japan_1945*
Japan_1945 -- is_opposed_to --> *US_1945*
US_1945 -- has_as_strategic_goal --> *unconditional_surrender_of_Japan*
US_1945 <-- has_as_opposing_force -- *Okinawa_1945* -- has_as_opposing_force --> *Jap*

Buttons: Remove, Generate, Accept, Expand, Default, Advanced, End Learning, Cancel Learning, View Rule



3. Task and Rule Learning



The screenshot shows the 'Workspace Manager' interface with a 'Domain Modeling Module'. It includes sections for 'Formalization' and 'Solution Viewer'. The 'Formalization' section contains a 'Task' (Test whether Emperor Hirohito is a viable strategic COG candidate...), a 'Question' (What is the strategic goal of US_1945?), an 'Answer' (unconditional_surrender_of_Japan), and a 'Subtask' (Test whether Emperor Hirohito is a viable strategic COG candidate...).

The 'Solution Viewer' section is divided into 'Accepted Explanations' and 'Proposed Explanations'. The 'Accepted Explanations' section shows two rules: `US_1945 -- has_as_strategic_goal --> unconditional_surrender_of_Japan` and `Japan_1945 -- is_opposed_to --> US_1945`. The 'Proposed Explanations' section shows three rules: `US_1945 -- is_opposed_to --> Japan_1945`, `Japan_1945 -- is_opposed_to --> US_1945`, and `US_1945 -- has_as_strategic_goal --> unconditional_surrender_of_Japan`. The first two rules are highlighted in yellow. The 'Proposed Explanations' section also includes a 'Generate' button and a list of buttons: 'Accept', 'Expand', 'Default', and 'Advanced'.

At the bottom of the interface, there are buttons for 'End Learning', 'Cancel Learning', and 'View Rule'.

The expert may direct Disciple to generate explanation pieces related to certain objects from the example

When the expert is satisfied with the identified explanation he can click on "End learning". Disciple will then create a general rule corresponding to this example and its explanation.



3. Task and Rule Learning



This is the general task reduction rule learned by Disciple.

During rule refinement the two conditions will converge toward one another, ultimately leading to a rule with a single condition.

Disciple Rule Viewer
Rule ID: DRR.0007

FORMAL STRUCTURE OF THE RULE:
IF
Test whether a controlling element is a viable strategic COG candidate with respect to the government of a single-member force
The controlling element is ?O1
The force is ?O2
Explanation:
?O2 is_opposed_to ?O3
?O3 has_as_strategic_goal ?O4
MAIN CONDITION:
Plausible Upper Bound Condition:
?O1 is (Strategic_cog_relevant_factor Agent)
?O2 is (Force)
is_opposed_to ?O3
?O3 is (Force)
has_as_strategic_goal ?O4
?O4 is (Force_goal)
Plausible Lower Bound Condition:
?O1 is (God_king)
?O2 is (Opposing_force Single_state_force)
is_opposed_to ?O3
?O3 is (Opposing_force Single_state_force)
has_as_strategic_goal ?O4
?O4 is (Strategic_goal)
THEN
Test whether a controlling element can cause a force to accept the strategic goal of the opposing force
The controlling element is ?O1
The force is ?O2
The opposing force is ?O3
The strategic goal is ?O4

Notice that it has a plausible upper bound condition and a plausible lower bound condition.



3. Task and Rule Learning

This is the general task reduction rule learned by Disciple.

In addition to the formal structure of the rule, which is used in problem solving and learning, Disciple maintains also an informal structure of the rule.

Disciple Rule Viewer
 Rule ID: DRR.0007

FORMAL STRUCTURE OF THE RULE:
 IF
 Test whether a controlling element is a viable strategic COG candidate with respect to the government of a single-member force
 The controlling element is ?O1
 The force is ?O2
Explanation:

Disciple Rule Viewer
 Rule ID: DRR.0007

INFORMAL STRUCTURE OF THE RULE:
 IF
 Test whether ?O1 is a viable strategic COG candidate with respect to the government of ?O2
Question: What is the strategic goal of ?O3 ?
Answer: ?O4
 THEN
 Test whether ?O1 can cause ?O2 to accept the strategic goal of ?O3 which is ?O4

?O1 is (Controlling_element)
 ?O2 is (Opposing_force Single_state_force)
 is_opposed_to ?O3
 ?O3 is (Opposing_force Single_state_force)
 has_as_strategic_goal ?O4
 ?O4 is (Strategic_goal)

THEN
 Test whether a controlling element is a viable strategic COG candidate with respect to the government of a single-member force
 The controlling element is ?O1
 The force is ?O2
 The opposing force is ?O3
 The strategic goal is ?O4

The informal structure is used in the communication with the user.



3. Task and Rule Learning



After learning a rule from the current task reduction step Disciple returns to the formalization mode.

The screenshot displays the Workspace Manager interface, divided into several panes:

- Reduction Tree (Left):** A hierarchical tree of tasks. The root task is "Identify and test a strategic COG candidate for the Okinawa_1945 scenario". It branches into "Japan_1945" and "unconditional_surrender_of_Japan". The "Japan_1945" branch includes tasks like "Identify and test a strategic COG candidate for Japan_1945", "Is Japan_1945 a single-member force?", and "Identify Emperor Hirohito as a strategic COG candidate with respect to the government of Japan_1945". The "unconditional_surrender_of_Japan" branch includes "Test whether Emperor Hirohito can cause Japan_1945 to accept the strategic goal of US_1945?".
- Formalization (Middle):** A pane showing the current formalization step, labeled "Subtask". The text reads: "Test whether Emperor Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan".
- Solution Viewer (Right):** A pane showing the formal task and its solution. The formal task is "Test whether a controlling element is a viable strategic COG candidate with respect to the government of a single-member force". The solution includes: "The controlling element is Emperor_Hirohito", "The force is Japan_1945", "The opposing force is US_1945", and "The strategic goal is unconditional_surrender_of_Japan".

At the bottom of the interface, there are navigation buttons: "Modeling" (selected), "Formalization", "Refining", "Previous", "Next", "Modeling" (dropdown), "Reports", "Rules", "Close", "Explain Example", "Incorrect Example", and "View Rule".



3. Task and Rule Learning



Following the same procedure, Disciple will learn another rule from the next task reduction step:

The screenshot displays the 'Workspace Manager' interface, divided into several functional areas:

- Domain Modeling Module:** Shows the current project: 'Teaching for COG-ISD-2002-formalization-learning/KB-With-Ontology/Okinawa'.
- Reduction Tree:** A hierarchical tree of tasks. The root task is 'Identify and test a strategic COG candidate for the Okinawa_1945 scenario'. It branches into 'Japan_1945', which further branches into 'Identify and test a strategic COG candidate for Japan_1945'. This task is further refined into 'Is Japan_1945 a single-member force or a multi-member force?', which leads to 'Japan_1945 is a single-member force'. This is followed by 'Identify and test a strategic COG candidate for Japan_1945 which is a single-member force', which leads to 'What type of strategic COG candidate should I consider for this single-member force?'. This task is refined to 'I consider a strategic COG candidate with respect to the government of Japan', which leads to 'Identify and test a strategic COG candidate with respect to the government of Japan'. This task is further refined to 'Who or what is a main controlling element of the government of Japan, 1945?', which leads to 'Emperor_Hirohito that has a critical role in setting objectives and managing the government of Japan, 1945'. This task is refined to 'Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan, 1945', which leads to 'Is Emperor_Hirohito a legitimate candidate?'. This task is refined to 'Yes', which leads to 'Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan, 1945'. This task is refined to 'Test whether Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan, 1945', which leads to 'What is the strategic goal of US_1945?'. This task is refined to 'unconditional_surrender_of_Japan', which leads to 'Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'. This task is refined to 'Assuming that Emperor_Hirohito would accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan?'. This task is refined to 'Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945', which leads to 'Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'.

The **Formalization** and **Solution Viewer** panels show the formalization of the selected task. The **Task** panel shows the formalized task: 'Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'. The **Question** panel shows the formalized question: 'Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan?'. The **Answer** panel shows the formalized answer: 'Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945'. The **Subtask** panel shows the formalized subtask: 'Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'. The **Formal Task** panel shows the formalized task: 'Test whether a controlling element can cause a force to accept the strategic goal of the opposing force'. The **Formal Subtask** panel shows the formalized subtask: 'Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan'. The **Formal Task** panel also shows the formalized solution: 'The controlling element is Emperor_Hirohito', 'The force is Japan_1945', 'The opposing force is US_1945', and 'The strategic goal is unconditional_surrender_of_Japan'. A **Formalize** button is visible in the **Formal Subtask** panel.

At the bottom of the interface, there are buttons for 'Learn Rule', 'View Rule', 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', and 'Close'. The 'Modeling' radio button is selected.



