**# Logic Puzzles Assessment Guide**

**This guide contains three logic puzzles arranged in order of difficulty, along with their solutions and evaluation criteria for candidate assessment.**

**## 1. The Water Jug Problem ## (Easy)**

**\*\*Problem Statement:\*\***

**You have a 5-liter jug and a 3-liter jug. Neither has markings on them. You need to measure exactly 4 liters of water. How can you do it?**

**\*\*Solution:\*\***

**1. Fill the 5L jug completely (5L)**

**2. Pour from 5L jug into 3L jug until full (5L → 3L = 2L left in 5L jug)**

**3. Empty the 3L jug**

**4. Pour the remaining 2L from 5L jug into 3L jug**

**5. Fill the 5L jug again**

**6. Pour water from the 5-liter jug into the 3-liter jug until the 3-liter jug is full. Since the 3-liter jug already has 2 liters, you can only pour 1 more liter into it.**

**7. The amount left in the 5L jug is exactly 4L**

**\*\*What This Tests:\*\***

**- Sequential problem-solving ability**

**- Basic mathematical reasoning**

**- Working memory (ability to track multiple variables)**

**- Methodical approach to problem-solving**

**- Comfort with numerical manipulation**

**- Ability to visualize multi-step processes**

**## 2. The River Crossing Puzzle ## (Easy-Medium)**

**\*\*Problem Statement:\*\***

**A farmer needs to transport a fox, a chicken, and a bag of grain across a river. The boat can only carry the farmer and one item at a time. If left alone, the fox will eat the chicken, and the chicken will eat the grain. How can the farmer get everything across safely?**

**\*\*Solution:\*\***

**1. Farmer takes chicken across first (fox and grain safe together)**

**2. Farmer returns alone**

**3. Farmer takes fox across**

**4. Farmer brings chicken back**

**5. Farmer takes grain across (fox and grain safe together)**

**6. Farmer returns alone**

**7. Farmer takes chicken across last**

**\*\*What This Tests:\*\***

**- Logical reasoning**

**- State management**

**- Constraint handling**

**- Ability to identify conflicts**

**- Forward planning**

**- Visualization of complex scenarios**

**- Understanding of dependency relationships**

**## 3. The Light Bulb Problem ## (Medium)**

**\*\*Problem Statement:\*\***

**You are outside a room with three light switches. Inside the room are three light bulbs. You can flip the switches as much as you want while outside, but once you enter the room, you cannot flip any more switches. How can you determine which switch controls which bulb by entering the room only once?**

**\*\*Solution:\*\***

**1. Turn on first switch and leave it on for several minutes**

**2. Turn off first switch and turn on second switch**

**3. Enter the room immediately**

**4. The bulb that's on is controlled by second switch**

**5. The bulb that's warm but off is controlled by first switch**

**6. The bulb that's off and cool is controlled by third switch**

**\*\*What This Tests:\*\***

**- Lateral thinking**

**- Creative problem-solving**

**- Ability to consider non-obvious properties (heat)**

**- Breaking free from assumed constraints**

**- Attention to detail**

**- Understanding of cause and effect**

**##4. The Bridge Crossing Problem ## (Easy)**

**\*\*Problem Statement:\*\***

**Four people need to cross a bridge at night. They only have one flashlight and the bridge is too dangerous to cross without it. The bridge can only hold two people at a time. The four people take different amounts of time to cross the bridge: 1 minute, 2 minutes, 7 minutes, and 10 minutes. When two people cross the bridge together, they must move at the slower person's pace. How can they all get across the bridge in 17 minutes?**

**\*\*Solution:\*\***

**1. First, the two fastest people (1-minute and 2-minute) cross the bridge. (Time = 2 minutes)**

**2. The 1-minute person goes back with the flashlight. (Time = 3 minutes)**

**3. The two slowest people (7-minute and 10-minute) cross the bridge. (Time = 13 minutes)**

**4. The 2-minute person goes back with the flashlight. (Time = 15 minutes)**

**5. Finally, the two fastest people (1-minute and 2-minute) cross the bridge again. (Time = 17 minutes)**

**\*\*What This Tests:\*\***

**- Sequential problem-solving ability**

**- Optimization skills**

**- Time management**

**- Methodical approach to problem-solving**

**\*\* Time: 20 minutes \*\***

**##5. The Two Room Problem ## (Medium)**

**\*\*Problem Statement:\*\***

**You have two separate rooms with three light bulbs in one room and three switches in another room. You can only go from one room to the other once. The task is to determine which switch controls which light bulb.**

