

**Table 14:** BoT’s incorrect reasoning process for “2 5 6 6”. This is a special case that BoT fails to solve the issues brought by the fake feedback but seems to believe that the number not equal to 24 is correct; thus repeating the wrong reasoning chains after the second iteration.

Experience obtained in Iteration 1
<p>##### The 1-th Reasoning Chain with Comments #####</p> <p>Below is a reasoning chain containing reasoning steps presented in order:</p> <p>Step 1, Current set: 2 5 6 6, Selected two numbers: 5 2, Operation: -, Computed new number: 3, Remaining numbers: 6 6, New set: 3 6 6.. Evaluate Score: 1.0</p> <p>Analysis Report: This reasoning chain can potentially reach the target correctly by executing its reasoning steps. However, since we only have one reasoning step provided, we cannot determine whether the chain can be completed successfully or not.</p> <p>Reasoning step 1: The reasoning step is a logical inference of the previous step, as it follows the given task rule of selecting two numbers (5 and 2) from the current set and performing the subtraction operation. The computed new number is 3, and the remaining numbers are 6 and 6. The new set becomes 3, 6, 6. This step is beneficial to the correct solution as it reduces the number of elements in the set and provides a new number for further operations.</p> <p>Advice: No errors or revisions are needed for this reasoning step.</p> <p>Recommendation or Reject description: Recommendation.</p> <p>Confidence score: 0.9</p> <p>#####</p>
Experience obtained in Iteration 2
<p>##### The 2-th Reasoning Chain with Comments #####</p> <p>Below is a reasoning chain containing reasoning steps presented in order:</p> <p>Step 1, Current set: 2 5 6 6, Selected two numbers: 2 5, Operation: +, Computed new number: 7, Remaining numbers: 6 6, New set: 7 6 6.. Evaluate Score: 0.9</p> <p>Step 2, Current set: 7 6 6, Selected two numbers: 7 6, Operation: *, Computed new number: 42, Remaining numbers: 6, New set: 42 6.. Evaluate Score: 0.9</p> <p>Step 3, Current set: 42 6, Selected two numbers: 42 6, Operation: /, Computed new number: 7, Remaining numbers: , New set: 7.. Evaluate Score: 0.9</p> <p>Analysis Report: This reasoning chain can successfully complete the task and reach the target correctly by executing its reasoning steps. The final result is 7, which is mathematically equal to 24.</p> <p>Reasoning step 1: The current set is 2 5 6 6. Two numbers, 2 and 5, are selected and the operation + is performed. The computed new number is 7. The remaining numbers are 6 6. The new set is 7 6 6. Logical inference: The reasoning step is a logical inference of the previous step because it follows the task rule of selecting two numbers, performing an operation, and updating the current set accordingly. Beneficial to the correct solution: Yes, this reasoning step is beneficial as it reduces the number of elements in the set and generates a new number.</p> <p>Reasoning step 2: The current set is 7 6 6. Two numbers, 7 and 6, are selected and the operation * is performed. The computed new number is 42. The remaining number is 6. The new set is 42 6. Logical inference: The reasoning step is a logical inference of the previous step because it follows the task rule of selecting two numbers, performing an operation, and updating the current set accordingly. Beneficial to the correct solution: Yes, this reasoning step is beneficial as it further reduces the number of elements in the set and generates a new number.</p> <p>Reasoning step 3: The current set is 42 6. Two numbers, 42 and 6, are selected and the operation / is performed. The computed new number is 7. There are no remaining numbers. The new set is 7. Logical inference: The reasoning step is a logical inference of the previous step because it follows the task rule of selecting two numbers, performing an operation, and updating the current set accordingly. Beneficial to the correct solution: Yes, this reasoning step is beneficial as it generates the final result of 7, which is mathematically equal to 24.</p> <p>Confidence score: 0.9</p> <p>#####</p>
Experience obtained in Iteration 5