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Teaching for COG-isd-2002-formalization-learning/KB-With-Ontology/Okinawa

Reduction Tree

```

graph TD
    Root["Identify and test a strategic COG candidate for the Okinawa_1945 scenario  
what kind of scenario is Okinawa_1945?"]
    Root --- Node1["Okinawa_1945 is a war scenario"]
    Node1 --- Node2["Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario"]
    Node2 --- Node3["Which is an opposing force in the Okinawa_1945 scenario?"]
    Node3 --- Node4["Japan_1945"]
    Node4 --- Node5["Identify and test a strategic COG candidate for Japan_1945"]
    Node5 --- Node6["Is Japan_1945 a single-member force or a multi-member force?"]
    Node6 --- Node7["Japan_1945 is a single-member force"]
    Node7 --- Node8["Identify and test a strategic COG candidate for Japan_1945 which is a single-member force"]
    Node8 --- Node9["What type of strategic COG candidate should I consider for this single-member force?"]
    Node9 --- Node10["I consider a strategic COG candidate with respect to the government of Japan"]
    Node10 --- Node11["Identify and test a strategic COG candidate with respect to the government of Japan"]
    Node11 --- Node12["Who or what is a main controlling element of the government of Japan_1945?"]
    Node12 --- Node13["Emperor_Hirohito that has a critical role in setting objectives and managing the military of Japan_1945"]
    Node13 --- Node14["Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945"]
    Node14 --- Node15["Is Emperor_Hirohito a legitimate candidate?"]
    Node15 --- Node16["Yes"]
    Node16 --- Node17["Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945"]
    Node17 --- Node18["Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945"]
    Node18 --- Node19["What is the strategic goal of US_1945?"]
    Node19 --- Node20["unconditional_surrender_of_Japan"]
    Node20 --- Node21["Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945?"]
    Node21 --- Node22["Assuming that Emperor_Hirohito would accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the unconditional_surrender_of_Japan?"]
    Node22 --- Node23["Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945"]
    Node23 --- Node24["Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945?"]
    Node24 --- Node25["Assuming that Emperor_Hirohito would accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the unconditional_surrender_of_Japan?"]
    Node25 --- Node26["Yes"]
    Node26 --- Node27["Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945"]
    
```

More...

Formalization | **Solution Viewer**

Task Parent

Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Question All Answers

Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is *unconditional_surrender_of_Japan*, could *Emperor_Hirohito* make the *Military_of_Japan_1945* accept the *unconditional_surrender_of_Japan*?

Answer New Subtask Result

Yes, because *Emperor_Hirohito* is the commander in chief of the *Military_of_Japan_1945*

Subtask Reduce Copy Parent Remove

Test whether *Emperor_Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Formal Task

Test whether a controlling element can cause a force to accept the strategic goal of the opposing force

The controlling element is *Emperor_Hirohito*

The force is *Japan_1945*

The opposing force is *US_1945*

The strategic goal is *unconditional_surrender_of_Japan*

Formal Subtask Formalize

Test whether a controlling element who controls the military of a force can cause that force to accept the strategic goal of the opposing force

The controlling element is *Emperor_Hirohito*

The military is *Military_of_Japan_1945*

The force is *Japan_1945*

The opposing force is *US_1945*

The strategic goal is *unconditional_surrender_of_Japan*

Learn Rule View Rule

Modeling
 Formalization
 Refining

Previous Next Modeling

Reports Rules Close



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module | Domain Modeling Module

Formalization | Solution Viewer

Task Parent

Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Question All Answers

Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is *unconditional_surrender_of_Japan*, could *Emperor_Hirohito* make the *Military_of_Japan_1945* accept it?

Answer

Yes, because *Emperor_Hirohito* is the commander in chief of the *Military_of_Japan_1945*

Subtask Reduce

Test whether *Emperor_Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US_1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

Remove

Proposed Explanations

Generate

Military_of_Japan_1945 -- has as commander in chief --> *Emperor_Hirohito*
Japan_1945 -- has as military force --> *Military_of_Japan_1945*

Accept
Expand
Default
Advanced

End Learning Cancel Learning View Rule



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module | Domain Modeling Module

Formalization | Solution Viewer

Task Parent

Test whether *Emperor Hirohito* can cause *Japan 1945* to accept the strategic goal of *US 1945* which is *unconditional_surrender_of_Japan*

Question All Answers

Assuming that *Emperor Hirohito* would accept the goal of *US 1945* which is *unconditional_surrender_of_Japan*, could *Emperor Hirohito* make the *Military_of_Japan_1945* accept it?

Answer

Yes, because *Emperor Hirohito* is the commander in chief of the *Military_of_Japan_1945*

Subtask Reduce

Test whether *Emperor Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US 1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

Japan_1945 -- has_as_military_force --> Military_of_Japan_1945 Remove

Proposed Explanations

... ... Generate

Military_of_Japan_1945 -- has_as_commander_in_chief --> Emperor_Hirohito Accept

Japan_1945 -- has_as_military_force --> Military_of_Japan_1945 Expand

Default

Advanced

End Learning Cancel Learning View Rule



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module | Domain Modeling Module

Formalization | Solution Viewer

Task Parent

Test whether *Emperor Hirohito* can cause *Japan 1945* to accept the strategic goal of *US 1945* which is *unconditional_surrender_of_Japan*

Question All Answers

Assuming that *Emperor Hirohito* would accept the goal of *US 1945* which is *unconditional_surrender_of_Japan*, could *Emperor Hirohito* make the *Military_of_Japan_1945* accept it?

Answer

Yes, because *Emperor Hirohito* is the commander in chief of the *Military_of_Japan_1945*

Subtask Reduce

Test whether *Emperor Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US 1945* which is *unconditional_surrender_of_Japan*

Accepted Explanations

Japan_1945 -- has_as_military_force --> *Military_of_Japan_1945*
Military_of_Japan_1945 -- has_as_commander_in_chief --> *Emperor_Hirohito*

Proposed Explanations

Military_of_Japan_1945 -- has_as_commander_in_chief --> *Emperor_Hirohito*
Japan_1945 -- has_as_military_force --> *Military_of_Japan_1945*

End Learning | Cancel Learning | View Rule



3. Task and Rule Learning



Workspace Manager

Domain Modeling Module

Teaching for COG-ISD-2002-formalization-learning/KB-With-Ontology/Okinawa

Reduction Tree

```

    Identify and test a strategic COG candidate for the Okinawa_1945 scenario
    What kind of scenario is Okinawa_1945?
    Okinawa_1945 is a war scenario
    Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
    Which is an opposing force in the Okinawa_1945 scenario?
    Japan_1945
    Identify and test a strategic COG candidate for Japan_1945
    Is Japan_1945 a single-member force or a multi-member force?
    Japan_1945 is a single-member force
    Identify and test a strategic COG candidate for Japan_1945 which is a single-member force
    What type of strategic COG candidate should I consider for this single-member force?
    I consider a strategic COG candidate with respect to the government of Japan_1945
    Identify and test a strategic COG candidate with respect to the government of Japan_1945
    Who or what is a main controlling element of the government of Japan_1945?
    Emperor_Hirohito that has a critical role in setting objectives and making decisions for the government of Japan_1945
    Identify Emperor_Hirohito as a strategic COG candidate with respect to the government of Japan_1945
    Is Emperor_Hirohito a legitimate candidate?
    Yes
    Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
    Test whether Emperor_Hirohito is a viable strategic COG candidate with respect to the government of Japan_1945
    What is the strategic goal of US_1945?
    unconditional_surrender_of_Japan
    Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945
    Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the strategic goal of US_1945?
    Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945
    Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945
    Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the strategic goal of US_1945?
    Yes
    Emperor_Hirohito is a strategic COG candidate with respect to the government of Japan_1945
  
```

More...

Formalization Solution Viewer

- Task** (Parent)
 - Test whether Emperor_Hirohito can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan
- Question** (All Answers)
 - Assuming that Emperor_Hirohito would accept the goal of US_1945 which is unconditional_surrender_of_Japan, could Emperor_Hirohito make the Military_of_Japan_1945 accept the strategic goal of US_1945?
- Answer**
 - Yes, because Emperor_Hirohito is the commander in chief of the Military_of_Japan_1945
- Subtask** (Reduce)
 - Test whether Emperor_Hirohito who controls the Military_of_Japan_1945 can cause Japan_1945 to accept the strategic goal of US_1945 which is unconditional_surrender_of_Japan

Formal Task

Test whether a controlling element can cause a force to accept the strategic goal of the opposing force

The controlling element is Emperor_Hirohito

The force is Japan_1945

The opposing force is US_1945

The strategic goal is unconditional_surrender_of_Japan

Formal Subtask

Test whether a controlling element who controls the military of a force can cause that force to accept the strategic goal of the opposing force

The controlling element is Emperor_Hirohito

The military is Military_of_Japan_1945

The force is Japan_1945

The opposing force is US_1945

The strategic goal is unconditional_surrender_of_Japan

Buttons: Explain Example, Incorrect Example, View Rule

Modeling Formalization Refining

Previous Next Modeling

Reports Rules Close



3. Task and Rule Learning

Following the same procedure, Disciple will learn another rule from the last task reduction step:

The screenshot displays the Disciple workspace with three main panels:

- Reduction Tree:** A hierarchical tree of tasks. The root task is "Identify and test a strategic COG candidate for the Okinawa_1945 scenario". It branches into "Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario" and "Which is an opposing force in the Okinawa_1945 scenario?". The "Japan_1945" branch is highlighted, showing tasks like "Identify and test a strategic COG candidate for Japan_1945" and "Identify and test a strategic COG candidate for Japan_1945 which is a single-member force". The final task, "Identify Emperor Hirohito as a strategic COG candidate with respect to the government of Japan_1945", is highlighted in green, indicating it is the current focus.
- Formalization:** Shows the formalized version of the selected task. The task is "Test whether *Emperor Hirohito* who controls the *Military of Japan 1945* can cause *Japan 1945* to accept the strategic goal of *US 1945* which is *unconditional surrender of Japan*". The question is "Assuming that *Emperor Hirohito* would accept the goal of *US 1945* which is *unconditional surrender of Japan*, could *Emperor Hirohito* make the *People of Japan 1945*". The answer is "Yes". The result is "Emperor Hirohito is a strategic COG candidate that cannot be eliminated".
- Solution Viewer:** Shows the solution for the formalized task. It lists the controlling element as "Emperor Hirohito", the military as "Military of Japan 1945", the force as "Japan 1945", and the opposing force as "US 1945". The strategic goal is "unconditional surrender of Japan". The result is "A controlling element is a strategic COG candidate that cannot be eliminated".

