

# Explanation Generation using Planning Ontology - Survey

This survey aims to understand user preferences regarding automated explanation generation in two well-known planning domains: **Blocks World** and **Sokoban**. As a participant, you will be helping us assess the clarity and effectiveness of different types of explanations generated by automated systems in these contexts.

You will be asked to review three types of planning explanation questions and answers:

1. **Plan Explanations**: Providing a high-level summary of the overall plan
2. **Action Selection**: Explaining the reasoning behind the selection of specific actions
3. **Action Omission**: Explaining why certain actions were not selected

After reviewing the questions and answers for each type, you will be asked to answer a few questions about the quality and clarity of the explanations provided.

To assist you in this process, we will provide links to the relevant domain, problem, and plan files for each question:

- The **domain file** formally defines the environment for the problem, including the predicates and actions
- The **problem file** consists of the objects present in that problem instance, the initial state description and the goal
- The **plan file** consists of a listing of the actions needed to solve the problem

Your responses will help us improve automated explanation generation systems for these planning domains. Thank you for your participation.

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\* Indicates required question

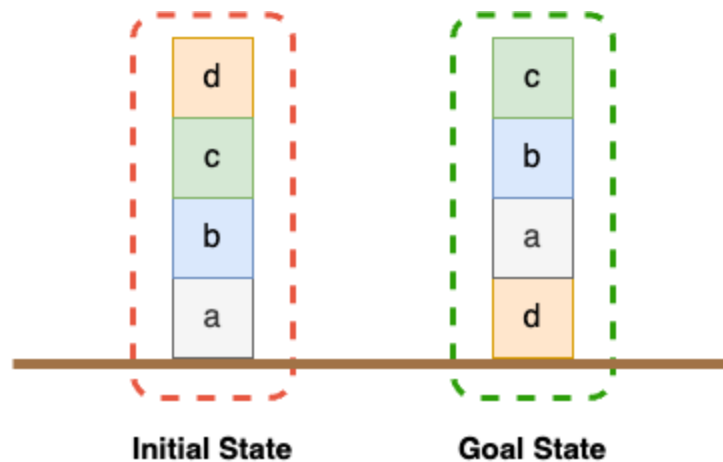
## Evaluating Explanations in Blocks World

In this instance of the **Blocks World** domain, you are presented with an initial configuration of blocks arranged on a table. The goal is to rearrange the blocks to match a specific target configuration. The image below shows the initial arrangement on the left and the desired goal arrangement on the right.

The plan involves four primary actions: *picking up a block*, *unstacking a block*, *putting down a block*, and *stacking a block*. Your task is to review the explanations provided for the planning decisions made to achieve this goal.

To aid in answering the questions, here are the [domain](#), [problem](#), and the [plan](#) files for this problem instance.

### Blocks World Problem Description



## Plan Explanation

### Q) Explain the plan needed to achieve the goal.

1. **(unstack d c)**: Removed block 'd' from block 'c'
2. **(put-down d)**: Placed down the block 'd' on the table
3. **(unstack c b)**: Removed block 'c' from block 'b'
4. **(put-down c)**: Placed down the block 'c' on the table
5. **(unstack b a)**: Removed block 'b' from block 'a'
6. **(put-down b)**: Placed down the block 'b' on the table
7. **(pick-up a)**: Picked up block 'a' from the table
8. **(stack a d)**: Placed block 'a' on block 'd'
9. **(pick-up b)**: Picked up block 'b' from the table
10. **(stack b a)**: Placed block 'b' on block 'a'
11. **(pick-up c)**: Picked up block 'c' from the table
12. **(stack c b)**: Placed block 'c' on block 'b'

1. **BQ-1:** On a scale from 1 to 5, to what extent did the explanation help you understand the rationale behind the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
Not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely helpful

2. **BQ-2:** On a scale from 1 to 5, how would you rate the clarity of the explanation provided for the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
Very	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very clear

**Action Selection****Q) Why was 'unstack b a' chosen in the plan at step 5?**

Action: Removed block 'b' from block 'a'

Preconditions:

- Block 'b' is on block 'a'
- Block 'b' is clear
- The hand is empty

Effects:

- Block 'b' is being held
- Block 'a' is clear
- Block 'b' is no longer clear
- The hand is no longer empty
- Block 'b' is no longer on block 'a'

This action is used in the plan because its preconditions are met and its effects are necessary for achieving the goal.