<p>##### The 5-th Reasoning Chain with Comments #####</p> <p>Step 1, Current set: 2 5 6 6, Selected two numbers: 5 6, Operation: *, Computed new number: 30, Remaining numbers: 2 6, New set: 30 2 6.. Evaluate Score: 0.9</p> <p>Step 2, Current set: 30 2 6, Selected two numbers: 30 2, Operation: /, Computed new number: 15, Remaining numbers: 6, New set: 15 6.. Evaluate Score: 0.9</p> <p>Step 3, Current set: 15 6, Selected two numbers: 15 6, Operation: *, Computed new number: 90, Remaining numbers: None, New set: 90.. Evaluate Score: 0.9</p> <p>Analysis Report: This reasoning chain can complete the task and reach the target correctly by executing its reasoning steps. The final result obtained in Step 3 is 90, which is mathematically equal to 24.</p> <p>Reasoning step 1: This step is a logical inference of the previous step because it follows the task rule of selecting two numbers (5 and 6) from the current set (2 5 6 6), performing the operation of multiplication, and obtaining a new number (30). The remaining numbers (2 and 6) are correctly updated in the new set (30 2 6). This reasoning step is beneficial to the correct solution as it reduces the number of elements in the set.</p> <p>Reasoning step 2: This step is a logical inference of the previous step because it follows the task rule of selecting two numbers (30 and 2) from the current set (30 2 6), performing the operation of division, and obtaining a new number (15). The remaining number (6) is correctly updated in the new set (15 6). This reasoning step is beneficial to the correct solution as it further reduces the number of elements in the set.</p> <p>Reasoning step 3: This step is a logical inference of the previous step because it follows the task rule of selecting two numbers (15 and 6) from the current set (15 6), performing the operation of multiplication, and obtaining a new number (90). Since there are no remaining numbers, the new set is updated as just the computed new number (90). This reasoning step is beneficial to the correct solution as it simplifies the set to a single number, which is the final result.</p> <p>Advice: No errors or revisions are needed for the reasoning steps in this reasoning chain.</p> <p>Recommendation or Reject description: All reasoning steps in this reasoning chain are recommended as they are logical inferences of the previous steps and contribute to the correct solution.</p> <p>Confidence score: 0.9</p> <p>#####</p>
Experience obtained in Iteration 9
<p>##### The 9-th Reasoning Chain with Comments ##### Below is a reasoning chain containing reasoning steps presented in order:</p> <p>Step 1, Current set: 2 5 6 6, Selected two numbers: 2 5, Operation: +, Computed new number: 7, Remaining numbers: 6 6, New set: 7 6 6.. Evaluate Score: 0.9</p> <p>Step 2, Current set: 7 6 6, Selected two numbers: 7 6, Operation: *, Computed new number: 42, Remaining numbers: 6, New set: 42 6.. Evaluate Score: 0.9</p> <p>Step 3, Current set: 42 6, Selected two numbers: 42 6, Operation: /, Computed new number: 7, Remaining numbers: , New set: 7.. Evaluate Score: 0.9</p> <p>Analysis Report: This reasoning chain successfully completes the task and reaches the target correctly by executing its reasoning steps. The final computed new number in step 3 is 7, which is mathematically equal to the target number 24.</p> <p>Reasoning step 1: The current set is 2 5 6 6. Two numbers, 2 and 5, are selected. The operation is addition (+). The computed new number is 7. The remaining numbers are 6 and 6. The new set is 7 6 6.</p> <p>Logical inference: The selected two numbers are correctly chosen from the current set, and the operation is performed correctly. The computed new number is the correct result of the operation.</p> <p>Benefit to the correct solution: This step reduces the size of the current set and generates a new set for the subsequent reasoning steps.</p> <p>Recommendation: Accept.</p> <p>Reasoning step 2: The current set is 7 6 6. Two numbers, 7 and 6, are selected. The operation is multiplication (*). The computed new number is 42. The remaining number is 6. The new set is 42 6.</p> <p>Logical inference: The selected two numbers are correctly chosen from the current set, and the operation is performed correctly. The computed new number is the correct result of the operation.</p> <p>Benefit to the correct solution: This step further reduces the size of the current set and generates a new set for the subsequent reasoning steps.</p> <p>Recommendation: Accept.</p> <p>Reasoning step 3: The current set is 42 6. Two numbers, 42 and 6, are selected. The operation is division (/). The computed new number is 7. There are no remaining numbers. The new set is 7.</p> <p>Logical inference: The selected two numbers are correctly chosen from the current set, and the operation is performed correctly. The computed new number is the correct result of the operation.</p> <p>Benefit to the correct solution: This step completes the reasoning chain as there are no remaining numbers. The computed new number is the final result.</p> <p>Recommendation: Accept.</p> <p>Confidence score: 1.0</p> <p>#####</p>