At the bottom of the workspace, there are buttons for "Explain Example", "Incorrect Example", and "View Rule". The status bar shows "Modeling", "Formalization", and "Refining" options, with "Formalization" selected. There are also "Previous", "Next", and "Modeling" buttons, and "Reports", "Rules", and "Close" buttons.

4. Rule Refinement

Disciple uses the partially learned rules in problem solving and refines them based on expert's feedback.

The screenshot displays the Disciple software interface. On the left, a 'Reduction Tree' shows a hierarchical task structure. The root task is 'Identify and test a strategic COG candidate for the Okinawa_1945 scenario'. It branches into 'Japan_1945' and 'US_1945'. Under 'US_1945', the tree continues with tasks like 'Identify and test a strategic COG candidate for US_1945', 'Is US_1945 a single-member force or a multi-member force?', and 'US_1945 is a single-member force'. The tree further refines these tasks, leading to the identification of 'President_Truman' as a strategic COG candidate and the testing of whether he is a viable candidate with respect to the government of US_1945. The final task in the tree is 'President_Truman is a strategic COG candidate that cannot be eliminated'. On the right, the 'Refining' panel shows the current task being refined: 'Identify and test a strategic COG candidate for US_1945'. Below this, a 'Question' is displayed: 'Is US_1945 a single-member force or a multi-member force?'. The 'Answer' section shows: 'US_1945 is a single-member force'. At the bottom of the interface, there are navigation buttons: 'Modeling', 'Formalization', 'Refining' (selected), 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', and 'Close'. An 'Expand All' button is also present at the bottom right of the main window.

4. Rule Refinement



Disciple uses the rules learned from the expert's identification and testing of Emperor Hirohito to identify and test President Truman as a US strategic center of gravity candidate.

The screenshot displays the Disciple software interface. On the left is a 'Reduction Tree' showing a sequence of reasoning steps. The tree starts with a task: 'Identify and test a strategic COG candidate for US_1945'. It branches into questions: 'Which kind of scenario is Okinawa_1945?', 'Okinawa_1945 is a war scenario', 'Which is an opposing force in the scenario which is a war scenario?', 'Japan_1945', and 'US_1945'. Further steps include identifying a single-member force, testing President Truman as a candidate, and testing whether he is a viable strategic COG candidate. A question mark '?' precedes several steps, indicating they are less plausible. The right window shows the current task, question, and answer. The bottom status bar shows 'Modeling', 'Formalization', and 'Refining' options, with 'Refining' selected. Navigation buttons for 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', and 'Close' are also visible.

The “?” preceding a reasoning step indicates that the step is less plausible, because it is based on the plausible upper bound condition of a learned rule.

4. Rule Refinement

The expert has to examine this step and has to indicate whether it is:

Workspace Manager

Domain Modeling Module | Domain Modeling Module

Teaching for COG-ISD-2002-training/KB-With-Ontology/Okinawa

Reduction Tree

- Identify and test a strategic COG candidate for the Okinawa_1945 scenario
- What kind of scenario is Okinawa_1945?
- Okinawa_1945 is a war scenario
- Identify and test a strategic COG candidate for Okinawa_1945 which is a war scenario
- Which is an opposing force in the Okinawa_1945 scenario?
- Japan_1945
- US_1945
- Identify and test a strategic COG candidate for US_1945
- Is US_1945 a single-member force or a multi-member force?
- US_1945 is a single-member force
- Identify and test a strategic COG candidate for US_1945 which is a single-member force
- What type of strategic COG candidate should I consider for this single-member force?
- I consider a strategic COG candidate with respect to the government of US_1945
- Identify and test a strategic COG candidate with respect to the government of US_1945
- Who or what is a main controlling element of the government of US_1945?
- President_Truman that has a critical role in setting objectives and making decisions
- Identify President_Truman
- Is President_Truman a legal person?
- Yes
- President_Truman is a legal person
- Test whether President_Truman is a viable strategic COG candidate
- What is the strategic goal of President_Truman?
- US_giving_honorable_end_of_hostilities_to_japan
- Test whether President_Truman can cause US_1945 to accept the strategic goal of giving_honorable_end_of_hostilities_to_japan
- Assess whether President_Truman is a viable strategic COG candidate with respect to the government of US_1945

Refining

Task Parent

Identify and test a strategic COG candidate with respect to the government of US_1945

Question All Answers

Who or what is a main controlling element of the government of US_1945?

Answer

President_Truman that has a critical role in setting objectives and making decisions

Explanations

President_Truman -- has_critical_role_in_decision_making_for --> US_1945
 President_Truman -- has_critical_role_in_setting_objectives_for --> US_1945

Correct Example Explain Example Incorrect Example View Rule

Modeling Formalization Refining

Previous Next Modeling Reports Rules Close

correct but incompletely explained by selecting "Explain Example"

correct and completely explained by selecting "Correct Example"

incorrect by selecting "Incorrect Example"

4. Rule Refinement

The expert has indicated that the reasoning step is correct and Disciple has generalized the plausible lower bound condition of the corresponding rule, to cover this example.

The screenshot displays the Disciple software interface. On the left, a 'Reduction Tree' shows a hierarchical list of tasks and questions. The root task is 'Identify and test a strategic COG candidate with respect to the government of US_1945'. It branches into questions like 'Which is an opposing force in the scenario?' and 'Which is a war scenario?'. Further down, it asks 'Who or what is a main controlling element of the government of US_1945?' and 'Is President_Truman a legitimate candidate?'. The final conclusion is 'President_Truman is a strategic COG candidate that cannot be eliminated'. On the right, a pane shows the current task: 'Identify and test a strategic COG candidate with respect to the government of US_1945'. Below it is a question: 'Who or what is a main controlling element of the government of US_1945?'. The answer is: 'President_Truman that has a critical role in setting objectives and making decisions'. Below the answer are two subtasks: 'Identify President_Truman as a strategic COG candidate with respect to the government of US_1945' and 'Test whether President_Truman is a viable strategic COG candidate with respect to the government of US_1945'. At the bottom, there are buttons for 'Explain Example', 'Incorrect Example', 'View Rule', 'Modeling', 'Formalization', 'Refining', 'Previous', 'Next', 'Modeling', 'Reports', 'Rules', and 'Close'.

4. Rule Refinement

- In the case of a correct but incompletely explained example the expert may further explain the example, as has been illustrated before.
- For an incorrect example the expert has to help Disciple to identify an explanation of why the example is incorrect.
- In all the cases the rule is automatically refined by Disciple.

The screenshot displays the Disciple expert system interface. On the left, a task tree shows a sequence of tasks for identifying and testing strategic COG candidates for Okinawa_1945 and US_1945. The current task is "Identify and test a strategic COG candidate with respect to the government of US_1945", which is further refined into "Who or what is a main controlling element of the government of US_1945?". The answer provided is "President_Truman that has a critical role in setting objectives and making decisions".

The right pane shows a detailed view of this task. It includes a "Question" section with the text: "Who or what is a main controlling element of the government of US_1945?". Below it is an "Answer" section with the text: "President_Truman that has a critical role in setting objectives and making decisions". There are also "Explanations" and "Subtask" sections. The "Subtask" section contains two entries: "Identify President_Truman as a strategic COG candidate with respect to the government of US_1945" and "Test whether President_Truman is a viable strategic COG candidate with respect to the government of US_1945".

At the bottom of the interface, there are buttons for "Explain Example", "Incorrect Example", and "View Rule". The status bar at the very bottom shows "Modeling", "Formalization", and "Refining" (selected), along with "Previous", "Next", and "Modeling" buttons.



5. Exception Handling

Because the object ontology of Disciple is incomplete, it may not contain the knowledge pieces that explain why a certain rule example is incorrect. In such a case the expert has two options:

- **End Rule Refinement (the incorrect example is kept as a negative exception of the rule; the knowledge base will be extended latter, with the help of the knowledge engineer);**
- **Invoke Exception Handling (the expert attempts to extend the object ontology by himself).**

We will demonstrate the handling of exceptions by the subject matter expert.