**\*\*Solution:\*\***

**1. Turn on the first switch and leave it on for a few minutes.**

**2. Turn off the first switch and turn on the second switch.**

**3. Immediately go to the other room.**

**4. The bulb that is still warm but off is connected to the first switch.**

**5. The bulb that is on is connected to the second switch.**

**6. The bulb that is off and cold is connected to the third switch.**

**\*\*What This Tests:\*\***

**- Logical reasoning**

**- Methodical approach to problem-solving**

**- Attention to detail**

**\*\* Time: 20 minutes \*\***

**##6. The Torch and The River Problem ## (Hard)**

**\*\*Problem Statement:\*\***

**You need to get a family of four across a river using a small torch that can only hold two people at a time. The family consists of a 5-year-old child, a 10-year-old child, and their parents. The 5-year-old child takes 1 minute to cross, the 10-year-old takes 2 minutes, one parent takes 5 minutes, and the other takes 10 minutes. When two people cross together, they must move at the slower person's pace. The goal is to get everyone across the river in the shortest amount of time.**

**\*\*Solution:\*\***

**1. The 5-year-old and 10-year-old cross the river. (Time = 2 minutes)**

**2. The 5-year-old goes back. (Time = 3 minutes)**

**3. The two parents cross the river. (Time = 13 minutes)**

**4. The 10-year-old goes back. (Time = 15 minutes)**

**5. The 5-year-old and 10-year-old cross the river again. (Time = 17 minutes)**

**\*\*What This Tests:\*\***

**- Sequential problem-solving ability**

**- Optimization skills**

**- Time management**

**- Working memory**

**\*\* Time: 25 minutes \*\***

**##7. The Three Missionaries and Three Cannibals Problem ## (Medium)**

**\*\*Problem Statement:\*\***

**Three missionaries and three cannibals need to cross a river using a boat that can hold at most two people at a time. If there are more cannibals than missionaries on either side of the river at any time, the cannibals will eat the missionaries. How can they all get across the river safely?**

**\*\*Solution:\*\***

**1. Two cannibals cross the river.**

**2. One cannibal comes back.**

**3. Two cannibals cross the river.**

**4. One cannibal comes back.**

**5. Two missionaries cross the river.**

**6. One cannibal and one missionary come back.**

**7. Two missionaries cross the river.**

**8. One cannibal comes back.**

**9. Two cannibals cross the river.**

**10. One cannibal comes back.**

**11. Two cannibals cross the river.**

**\*\*What This Tests:\*\***

**- Sequential problem-solving ability**

**- Logical reasoning**

**- Time management**

**- Attention to detail**

**\*\* Time: 20 minutes \*\***

**##8. The Five Pirates Problem ## (Hard)**

**\*\*Problem Statement:\*\***

**Five pirates discover a treasure of 100 gold coins. They must agree on a distribution of the coins. The most senior pirate proposes a distribution, and all pirates (including the proposer) vote on it. If at least half agree, the coins are distributed accordingly. If not, the proposer is thrown overboard, and the next senior pirate makes a new proposal to be voted upon. What is the optimal distribution for the most senior pirate to propose to maximize their share while ensuring survival?**

**\*\*Solution:\*\***

**1. The most senior pirate (Pirate A) needs a majority vote (3 out of 5 pirates) to survive and keep their share.**

**2. Pirate A can give 1 coin to Pirate C and 1 coin to Pirate E.**

**3. Pirates C and E will vote for this proposal because they get 1 coin each, ensuring a majority.**

**4. Pirate A keeps the remaining 98 coins.**

**\*\*What This Tests:\*\***

**- Sequential problem-solving ability**

**- Logical reasoning**

**- Strategic thinking**

**- Understanding of voting dynamics**

**\*\* Time: 20 minutes \*\***

**##9. The Four Colored Map Problem ## (Medium)**

**\*\*Problem Statement:\*\***

**You need to color a map with regions in such a way that no two adjacent regions have the same color. You have only four colors available. Prove that any map can be colored this way.**

**\*\*Solution:\*\***

**1. Four Color Theorem: The solution is based on the mathematical Four Color Theorem, which states that any map can be colored using four colors so that no two adjacent regions share the same color.**

**2. Application: To apply this theorem, start by selecting any region and color it with the first color. Move to an adjacent region and color it with a different color. Continue this process, ensuring that no adjacent regions share the same color.**

**3. Demonstration: Show that even with complex maps, this method will work using only four colors.**

**\*\*What This Tests:\*\***

**- Logical reasoning**

**- Understanding of mathematical theorems**

**- Problem-solving with constraints**

**- Attention to detail**

**\*\* Time: 20 minutes \*\***

**##10. The Coin Weighing Problem ## (Medium)**

**\*\*Problem Statement:\*\***

**You have 8 coins, and one of them is counterfeit. The counterfeit coin is either heavier or lighter than the others. You have a balance scale and can use it twice. How can you determine which coin is the counterfeit and whether it is heavier or lighter?**