3. **BQ-3:** On a scale from 1 to 5, to what extent did the explanation help you understand the rationale behind the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
	<hr/>					
Not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely helpful
<hr/>						

4. **BQ-4:** On a scale from 1 to 5, how would you rate the clarity of the explanation provided for the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
	<hr/>					
Very	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very clear
<hr/>						

**Action Omission****Q) Why was 'stack a b' not chosen in the plan?**

Action: Placed block 'a' on block 'b'

Preconditions:

- Block 'a' is being held
- Block 'b' is clear

Effects:

- Block 'a' is no longer being held
- Block 'b' is no longer clear
- Block 'a' is clear
- The hand is empty
- Block 'a' is on block 'b'

This action is not used in the plan because either its preconditions are not met or its effects are not necessary for achieving the goal.

5. **BQ-5:** On a scale from 1 to 5, to what extent did the explanation help you understand the rationale behind the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
Not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely helpful

6. **BQ-6:** On a scale from 1 to 5, how would you rate the clarity of the explanation provided for the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
Very	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very clear

## Evaluating Explanations in Sokoban

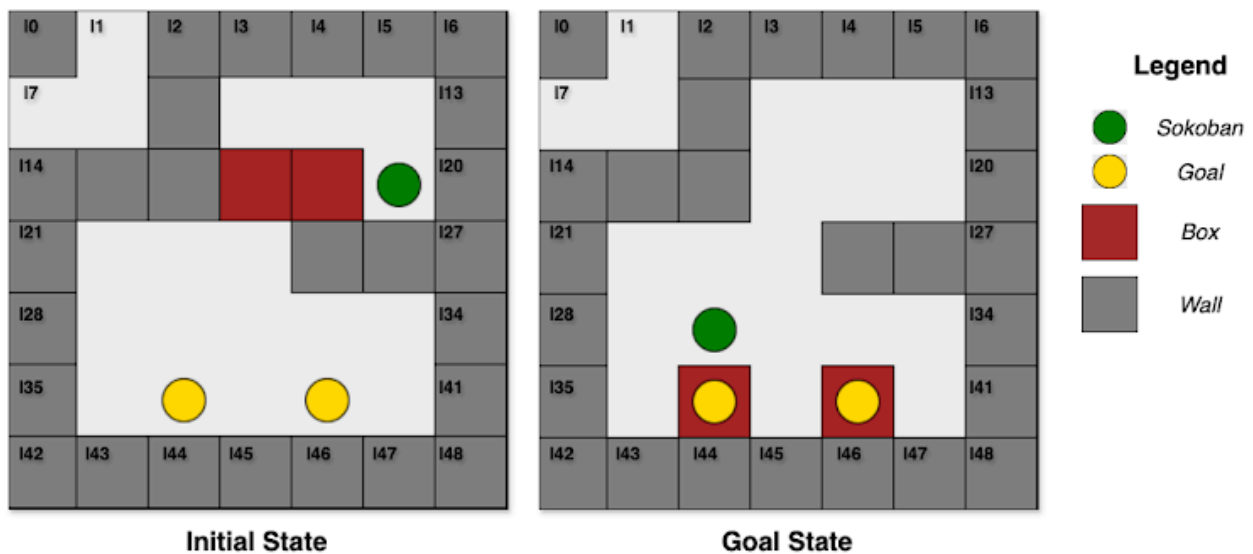
In this instance of the **Sokoban** domain, a player is tasked with moving boxes within a grid to specific goal positions. The initial configuration of the boxes and player is shown on the left, while the goal configuration is on the right.