5. Exception Handling

Disciple generates a task reduction step which is rejected by the expert. The expert and Disciple attempt to find an explanation of why this reasoning step is incorrect.

The screenshot shows the 'Workspace Manager' interface with a 'Domain Modeling Module' and a 'Refining' panel. The 'Task' section contains the text: 'Test whether the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945*'. The 'Question' section asks: 'Would the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* have a...'. The 'Answer' section states: 'Yes, because *Industrial_capacity_of_Japan_1945* is an essential generator of war materiel from...'. The 'Explanations' section is empty. The 'Result' section states: '*Industrial_capacity_of_Japan_1945* is a strategic COG candidate that cannot be eliminated'. The main workspace displays a rule: '*Industrial_capacity_of_Japan_1945* -- generates_essential_war_materiel_from_the_strategic_perspective_of --> *Japan_1945* *Japan_1945* -- has_as_military_force --> *Military_of_Japan_1945*'. Below this, the 'Accepted Explanations' section is empty. The 'Proposed Explanati...' section contains several lines of text: '*_of_Japan_1945* IS ...', '*_of_Japan_1945* -- generates_essential_war_materiel_for --> *Okinawa_1945* ...', '*_of_Japan_1945* -- produces_war_materiel_for --> *Japan_1945*', and '*_of_Japan_1945* <-- has_as_industrial_factor -- *Japan_1945*'. On the right side, there are buttons for 'Generate', 'Accept', 'Expand', and 'Default'. At the bottom, there are buttons for 'End Refining', 'Cancel Refining', 'View Rule', and 'Exception Handling'.

However, there is no ontology piece that explains why this is an incorrect reasoning step.

The expert may end Rule Refining, and Disciple will keep the incorrect reasoning step as a negative exception to the rule that generated it.

Or, the expert may start Exception Handling

5. Exception Handling

The Exception Handling module shows:

The incorrect reasoning step (the negative exception of the rule)

An object from the positive example

The left and right buttons used to view the other objects from the rule's examples

The corresponding object from the negative exception of the rule

The screenshot shows a software interface for exception handling. At the top, there are navigation icons (home, info, back, forward) and a title bar. The main content area is divided into several sections:

- Informal Example / Formal Example:** A tabbed interface showing a task, question, answer, and explanations.
- Task:** "Test whether the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* would cause *Japan_1945* to accept *unconditional_surrender_of_Japan*".
- Question:** "Would the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* have a deteriorating effect on *Japan_1945*?"
- Answer:** "Yes, because *Industrial_capacity_of_Japan_1945* is an essential generator of war materiel from the strategic perspective".
- Explanations:** A scrollable area with a blue background.
- Task:** "*Industrial_capacity_of_Japan_1945* is a strategic COG candidate that cannot be eliminated".
- Positive Example:** A list containing "+ *Military_of_US_1945*".
- Negative Exception:** A list containing "- *Military_of_Japan_1945*".
- Navigation:** Buttons for "View", "<< Left", and "Right >>".
- Footer:** Buttons for "View Rule" and "Close Tool".

Callouts point to specific elements: a blue box highlights the task/question/answer/explanations section; a blue box points to the "Incorrect reasoning step" (negative exception) in the "Negative Exception" list; a blue box points to the "Positive Example" object; a blue box points to the left and right navigation buttons; and a blue box points to the "Negative Exception" object.

5. Exception Handling

The screenshot shows a software interface titled "Workspace Manager" with a "Domain Modeling Module" and "KB Name: COG-demo". The interface is divided into several sections: "Informal Example", "Task", "Question", "Answer", "Explanations", and "Positive Example".

Informal Example: "Test whether the reduction in the number of operations is unconditional surrender." (Note: "Industrial_capacity" is crossed out in the original image).

Task: "Test whether the reduction in the number of operations is unconditional surrender." (Note: "Industrial_capacity" is crossed out).

Question: "Would the reduction in the number of operations be unconditional surrender?" (Note: "Industrial_capacity" is crossed out).

Answer: "Yes, because Industrial_capacity is from the strategic perspective." (Note: "Industrial_capacity" is crossed out).

Explanations: (Empty section).

Task: "Test whether the reduction in the number of operations is unconditional surrender." (Note: "Industrial_capacity_of_Japan_1945" is crossed out).

Positive Example: "+ Military_of_US_1945".

Negative Example: "- Military_of_Japan_1945".

Right Panel: A list of candidate hypotheses:

- Property is_mission_oriented for: Military_of_US_1945 (highlighted in yellow)
- Property type_of_operations for: Military_of_US_1945
- Property type_of_operations for: US_1945

Bottom Panel: A detailed description of the highlighted candidate:

Property is_mission_oriented for: Military_of_US_1945 and may distinguish it from Military_of_Japan_1945.

Property type_of_operations for: Military_of_US_1945 is "at least as much as and appreciative of the worth of the individual".

Property type_of_operations for: Military_of_US_1945 is "Applicable".

Buttons: "Select Candidate", "More Candidates", "Close Tool".

Disciple generates an ordered list of candidate hypotheses that may distinguish between the positive example and the negative exception of the rule

These candidate hypotheses are new ontology pieces (e.g. new feature values, new features, or new objects)

This is a more detailed description of the candidate highlighted above

The negative exception may be removed by providing a value for the property "is_mission_oriented" of Military_of_Japan_1945 which is different from the value for Military_of_US_1945

The expert selects this candidate to remove the exception

5. Exception Handling

Disciple guides the expert in the definition of new knowledge about the selected candidate

The screenshot shows a software interface with a left sidebar and a main workspace. The sidebar contains sections for 'Informal Example', 'Question', 'Answer', 'Explanations', and 'Task'. The main workspace contains a text instruction, a table with two rows, and buttons for 'Confirm Candidate', 'Cancel Candidate', 'View Rule', and 'Close Tool'.

Informal Example

Task
Test whether the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* would cause *Japan_1945* to accept *unconditional_surrender_of_Japan*

Question
Would the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* have a deteriorating effect on *Japan_1945*?

Answer
Yes, because *Industrial_capacity_of_Japan_1945* is an essential generator of war materiel from the strategic perspective

Explanations

Task
Industrial_capacity_of_Japan_1945 is a strategic COG candidate that cannot be eliminated

Positive Example:
+ *Military_of_US_1945*

Negative Exception:
- *Military_of_Japan_1945*

Complete the table below with the appropriate values of the property *is_mission_oriented*, in order to distinguish *Military_of_US_1945* from *Military_of_Japan_1945*

| | <i>is_mission_oriented</i> |
|---------------------------------|---|
| + <i>Military_of_US_1945</i> | at least cost and appreciative of the worth of the individual |
| - <i>Military_of_Japan_1945</i> | Applicable |

Buttons: Confirm Candidate, Cancel Candidate, View Rule, Close Tool



5. Exception Handling



The expert defines the value of the property "is_mission_oriented" for "Military_of_Japan_1945"

Informal Example | **Formal Example**

Task
Test whether the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* would cause *Japan_1945* to accept *unconditional_surrender_of_Japan*

Question
Would the reduction in the quantity of newly produced war materiel by the *Industrial_capacity_of_Japan_1945* have a deteriorating effect on *Japan_1945*?

Complete the table below with the appropriate values of the property *is_mission_oriented*, in order to distinguish *Military_of_US_1945* from *Military_of_Japan_1945*

| | <i>is_mission_oriented</i> |
|---------------------------------|---|
| + <i>Military_of_US_1945</i> | at least cost and appreciative of the worth of the individual |
| - <i>Military_of_Japan_1945</i> | in absolute terms and disregard of preserving the lives of its soldiers |

This property value differentiates between the object from the positive example (Military_of_US_1945) and the object from the negative exception (Military_of_Japan_1945)

