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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| * 1. Test that the game can be completed with minimum moves (program will allow user to drag the disks from its respective pegs) while keeping count of the moves and storing the moves and displaying appropriate message | Run “Towers of Hanoi’ program | Moves: 0 | Output obtained successfully as expected. |
| 1.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 1.3. Move 2 | Move disk 2 from peg 1 to peg 3 | Move allowed  Moves: 2  Move stored | Output obtained successfully as expected. |
| 1.4. Move 3 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 3  Move stored | Output obtained successfully as expected. |
| 1.5. Move 4 | Move disk 3 from peg 1 to peg 2 | Move allowed  Moves: 4  Move stored | Output obtained successfully as expected. |
| 1.6. Move 5 | Move disk 1 from peg 3 to peg 1 | Move allowed  Moves: 5  Move stored | Output obtained successfully as expected. |
| 1.7. Move 6 | Move disk 2 from peg 3 to peg 2 | Move allowed  Moves: 6  Move stored | Output obtained successfully as expected. |
| 1.8. Move 7 | Move disk 1 from peg 1 to peg 2 | Move allowed  Moves: 7  Move stored | Output obtained successfully as expected. |
| 1.9. Move 8 | Move disk 4 from peg 1 to peg 3 | Move allowed  Moves: 8  Move stored | Output obtained successfully as expected. |
| 1.10. Move 9 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 9  Move stored | Output obtained successfully as expected. |
| 1.11 Move 10 | Move disk 2 from peg 2 to peg 1 | Move allowed  Moves: 10  Move stored | Output obtained successfully as expected. |
| 1.12 Move 11 | Move disk 1 from peg 3 to peg 1 | Move allowed  Moves: 11  Move stored | Output obtained successfully as expected. |
| 1.13 Move 12 | Move disk 3 from peg 2 to peg 3 | Move allowed  Moves: 12  Move stored | Output obtained successfully as expected. |
| 1.14 Move 13 | Move disk 1 from peg 1 to peg 2 | Move allowed  Moves: 13  Move stored | Output obtained successfully as expected. |
| 1.15 Move 14 | Move disk 2 from peg 1 to peg 3 | Move allowed  Moves: 14  Move stored | Output obtained successfully as expected. |
| 1.16 Move 15 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 15  Move stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| * 1. Test that the interface is displayed correctly when the program runs | Run “Towers of Hanoi’ program | Moves: 0 | Output obtained successfully as expected. |
| 2.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 2.3. Move 2 | Move disk 2 from peg 1 to peg 2 | Move not allowed on smaller disk  Moves: 1  Move not stored | Output obtained successfully as expected. |
| 2.4. Move 3 | Move disk 1 from peg 2 to peg 2 | Move not allowed if moving on same peg  Moves: 1  Move not stored | Output obtained successfully as expected. |
| 2.5. Move 4 | Move disk 4 from peg 1 to peg 2 | Move not allowed if not a top disk  Moves: 1  Move not stored | Output obtained successfully as expected. |
| 2.6. Move 5 | Click on ‘New Game’ button to start a new Game | Moves: 0 | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 3.1. Test that valid moves are stored. | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 3.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 3.3. Move 2 | Move the disk 1 from peg 2 to peg 3 | Move allowed  Moves: 2  Move stored | Output obtained successfully as expected. |
| 3.4. Move 3 | Move the disk 2 from peg 1 to peg 2 | Move allowed  Moves: 3  Move stored | Output obtained successfully as expected. |
| 3.5. Move 4 | Move the disk 1 from peg 3 to peg 2 | Move allowed  Moves: 2  Move stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 4.1. Test that game uses four disks and three pegs and lets the user drag and drop disks from one peg to another | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 4.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Disk 1 drag and drop to peg 2  Moves: 1  Move stored | Output obtained successfully as expected. |
| 4.3. Move 2 | Move the disk 1 from peg 2 to peg 3 | Move allowed  Disk 1 drag and drop to peg 3  Moves: 2  Move stored | Output obtained successfully as expected. |
| 4.4. Move 3 | Move the disk 2 from peg 1 to peg 2 | Move allowed  Disk 2 drag and drop to peg 2  Moves: 3  Move stored | Output obtained successfully as expected. |
| 4.5. Move 4 | Move the disk 1 from peg 3 to peg 2 | Move allowed  Disk 1 drag and drop to peg 2  Moves: 4  Move stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 5.1. Test that game keeps the count of the number of moves | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 5.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 5.3. Move 2 | Move the disk 1 from peg 2 to peg 3 | Move allowed  Moves: 2  Move stored | Output obtained successfully as expected. |
| 5.4. Move 3 | Move the disk 2 from peg 1 to peg 2 | Move allowed  Moves: 3  Move stored | Output obtained successfully as expected. |
| 5.5. Move 4 | Move the disk 1 from peg 3 to peg 2 | Move allowed  Moves: 4  Move stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 6.1. Test the game can be completed with without minimum moves (program will allow user to drag the disks from its respective pegs) while keeping count of the moves and storing the moves and displaying appropriate message | Run “Towers of Hanoi’ program | Moves: 0 | Output obtained successfully as expected. |