The task involves eight primary actions: *move-up*, *down*, *left*, *right*, and *push-up*, *down*, *left*, *right*. Your task is to review the explanations provided for the actions taken to reach the goal state.

To aid in answering the questions, here are the [domain](#), [problem](#), and the [plan](#) files for this problem instance.

To help understand the Sokoban layout, all bordering cells have been labeled. The labeling starts from the top-left and takes the form of the letter 'l' (for location) concatenated with a number.

### Sokoban Problem Description



## Plan Explanation

### Q) Explain the plan needed to achieve the goal.

1. **(moveup sokoban l19 l12):** The Sokoban moves up from 'l19' to 'l12'
2. **(moveleft sokoban l12 l11):** The Sokoban moves left from 'l12' to 'l11'
3. **(moveleft sokoban l11 l10):** The Sokoban moves left from 'l11' to 'l10'
4. **(pushdown sokoban l10 l17 l24 crate1):**  
From 'l10', the Sokoban pushes 'crate1' down from 'l17' to 'l24' and moves to 'l17'
5. **(pushdown sokoban l17 l24 l31 crate1):**  
From 'l17', the Sokoban pushes 'crate1' down from 'l24' to 'l31' and moves to 'l24'
6. **(moveleft sokoban l24 l23):** The Sokoban moves left from 'l24' to 'l23'
7. **(movedown sokoban l23 l30):** The Sokoban moves down from 'l23' to 'l30'
8. **(movedown sokoban l30 l37):** The Sokoban moves down from 'l30' to 'l37'
9. **(moveright sokoban l37 l38):** The Sokoban moves right from 'l37' to 'l38'
10. **(moveright sokoban l38 l39):** The Sokoban moves right from 'l38' to 'l39'
11. **(moveup sokoban l39 l32):** The Sokoban moves up from 'l39' to 'l32'
12. **(pushleft sokoban l32 l31 l30 crate1):**  
From 'l32', the Sokoban pushes 'crate1' left from 'l31' to 'l30' and moves to 'l31'
13. **(moveup sokoban l31 l24):** The Sokoban moves up from 'l31' to 'l24'
14. **(moveup sokoban l24 l17):** The Sokoban moves up from 'l24' to 'l17'
15. **(moveup sokoban l17 l10):** The Sokoban moves up from 'l17' to 'l10'
16. **(moveright sokoban l10 l11):** The Sokoban moves right from 'l10' to 'l11'
17. **(moveright sokoban l11 l12):** The Sokoban moves right from 'l11' to 'l12'
18. **(movedown sokoban l12 l19):** The Sokoban moves down from 'l12' to 'l19'
19. **(pushleft sokoban l19 l18 l17 crate2):**  
From 'l19', the Sokoban pushes 'crate2' left from 'l18' to 'l17' and moves to 'l18'
20. **(moveup sokoban l18 l11):** The Sokoban moves up from 'l18' to 'l11'
21. **(moveleft sokoban l11 l10):** The Sokoban moves left from 'l11' to 'l10'
22. **(pushdown sokoban l10 l17 l24 crate2):**  
From 'l10', the Sokoban pushes 'crate2' down from 'l17' to 'l24' and moves to 'l17'
23. **(pushdown sokoban l17 l24 l31 crate2):**  
From 'l17', the Sokoban pushes 'crate2' down from 'l24' to 'l31' and moves to 'l24'
24. **(pushdown sokoban l24 l31 l38 crate2):**  
From 'l24', the Sokoban pushes 'crate2' down from 'l31' to 'l38' and moves to 'l31'
25. **(moveup sokoban l31 l24):** The Sokoban moves up from 'l31' to 'l24'
26. **(moveleft sokoban l24 l23):** The Sokoban moves left from 'l24' to 'l23'
27. **(moveleft sokoban l23 l22):** The Sokoban moves left from 'l23' to 'l22'
28. **(movedown sokoban l22 l29):** The Sokoban moves down from 'l22' to 'l29'
29. **(movedown sokoban l29 l36):** The Sokoban moves down from 'l29' to 'l36'
30. **(moveright sokoban l36 l37):** The Sokoban moves right from 'l36' to 'l37'
31. **(pushright sokoban l37 l38 l39 crate2):**  
From 'l37', the Sokoban pushes 'crate2' right from 'l38' to 'l39' and moves to 'l38'
32. **(moveup sokoban l38 l31):** The Sokoban moves up from 'l38' to 'l31'
33. **(moveup sokoban l31 l24):** The Sokoban moves up from 'l31' to 'l24'