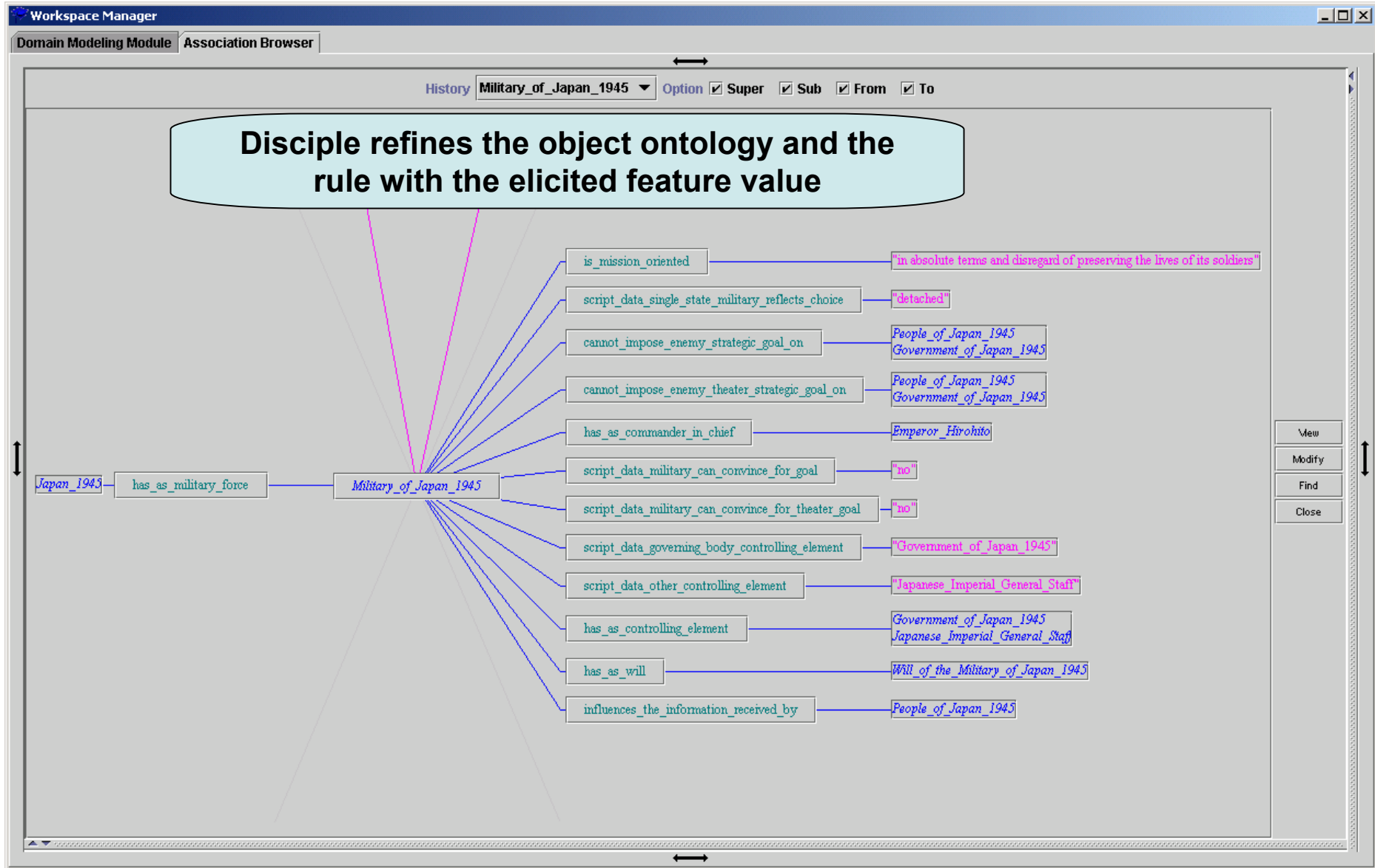
in absolute terms and disregard of preserving the lives of its soldiers

Positive Example:
+ *Military_of_US_1945*

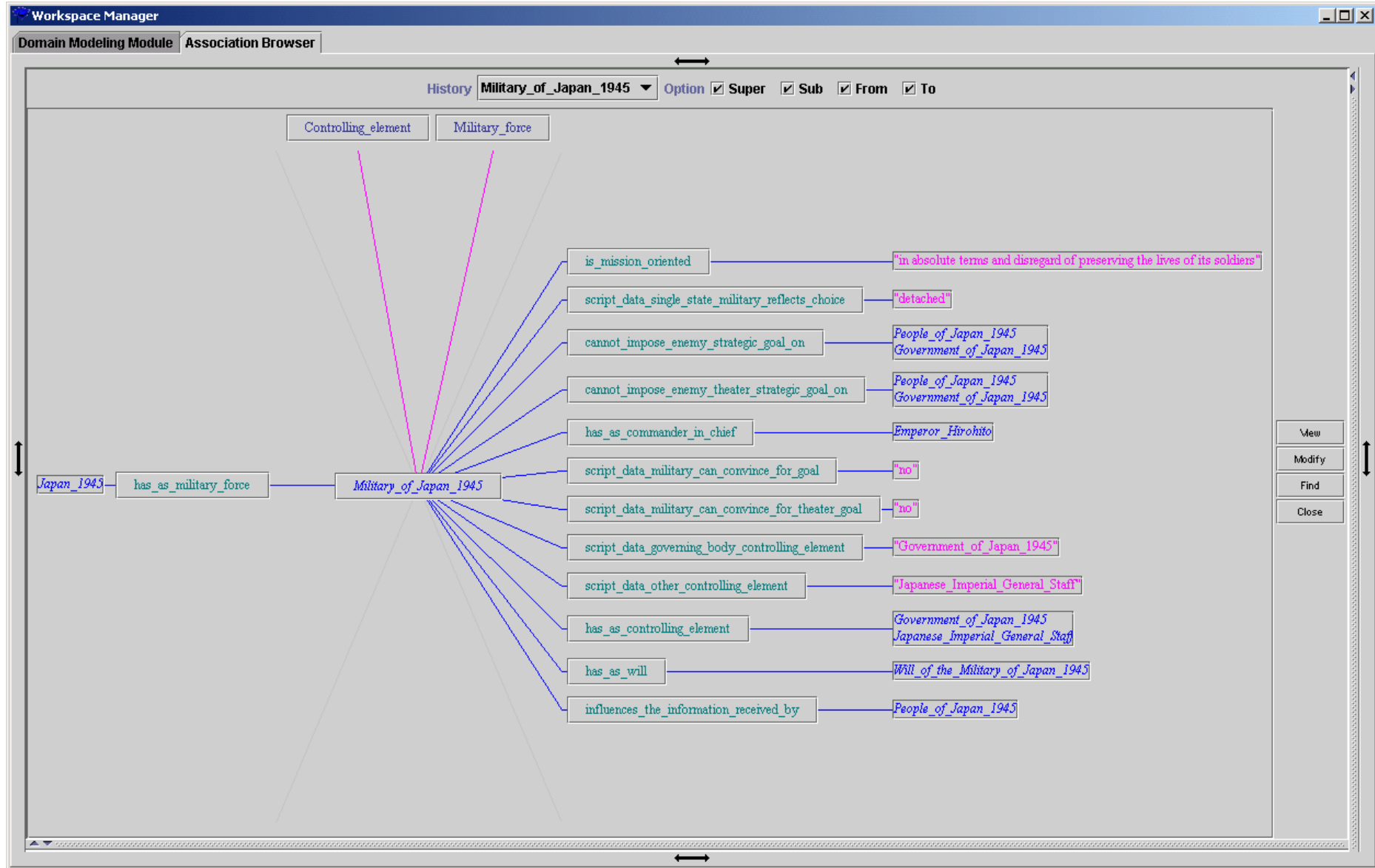
Negative Exception:
- *Military_of_Japan_1945*

View Rule Close Tool Confirm Candidate Cancel Candidate

5. Exception Handling



5. Exception Handling





6. Problem Solving



The automated problem solver presented at the beginning of this demonstration was customized for the Center of Gravity domain.

The screenshot shows a software window titled "workspace manager" with a sub-window "COG Solutions Viewer". The main area is divided into two panes. The left pane, titled "Sicily_1943 COG candidates", lists two groups of candidates:

- Allied_Forces_1943 COG candidates**
 - Will_of_the_People_of_US_1943
 - President_Roosevelt
 - Military_of_US_1943
 - Industrial_capacity_of_US_1943
 - Will_of_the_People_of_Britain_1943
 - Winston_Churchill
 - War_cabinet
 - Military_of_Britain_1943
 - Industrial_capacity_of_Britain_1943
 - Joseph_Stalin
 - Military_of_USSR_1943
 - Industrial_capacity_of_USSR_1943
 - Will_of_Allied_Forces_1943
 - Industrial_capacity_of_Allied_Forces_1943
- European_Axis_1943 COG candidates**
 - Adolph_Hitler
 - Military_of_Germany_1943
 - Industrial_capacity_of_Germany_1943
 - King_Emanuele_II
 - Military_of_Italy_1943
 - Industrial_capacity_of_Italy_1943
 - Will_of_European_Axis_1943
 - Industrial_capacity_of_European_Axis_1943

The right pane, titled "Justification of testing for Will_of_the_People_of_US_1943 as a strategic COG candidate", contains the following text:

- What is the strategic goal of *European Axis 1943*?
- *Dominance of Europe by European Axis*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Government of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Government of US 1943* reflects the *Will of the People of US 1943*
- Assuming that the *People of US 1943* would accept the goal of *European Axis 1943* which is *Dominance of Europe by European Axis*, does it have the power to cause the *Military of US 1943* to accept that goal?
- Yes, because *US 1943* is a representative democracy and the *Will of the Military of US 1943* reflects the *Will of the People of US 1943*

The final line of text in the justification pane is: *The Will of the People of US 1943 is a strategic COG candidate that cannot be eliminated*

At the bottom of the window, there are radio buttons for "Abstract Justification" (selected) and "Detailed Justification", along with "Update" and "Close" buttons.

6. Problem Solving

The Disciple shell also contains a general automated problem solver.

The screenshot displays the 'Workspace Manager' interface for the 'Domain Modeling Module'. The title bar indicates the current task is 'Solving for COG-course-training-02-17/KB-With-Ontology/Okinawa'. The interface is split into two main panels: 'Abstract Justification', 'Detailed Justification', and 'Reduction Tree' on the left, and 'Reduction Step' and 'Solution Viewer' on the right.

