**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**

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| **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**

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| **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**

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| **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)**

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| **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 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**

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| **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**

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| **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 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 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 |