**\*\*Solution:\*\***

**1. Divide the 8 coins into three groups: two groups of 3 coins each and one group of 2 coins.**

**2. Weigh the first group of 3 coins against the second group of 3 coins.**

**- If the two groups of 3 coins balance, the counterfeit coin is in the group of 2 coins. Weigh the two coins against each other to find the counterfeit coin and determine if it is heavier or lighter.**

**- If the two groups of 3 coins do not balance, take the three coins from the heavier (or lighter) side and weigh two of them against each other.**

**3. If they balance, the third coin is the counterfeit one. If they do not balance, you can identify the counterfeit coin and whether it is heavier or lighter based on the result.**

**\*\*What This Tests:\*\***

**- Logical reasoning**

**- Sequential problem-solving ability**

**- Ability to use elimination strategies**

**- Attention to detail**

**\*\* Time: 20 minutes \*\***

**## 11. The Weighing Coins Problem ## (Easy)**

**\*\*Problem Statement:\*\***

**You have 12 coins, and one of them is different in weight (either heavier or lighter) compared to the others. You have a balance scale, and you can use it only three times to determine which coin is different and whether it is heavier or lighter. How can you do it?**

**\*\*Solution:\*\***

**1. Divide the 12 coins into three groups of four coins each.**

**2. Weigh the first group of four coins against the second group of four coins.**

**- If the scales balance, the different coin is in the third group.**

**- If the scales do not balance, the different coin is in the heavier or lighter group.**

**3. From the group with the different coin, take three coins and weigh them against three of the coins from a group that balanced.**

**- If the scales balance, the different coin is the remaining coin.**

**- If the scales do not balance, the different coin is one of the three coins.**

**4. Use the final weighing to identify the different coin and determine whether it is heavier or lighter.**

**\*\*What This Tests:\*\***

**- Logical reasoning**

**- Sequential problem-solving ability**

**- Attention to detail**

**\*\* Time: 15 minutes \*\***

**### 12. The Mislabeled Jars Problem ## (Easy)**

**\*\*Problem Statement:\*\***

**You have three jars. One contains only apples, one contains only oranges, and one contains a mix of both apples and oranges. Each jar is mislabeled, meaning none of the labels ("Apples," "Oranges," "Mixed") correctly identify the contents of the jars. You are allowed to pick one fruit from one jar to determine the correct labeling for all jars. How can you do it?**

**\*\*Solution:\*\***

**1. Pick one fruit from the jar labeled "Mixed."**

**2. If you pick an apple, you know this jar can’t be mixed or apples; hence, it must be the jar labeled "Apples."**

**3. From this, you can deduce the jar labeled "Oranges" must be the mixed jar because it is mislabeled. Therefore, the jar labeled "Apples" must actually be the "Oranges" jar.**

**\*\*What This Tests:\*\***

**- Logical reasoning**

**- Deductive thinking**

**- Problem-solving skills**

**\*\* Time: 10 minutes \*\***

**### 13. The Two Rope Problem ## (Easy)**

**\*\*Problem Statement:\*\***

**You have two ropes and a lighter. Each rope takes exactly 60 minutes to burn from one end to the other, but they burn at an uneven rate. How can you measure exactly 45 minutes using these ropes and the lighter?**

**\*\*Solution:\*\***

**1. Light one end of the first rope and both ends of the second rope simultaneously.**

**2. When the second rope has completely burned (in 30 minutes), light the other end of the first rope.**

**3. The first rope will now take an additional 15 minutes to burn, giving a total of 45 minutes.**

**\*\*What This Tests:\*\***

**- Creative thinking**

**- Logical reasoning**

**- Time management**

**\*\* Time: 10 minutes \*\***

**## Evaluation Guidelines**

**When administering these puzzles, consider the following:**

**1. \*\*Time Management:\*\***

**- Allow 10-15 minutes per puzzle**

**- Note how candidates manage their time**

**- Observe if they rush or take a methodical approach**

**2. \*\*Problem-Solving Process:\*\***

**- Ask candidates to think aloud**

**- Note whether they ask clarifying questions**

**- Observe their systematic approach (or lack thereof)**

**- Watch for organization of thoughts and ideas**

**3. \*\*Response to Hints:\*\***

**- Start with minimal hints**

**- Note how candidates use provided hints**

**- Observe if they can build on partial solutions**

**4. \*\*Communication:\*\***

**- Evaluate clarity in explaining their approach**

**- Note ability to articulate their thinking process**

**- Observe how they handle getting stuck**

**5. \*\*Learning and Adaptation:\*\***

**- After solving (or attempting), discuss alternative approaches**

**- Note their receptiveness to different solutions**

**- Observe their ability to learn from the experience**

**Remember: The goal is not just to see if candidates can solve the puzzles, but to understand their problem-solving approach, logical thinking process, and ability to handle challenges systematically.**