34. (**moveleft sokoban l24 l23**): The Sokoban moves left from 'l24' to 'l23'

35. (**pushdown sokoban l23 l30 l37 crate1**):

From 'l23', the Sokoban pushes 'crate1' down from 'l30' to 'l37' and moves to 'l30'

7. **SQ-1:** On a scale from 1 to 5, to what extent did the explanation help you understand the rationale behind the plan? \*

Mark only one oval.

	1	2	3	4	5	
Not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely helpful

8. **SQ-2:** On a scale from 1 to 5, how would you rate the clarity of the explanation provided for the plan? \*

Mark only one oval.

	1	2	3	4	5	
Very	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very clear

## Action Selection

**Q) Why was 'moveup sokoban l19 l12' chosen in the plan as the first step?**

Action: The Sokoban moves up from 'l19' to 'l12'

Preconditions:

- The Sokoban 'sokoban' must be at position 'l19'
- The Sokoban must be at position 'l19'
- Position 'l19' must be below position 'l12'
- Position 'l12' must be clear

Effects:

- The Sokoban is now at position 'l12'
- Position 'l19' is now clear
- The Sokoban is no longer at position 'l19'
- Position 'l12' is no longer clear

This action is used in the plan because its preconditions are met and its effects are necessary for achieving the goal.



9. **SQ-3:** On a scale from 1 to 5, to what extent did the explanation help you understand the rationale behind the plan? \*

Mark only one oval.

1   2   3   4   5

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Not ☐ ☐ ☐ ☐ ☐ Extremely helpful

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10. **SQ-4:** On a scale from 1 to 5, how would you rate the clarity of the explanation provided for the plan? \*

Mark only one oval.

1   2   3   4   5

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Very ☐ ☐ ☐ ☐ ☐ Very clear

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### Action Omission

#### Q) Why was '*moveright sokoban l12 l13*' not chosen in the plan?

Action: The Sokoban moves right from 'l12' to 'l13'

Preconditions:

- 'sokoban' must be a Sokoban
- The Sokoban must be at position 'l12'
- Position 'l12' must be to the left of position 'l13'
- Position 'l13' must be clear

Effects:

- The Sokoban is now at position 'l13'
- Position 'l12' is now clear
- The Sokoban is no longer at position 'l12'
- Position 'l13' is no longer clear

This action is not used in the plan because either its preconditions are not met or its effects are not necessary for achieving the goal.

11. **SQ-5:** On a scale from 1 to 5, to what extent did the explanation help you understand the rationale behind the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
Not	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely helpful

12. **SQ-6:** On a scale from 1 to 5, how would you rate the clarity of the explanation provided for the plan? \*

*Mark only one oval.*

	1	2	3	4	5	
Very	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very clear

## Conclusion

Thank you for participating in this survey on explanation generation using planning ontology. Your feedback is invaluable and will contribute significantly to improving explanation systems in the Blocks World and Sokoban domains.

13. If you have any additional comments or suggestions regarding the explanations or the survey itself, please feel free to provide them below.

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