Analyze each of them with respect to the seven problem characteristics

- **Chess**
- **Water jug**
- **8-puzzle**
- **Traveling salesman**
- **Missionaries and cannibals**
- **Tower of Hanoi**

1. Chess

Problem characteristic	Satisfied	Reason
Is the problem decomposable?	No	One game have Single solution
Can solution steps be ignored or undone?	No	In actual game(not in PC) we can't undo previous steps
Is the problem universe predictable?	No	Problem Universe is not predictable as we are not sure about move of other player(second player)
Is a good solution absolute or relative?	absolute	Absolute solution : once you get one solution you do need to bother about other possible solution. Relative Solution : once you get one solution you have to find another possible solution to check which solution is best(i.e low cost). By considering this **chess is absolute**
Is the solution a state or a path?	Path	Is the solution a state or a path to a state? – For natural language understanding, some of the words have different interpretations .therefore sentence may cause ambiguity. To solve the problem we need to find interpretation only , the workings are not necessary (i.e path to solution is not necessary) So In chess winning state(goal state) describe path to state
What is the role of knowledge?		lot of knowledge helps to constrain the search for a solution.
Does the task require human-interaction?	No	Conversational In which there is intermediate communication between a person and

| | | the computer, either to provide additional assistance to the computer or **to provide additional information to the user**, or both.

In chess additional assistance is not required |
|---|---|---|

2. Water jug

Problem characteristic	Satisfied	Reason
Is the problem decomposable?	No	One Single solution
Can solution steps be ignored or undone?	Yes	
Is the problem universe predictable?	Yes	Problem Universe is predictable bcz to slove this problem it require only one person .we can predict what will happen in next step
Is a good solution absolute or relative?	absolute	**Absolute solution** , water jug problem may have number of solution , bt once we found one solution,no need to bother about other solution **Bcz it doesn't effect on its cost**
Is the solution a state or a path?	Path	Path to solution
What is the role of knowledge?		lot of knowledge helps to constrain the search for a solution.
Does the task require human-interaction?	Yes	additional assistance is required. Additional assistance, like to get jugs or pump

3. 8 puzzle

Problem characteristic	Satisfied	Reason
Is the problem decomposable?	No	One game have Single solution
Can solution steps be ignored or undone?	Yes	We can undo the previous move

Is the problem universe predictable?	Yes	Problem Universe is predictable bcz to slove this problem it require only one person .we can predict what will be **position of blocks** in next move
Is a good solution absolute or relative?	absolute	Absolute solution : once you get one solution you do need to bother about other possible solution. Relative Solution : once you get one solution you have to find another possible solution to check which solution is best(i.e low cost). By considering this 8 puzzle **is absolute**
Is the solution a state or a path?	Path	Is the solution a state or a path to a state? – For natural language understanding, some of the words have different interpretations .therefore sentence may cause ambiguity. To solve the problem we need to find interpretation only , the workings are not necessary (i.e path to solution is not necessary) So In 8 puzzle winning state(goal state) describe path to state
What is the role of knowledge?		lot of knowledge helps to constrain the search for a solution.
Does the task require human-interaction?	No	Conversational In which there is intermediate communication between a person and the computer, either to provide additional assistance to the computer or **to provide additional information to the user**, or both. In 8 puzzle additional assistance is not required

4. Travelling Salesman (TSP)

Problem characteristic	Satisfied	Reason
Is the problem decomposable?	No	One game have Single solution
Can solution steps be ignored or undone?	Yes	
Is the problem universe	Yes	

predictable?		
Is a good solution absolute or relative?	absolute	Absolute solution : once you get one solution you do need to bother about other possible solution. Relative Solution : once you get one solution you have to find another possible solution to check which solution is best(i.e low cost). By considering this TSP **is absolute**
Is the solution a state or a path?	Path	Is the solution a state or a path to a state? – For natural language understanding, some of the words have different interpretations .therefore sentence may cause ambiguity. To solve the problem we need to find interpretation only , the workings are not necessary (i.e path to solution is not necessary) So In TSP (goal state) describe path to state
What is the role of knowledge?		lot of knowledge helps to constrain the search for a solution.
Does the task require human-interaction?	No	Conversational In which there is intermediate communication between a person and the computer, either to provide additional assistance to the computer or **to provide additional information to the user**, or both. In chess additional assistance is not required

5. Missionaries and cannibals

Problem characteristic	Satisfied	Reason
Is the problem decomposable?	No	One game have Single solution
Can solution steps be ignored or undone?	Yes	
Is the problem universe predictable?	Yes	Problem Universe is not predictable as we are not sure about move of other

		player(second player)
Is a good solution absolute or relative?	absolute	Absolute solution : once you get one solution you do need to bother about other possible solution. Relative Solution : once you get one solution you have to find another possible solution to check which solution is best(i.e low cost). By considering this **is absolute**
Is the solution a state or a path?	Path	Is the solution a state or a path to a state? – For natural language understanding, some of the words have different interpretations .therefore sentence may cause ambiguity. To solve the problem we need to find interpretation only , the workings are not necessary (i.e path to solution is not necessary) So In winning state(goal state) describe path to state
What is the role of knowledge?		lot of knowledge helps to constrain the search for a solution.
Does the task require human-interaction?	Yes	Conversational In which there is intermediate communication between a person and the computer, either to provide additional assistance to the computer or **to provide additional information to the user**, or both. In chess additional assistance is required to move **Missionaries to other side of river of other assistance is required**

6. Tower of Hanoi

Problem characteristic	Satisfied	Reason
Is the problem decomposable?	No	One game have Single solution
Can solution steps be ignored or undone?	Yes	
Is the problem universe predictable?	Yes	
Is a good solution absolute or	absolute	Absolute solution : once you get one

relative?		solution you do need to bother about other possible solution. Relative Solution : once you get one solution you have to find another possible solution to check which solution is best(i.e low cost). By considering this Tower of Hanoi is **absolute**
Is the solution a state or a path?	Path	Is the solution a state or a path to a state? – For natural language understanding, some of the words have different interpretations .therefore sentence may cause ambiguity. To solve the problem we need to find interpretation only , the workings are not necessary (i.e path to solution is not necessary) So In tower of Hanoi winning state(goal state) describe path to state
What is the role of knowledge?		lot of knowledge helps to constrain the search for a solution.
Does the task require human-interaction?	No	Conversational In which there is intermediate communication between a person and the computer, either to provide additional assistance to the computer or **to provide additional information to the user**, or both. In tower of Hanoi additional assistance is not required