Reduction Step / Solution Viewer:

- Task:** Identify and test a strategic COG candidate for the *Okinawa_1945* scenario
- Result 1:** *Emperor_Hirohito* is a strategic COG candidate with respect to the government of *Japan_1945*
- Result 2:** *Emperor_Hirohito* is a strategic COG candidate that cannot be eliminated
- Result 3:** *Japanese_Imperial_General_Staff* is a strategic COG candidate that cannot be eliminated with respect to the government of *Japan_1945*
- Result 4:** *Japanese_Imperial_General_Staff* is a strategic COG candidate that cannot be eliminated
- Result 5:** *Military_of_Japan_1945* is a COG candidate with respect to the armed forces of *Japan_1945*
- Result 6:** *Military_of_Japan_1945* is a strategic COG candidate that can be eliminated

Abstract Justification / Reduction Tree:

- Identify and test a strategic COG candidate for the *Okinawa_1945* scenario
- What kind of scenario is *Okinawa_1945*?
- Okinawa_1945* is a war scenario
- Identify and test a strategic COG candidate for *Okinawa_1945* which is a war scenario
- Which is an opposing force in the *Okinawa_1945* scenario?
- Japan_1945*
- Identify and test a strategic COG candidate for *Japan_1945*
- Is *Japan_1945* a single-member force or a multi-member force?
- Japan_1945* is a single-member force
- Identify and test a strategic COG candidate for *Japan_1945* which is a single-member force
- What type of strategic COG candidate should I consider for this single-member force?
- I consider a strategic COG candidate with respect to the government of *Japan_1945*
- Identify and test a strategic COG candidate with respect to the government of *Japan_1945*
- Who or what is a main controlling element of the government of *Japan_1945*?
- Emperor_Hirohito* that has a critical role in setting objectives and making decisions
- Identify *Emperor_Hirohito* as a strategic COG candidate with respect to the government of *Japan_1945*
- Is *Emperor_Hirohito* a legitimate candidate?
 - Yes
 - Emperor_Hirohito* is a strategic COG candidate with respect to the government of *Japan_1945*
- Test whether *Emperor_Hirohito* is a viable strategic COG candidate with respect to the government of *Japan_1945*
- What is the strategic goal of *US_1945*?
- unconditional_surrender_of_Japan
- Test whether *Emperor_Hirohito* can cause *Japan_1945* to accept the strategic goal of *US_1945*
- Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is unconditional_surrender_of_Japan
- Yes, because *Emperor_Hirohito* is the commander in chief of the *Military_of_Japan_1945*
- Test whether *Emperor_Hirohito* who controls the *Military_of_Japan_1945* can cause *Japan_1945* to accept the strategic goal of *US_1945*
- Assuming that *Emperor_Hirohito* would accept the goal of *US_1945* which is unconditional_surrender_of_Japan
- Yes
- Emperor_Hirohito* is a strategic COG candidate that cannot be eliminated

A blue callout box labeled 'Justification' points to the left panel. Another blue callout box labeled 'Solution' points to the 'Result 2' and 'Result 3' entries in the right panel.



Tools for the knowledge engineer



The Disciple shell contains also a suite of knowledge base development tools for the knowledge engineer:

- Ontology browsers and editors to develop the object ontology;**
- Ontology import tools to import ontological knowledge for reusable knowledge repositories, such as CYC;**
- Script editor to define elicitation scripts;**
- More complex exception handling tools for the knowledge engineer.**

They will be briefly demonstrated in the following.



1. Ontology Development Tools



The screenshot displays a software interface for ontology development, titled "Workspace Manager". It is divided into several main sections:

- Object Hierarchy Browser:** Located on the left, it shows a tree structure of objects. The root is "OBJECT", with children including "Agent", "Force", "Group", "Military_force", "Multi_member_force", "Opposing_force", "Single_member_force", "Governing_body", "Industrial_authority", "Person", "Force_goal", "Resource_or_infrastructure_element", "Scenario", and "Strategic_cog_relevant_factor". Under "Opposing_force", there are sub-entries for "Japan_1945" and "US_1945".
- Object Viewer:** Located on the right, it displays details for the selected object "US_1945". It includes fields for "Name" (US_1945) and "Documentation". Below these is a "Hierarchy position" section showing "Super-concepts" as "Opposing_force" and "Single_state_force".
- Search Panel:** Located at the bottom left, it is titled "Find objects in COG-Winter-2002/COG/Okinawa". It has a search box containing "US_1945" and a "Find" button. Below the search box, there are checkboxes for "Type" with "Concepts" and "Instances" selected. A list of search results is shown, including "US_1945" and various related terms like "Economy_of_US_1945", "Government_of_US_1945", etc.
- Features Panel:** Located at the bottom right, it is titled "Features" and "Name and values". It lists various features and their values, such as "script_data_has_as_member" with value "US_1945", "has_as_capital" with value "Washington_DC", "has_as_operational_goal" with value "Seizure_of_Okinawa_by_the_US_forces", "has_as_strategic_goal" with value "unconditional_surrender_of_Japan", "has_as_theater_strategic_goal" with value "Establishing_of_a_base_for_the_US_invasion_of_Japan", "has_as_economy" with value "Economy_of_US_1945", "has_as_industrial_factor" with value "Industrial_capacity_of_US_1945", and "has_as_other_demographic_factor" with value "Other_demographic_factors_of_US_1945".

Two callout boxes are present: "Object Browser" points to the Object Hierarchy Browser, and "Object Viewer" points to the Object Viewer. The interface includes standard window controls (minimize, maximize, close) and navigation arrows.



1. Ontology Development Tools



The screenshot displays the 'Workspace Manager' application interface, which is divided into several functional areas:

- Object Hierarchy Browser / Object Editor:** This central panel shows a hierarchical tree of concepts. A blue callout bubble labeled 'Object Editor' points to this area. The tree includes categories like 'Commerce_authority', 'Controlling_element', 'Force', 'Group', 'Military_force', 'Multi_member_force', 'Opposing_force', 'Single_member_force', 'Single_group_force', 'Single_state_force', 'Governing_body', 'Industrial_authority', 'Person', 'Force_goal', 'Resource_or_infrastructure_element', 'Scenario', and 'Strategic_cog_relevant_factor'. The 'Single_state_force' node is currently selected.
- Create a new concept:** A panel on the left with a text input field containing 'US_1945' and buttons for 'Apply' and 'Revert'.
- Documentation:** A panel with a text area and 'Apply'/'Revert' buttons.
- Hierarchy position:** A panel showing 'Super-concepts' with 'Opposing_force' and '+ Single_state_force' listed, and buttons for 'Add', 'Delete', and 'Revert'.
- Sub-concepts and instances:** A panel with a text area and buttons for 'Add', 'Delete', 'Revert', and 'Apply links'.
- Features:** A panel with a text area and buttons for 'Add feature', 'Add value', 'Remove', and 'Change value'.
- Find objects in COG-Winter-2002/COG/Okinawa:** A panel at the bottom right with a search input field containing 'Single', 'Type' checkboxes for 'Concepts' and 'Instances', and buttons for 'Find', 'Stop', and 'Select'. The search results list 'Single_group_force', 'Single_member_force', and 'Single_state_force'.



1. Ontology Development Tools



The screenshot displays the 'Workspace Manager' interface, which is divided into several panels:

- Object Hierarchy Browser:** Located on the left, it shows a tree structure of objects under the path 'COG-Winter-2002/COG/Okinawa'. The 'Scenario' object is highlighted. A blue callout bubble labeled 'Object Browser' points to this panel.
- Find objects in COG-Winter-2002/COG/Okinawa:** A search panel below the hierarchy browser. It shows search results for 'Scenario', including 'Scenario', 'Military_operations_other_than_war_scenario', and 'War_scenario'. A blue callout bubble labeled 'Object Browser' also points to this panel.
- Script Editor:** The main right-hand panel, titled 'Edit script for: eliciting instances of Scenario'. It contains several sections:
 - Controls:** Includes fields for 'Control type' (single-line), 'Question' (Provide a name for the scenario to be), 'Help' (For instance, the World War II allied), and 'Answer variable' (<scenario-name>).
 - Additional variables:** A section with a 'New' button.
 - Ontology actions:** A section with a dropdown menu showing '<scenario-name>' and 'instance-of', and a dropdown menu showing 'Scenario'.
 - Script calls:** A section with a dropdown menu showing 'eliciting superconcepts of an instance' and an 'Instance' field containing '<scenario-name>'.

At the bottom of the Script Editor, there are 'Save' and 'Close' buttons, and a checkbox labeled 'is root' which is checked.



2. Ontology import tools

Ontology import tools perform a three step import process:

- **Mixed-initiative retrieval of potentially relevant ontological knowledge from external knowledge repositories, such as CYC;**
- **Automatic translation of the retrieved ontological knowledge into an intermediate Disciple ontology;**
- **Mixed-initiative import from the intermediate Disciple ontology into the destination Disciple ontology.**

The following is a brief demonstration of ontology import from CYC.

2. Ontology import tools

The expert looks for relevant ontological knowledge in CYC

The expert specifies a searching string

The screenshot shows a dialog box titled "Name Completion" with a search input field at the top. Below the input field are two buttons: "Complete" and "Ready". The main area of the dialog is divided into two panes, each with a vertical scrollbar. Between these panes are three buttons: "Delete", "<--", and "-->". Below the panes, there are four text labels: "Name:", "Type:", "Natural Language Name:", and "Description:". At the bottom, there is a "Filters" section with four checkboxes: "Objects & Features" (checked), "Microtheories" (checked), "As Prefix only" (checked), and "Case Sensitive" (unchecked). At the very bottom are three buttons: "Ok", "Cancel", and "Settings <<".

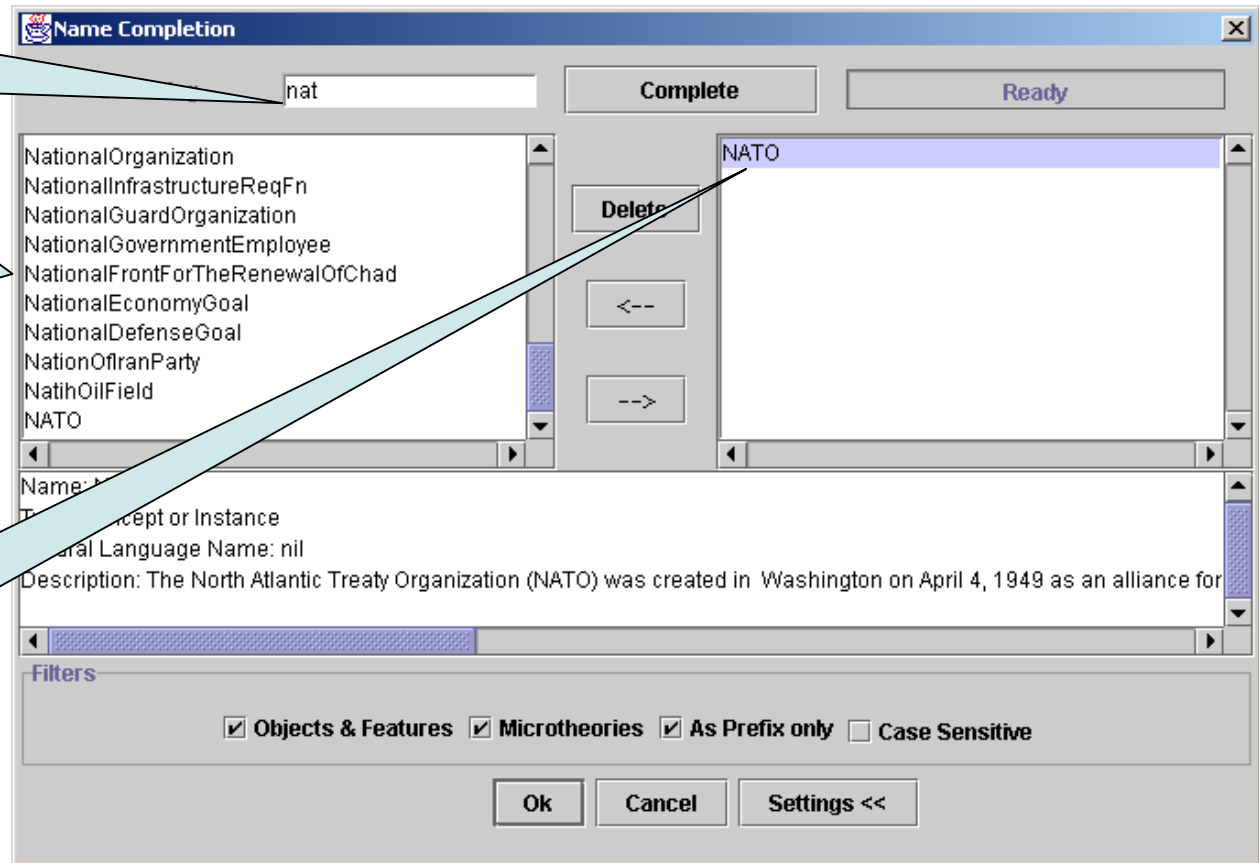
2. Ontology import tools

The expert looks for relevant ontological knowledge in CYC

The expert specifies a search string

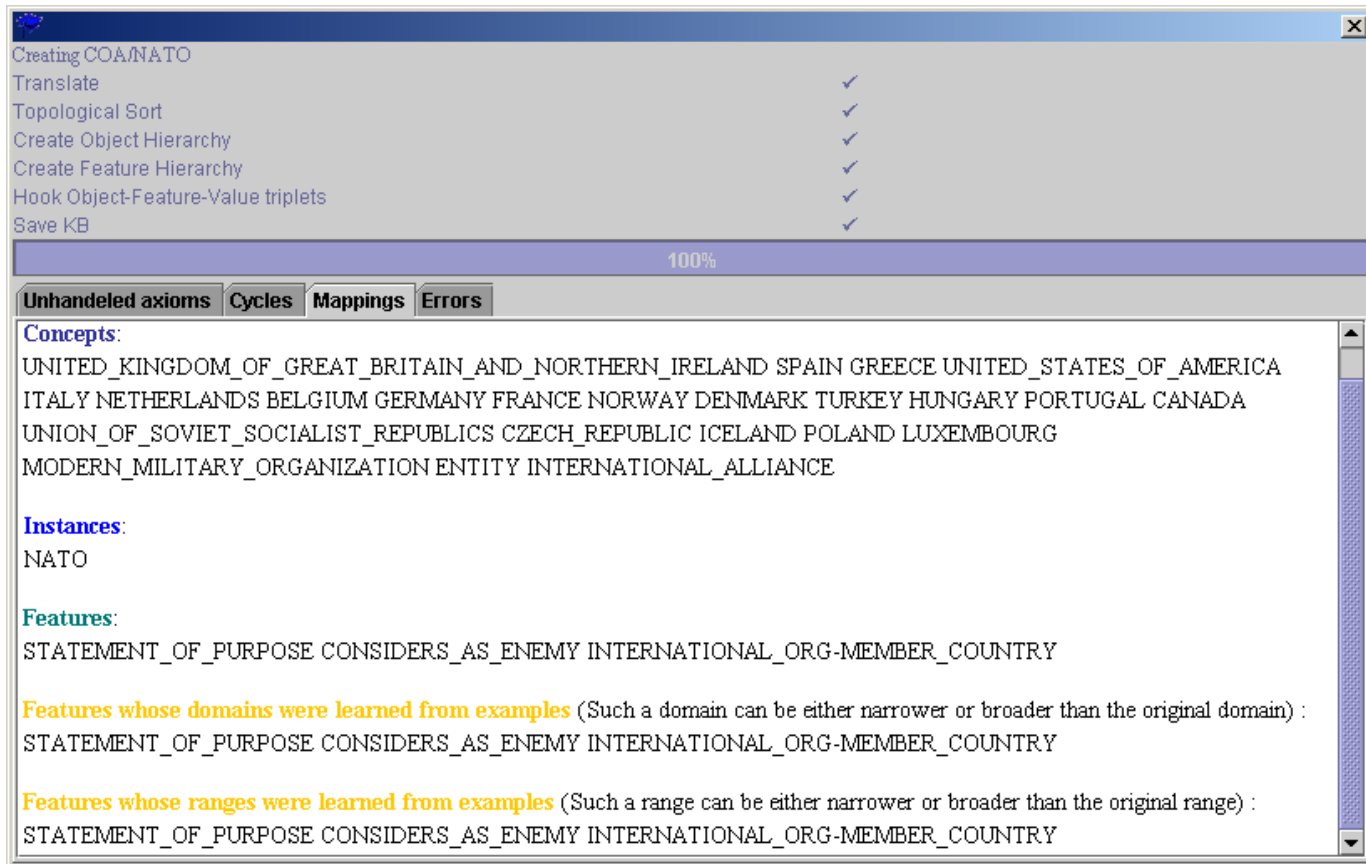
CYC returns all the matching names

The expert chooses to import "NATO" and the knowledge related to it



2. Ontology import tools

The knowledge retrieved from CYC is automatically translated into an intermediate Disciple ontology.



Creating COA/NATO

Translate ✓

Topological Sort ✓

Create Object Hierarchy ✓

Create Feature Hierarchy ✓

Hook Object-Feature-Value triplets ✓

Save KB ✓

100%

Unhandled axioms Cycles Mappings Errors

Concepts:
UNITED_KINGDOM_OF_GREAT_BRITAIN_AND_NORTHERN_IRELAND SPAIN GREECE UNITED_STATES_OF_AMERICA
ITALY NETHERLANDS BELGIUM GERMANY FRANCE NORWAY DENMARK TURKEY HUNGARY PORTUGAL CANADA
UNION_OF_SOVIET_SOCIALIST_REPUBLICS CZECH_REPUBLIC ICELAND POLAND LUXEMBOURG
MODERN_MILITARY_ORGANIZATION ENTITY INTERNATIONAL_ALLIANCE

Instances:
NATO

Features:
STATEMENT_OF_PURPOSE CONSIDERS_AS_ENEMY INTERNATIONAL_ORG-MEMBER_COUNTRY

Features whose domains were learned from examples (Such a domain can be either narrower or broader than the original domain) :
STATEMENT_OF_PURPOSE CONSIDERS_AS_ENEMY INTERNATIONAL_ORG-MEMBER_COUNTRY

Features whose ranges were learned from examples (Such a range can be either narrower or broader than the original range) :
STATEMENT_OF_PURPOSE CONSIDERS_AS_ENEMY INTERNATIONAL_ORG-MEMBER_COUNTRY

2. Ontology import tools

The expert and the knowledge engineer import knowledge from the intermediate Disciple ontology into the destination Disciple ontology

The objects selected to be imported from the intermediate Disciple ontology into the destination Disciple ontology

Fragment of the intermediate Disciple ontology translated from CYC

The screenshot displays a software interface for ontology management. On the left, a panel titled 'Objects' lists 'GEOGRAPHICAL_REGION', 'GEOPOLITICAL_ENTITY', and 'NATO'. The main window, titled 'Browse COA/nato22', shows a hierarchical list of entities including 'GEOGRAPHICAL_REGION', 'GEOPOLITICAL_ENTITY', 'GEORGIA-STATE', 'GERMAN_LANGUAGE', 'GREAT_BRITAIN-THE_ISLAND', 'GREEK_PERSON', 'GREENLAND', 'GUAM', 'HAMPTON_ROADS', 'HAWAII-STATE', 'HIGH', 'ICELANDIC_PERSON', 'IDAHO-STATE', 'ILLINOIS-STATE', 'INDEPENDENT_COUNTRY', 'INDIANA-STATE', 'INDUSTRIALIZED_COUNTRY', 'INPUTS_DESTROYED', 'INTANGIBLE_OBJECT_PREDICATE', 'INTERNATIONAL_ORGANIZATION', 'NATO', 'INTERNATIONAL_ORGANIZATION_OF_COUNTRIES', 'INTERNATIONAL_ALLIANCE-AS-CONCEPT', 'IOWA-STATE', 'IRAN', 'IRAQ', 'IRAQ_STRATEGIC_PIPELINE', 'IRELAND-THE_NATION', 'IRISH_PERSON', and 'IRREFLEXIVE_BINARY_PREDICATE'. A double-headed arrow indicates a relationship between the 'Objects' panel and the 'Browse' window. A callout bubble points to the 'NATO' entry in the list.

The expert and the knowledge engineer select the entities to be imported into the destination Disciple ontology

2. Ontology import tools

The expert and the knowledge engineer import knowledge from the intermediate Disciple ontology into the destination Disciple ontology

“NATO” is being imported from the intermediate Disciple ontology into the destination Disciple ontology

The user specifies the additional knowledge to be imported together with “NATO”

The selected super-concepts of “NATO” will also be imported

The selected features of “NATO” will also be imported

The screenshot displays a software interface for ontology import. The main window is titled "Select what to import together with NATO". It features several sections:

- Name:** NATO
- Documentation:** The North Atlantic Treaty Organization (NATO) was created in Washington on April 4, 1949 as an alliance for collective defence as defined in Article 51 of the United Nations Charter.
- Hierarchy position:** Super-concepts
 - AGENT
 - ENTITY-AS-CONCEPT
 - INTERNATIONAL_ALLIANCE-AS-CONCEPT
 - INTERNATIONAL_ORGANIZATION
 - MODERN_MILITARY_ORGANIZATION-AS-CONCEPT
 - PARTIALLY_INTANGIBLE_INDIVIDUAL
- Features:** Name and values
 - CONSIDERS_AS_ENEMY
 - UNION_OF_SOVIET_SOCIALIST_REPUBLICS
 - INTERNATIONAL_ORG-MEMBER_COUNTRY
 - UNITED_STATES_OF_AMERICA
 - POLAND
 - UNITED_KINGDOM_OF_GREAT_BRITAIN_AND_NORTHERN_IRELAND
 - HUNGARY
 - CZECH_REPUBLIC
 - TURKEY
 - PORTUGAL
 - NORWAY
 - NETHERLANDS
 - LUXEMBOURG
 - ITALY
 - ICELAND

On the left side, a "features" list shows "GEOGRAPHICAL_REGION", "GEOLOGICAL_ENTITY", and "NATO". A "Select Info" dialog is open, showing "NATO" selected. The "Import" button is visible in the top right corner.

2. Ontology import tools

The ontology fragment represented by “NATO”, its super-concepts, and its features is copied into the destination Disciple ontology

A + denotes a term that does not yet exist in the ontology, while a + denotes an existing term

The user specifies the position of the imported concepts in the destination Disciple ontology

Workspace Manager

Ontology Manager Object Editor

Modify imported instance NATO

Name
NATO

Documentation
The North Atlantic Treaty Organization (NATO) was created in Washington on April 4, 1949 as an allia

Hierarchy position
Super-concepts

- + MODERN_MILITARY_ORGANIZATION-AS-CONCEPT
- + INTERNATIONAL_ORGANIZATION
- + INTERNATIONAL_ALLIANCE-AS-CONCEPT
- + AGENT
- OBJECT

Features
Current feature values

Imported feature values

- + STATEMENT_OF_PURPOSE
 - + to promote mutual defense and cooperation
- + INTERNATIONAL_ORG-MEMBER_COUNTRY
 - + SPAIN
 - + CANADA

2. Ontology import tools

The screenshot shows the 'Workspace Manager' application with the 'Object Editor' tab active. The main window displays the 'Modify imported instance NATO' dialog. The dialog is divided into several sections:

- Name:** A text field containing 'NATO' with 'Apply' and 'Revert' buttons.
- Documentation:** A text area containing 'The North Atlantic Treaty Organization (NATO) was created in Washington on April 4, 1949 as an allia' with 'Apply' and 'Revert' buttons.
- Hierarchy position:** A section titled 'Super-concepts' containing a list of concepts: 'MODERN_MILITARY_ORGANIZATION-AS-CONCEPT', 'INTERNATIONAL_ORGANIZATION', 'INTERNATIONAL_ALLIANCE-AS-CONCEPT', and 'AGENT'. To the right are buttons for 'Add', 'Undelete', 'Revert', 'Rename', and 'Apply links'.
- Features:** A section titled 'Current feature values' containing a tree view of features and their values:
 - STATEMENT_OF_PURPOSE
 - to promote mutual defense and cooperation
 - CONSIDERS_AS_ENEMY
 - UNION_OF_SOVIET_SOCIALIST_REPUBLICS
 - INTERNATIONAL_ORG-MEMBER_COUNTRY
 - SPAIN
 - CANADATo the right are buttons for 'Add feature', 'Add value', 'Remove', and 'Change value'.
- Imported feature values:** A section containing a tree view of imported features and their values:
 - INTERNATIONAL_ORG-MEMBER_COUNTRY
 - + BELGIUM
 - + DENMARK
 - + FRANCE
 - + GERMANY
 - + GREECETo the right are buttons for 'Remove', 'Apply', and 'Rename'.

A callout bubble on the left side of the dialog points to the 'Imported feature values' section, containing the text: 'The user updates the feature values'.

2. Ontology import tools

The import of "NATO" has led to the partial import of these additional objects. Disciple suggests the user to complete their import.

"NATO" is marked as imported in the intermediate Disciple ontology

The screenshot displays the Disciple ontology editor interface. The main window is titled "Browse COA/nato22" and shows a list of ontology classes. The class "NATO" is highlighted with a red asterisk, indicating it is imported. Below it, several other classes are listed, including "INTERNATIONAL_ORGANIZATION_OF_COUNTRIES", "IOWA-STATE", "IRAN", "IRAQ", "IRAQ_STRATEGIC_PIPELINE", "IRELAND-THE_NATION", "IRISH_PERSON", "IRREFLEXIVE_BINARY_PREDICATE", "ISLAM", "ISLAND_AND_CONTINENT_NOTE", "ISRAEL", "ITALIAN_LANGUAGE", "JAPAN", "JORDAN-THE_NATION", "JUDAISM", "KANSAS-STATE", "KENTUCKY-STATE", and "KURDISH_LANGUAGE".

On the left side, there is a panel titled "Object" and "Features". The "Object" tab is active, showing a list of objects that have been imported along with "NATO":

- MODERN_MILITARY_ORGANIZATION-AS-CONCEPT
- INTERNATIONAL_ORGANIZATION
- INTERNATIONAL_ALLIANCE-AS-CONCEPT
- UNITED_STATES_OF_AMERICA
- UNITED_KINGDOM_OF_GREAT_BRITAIN_AND_NO
- UNION_OF_SOVIET_SOCIALIST_REPUBLICS
- PORTUGAL
- CZECH_REPUBLIC

At the top of the interface, there are several buttons: "Import", "Select Info", "Open Browsers", "Feature Browser", "Object Browser", "Delete", "UnderSpecified-ness", "Clear", and "Clear All".