| 6.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 6.3. Move 2 | Move disk 2 from peg 1 to peg 3 | Move allowed  Moves: 2  Move stored | Output obtained successfully as expected. |
| 6.4. Move 3 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 3  Move stored | Output obtained successfully as expected. |
| 6.5. Move 4 | Move disk 3 from peg 1 to peg 2 | Move allowed  Moves: 4  Move stored | Output obtained successfully as expected. |
| 6.6. Move 5 | Move disk 1 from peg 3 to peg 1 | Move allowed  Moves: 5  Move stored | Output obtained successfully as expected. |
| 6.7. Move 6 | Move disk 2 from peg 3 to peg 2 | Move allowed  Moves: 6  Move stored | Output obtained successfully as expected. |
| 6.8. Move 7 | Move disk 1 from peg 1 to peg 2 | Move allowed  Moves: 7  Move stored | Output obtained successfully as expected. |
| 6.9. Move 8 | Move disk 4 from peg 1 to peg 3 | Move allowed  Moves: 8  Move stored | Output obtained successfully as expected. |
| 6.10. Move 9 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 9  Move stored | Output obtained successfully as expected. |
| 6.11 Move 10 | Move disk 2 from peg 2 to peg 1 | Move allowed  Moves: 10  Move stored | Output obtained successfully as expected. |
| 6.12 Move 11 | Move disk 1 from peg 3 to peg 1 | Move allowed  Moves: 11  Move stored | Output obtained successfully as expected. |
| 6.13 Move 12 | Move disk 3 from peg 2 to peg 3 | Move allowed  Moves: 12  Move stored | Output obtained successfully as expected. |
| 6.14 Move 13 | Move disk 1 from peg 1 to peg 2 | Move allowed  Moves: 13  Move stored | Output obtained successfully as expected. |
| 6.15 Move 14 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 14  Move stored | Output obtained successfully as expected. |
| 6.16 Move 15 | Move disk 1 from peg 3 to peg 2 | Move allowed  Moves: 15  Move stored | Output obtained successfully as expected. |
| 6.17 Move 16 | Move disk 2 from peg 1 to peg 3 | Move allowed  Moves: 16  Move stored | Output obtained successfully as expected. |
| 6.18 Move 17 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 17  Move stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| * 1. Test that the game enforces the rules | Run “Towers of Hanoi’ program | Moves: 0 | Output obtained successfully as expected. |
| 7.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 7.3. Move 2 | Move disk 2 from peg 1 to peg 2 | Move not allowed on smaller disk  Moves: 1  Move not stored | Output obtained successfully as expected. |
| 7.4. Move 3 | Move disk 1 from peg 2 to peg 2 | Move not allowed if moving on same peg  Moves: 1  Move not stored | Output obtained successfully as expected. |
| 7.5. Move 4 | Move disk 4 from peg 1 to peg 2 | Move not allowed if not a top disk  Moves: 1  Move not stored | Output obtained successfully as expected. |
| 7.6. Start a new game | Click on ‘New Game’ button to start a new Game | Moves: 0 | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 8.1. Try moving more than one disk at a time | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 8.2. Move 1 | Move the disk 1 and disk 2 from peg 1 to peg 2 | Move not allowed  Moves: 0  Move not stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 9.1. Try moving a disk at the bottom of a pile | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 9.2. Move 1 | Move the disk 1 from peg 1 to bottom of peg 2 | Move not allowed  Moves: 0  Move not stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 10.1. Try moving a second disk from top of a pile | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 10.2. Move 1 | Move the disk 2 from peg 1 to peg 2 | Move not allowed  Moves: 0  Move not stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 11.1. Try putting a larger disk on top of a smaller disk | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 11.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 11.3. Move 2 | Move the disk 2 from peg 1 to peg 2 | Move not allowed  Moves: 1  Move not stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 12.1. Try beginning a new game after a game has started. | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 12.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 12.3. Start a new game | Click on ‘New Game’ button | Moves: 0 | New game has been started successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 13.1. Try number of moves set to zero when beginning a new game. | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 13.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 13.3. Start a new game | Click on ‘New Game’ button | Moves: 0 | New game has been started successfully and the number of moves set to zero as expected. |
| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 14.1. Try the disk move back to starting positions when beginning a new game. | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 14.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 14.3. Start a new game | Click on ‘New Game’ button | Moves: 0  Disk moved to the starting positions. | New game has been started successfully and the disks moved to the starting positions as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| 15.1. Load a saved game and finish it. | Run “Towers of Hanoi” program | Moves: 0 | Output obtained successfully as expected. |
| 15.2. Load the saved game. | Click on ‘Load’ button | Loaded saved game  Moves: 12 | Output obtained successfully as expected. |
| 15.3. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 13  Move stored | Output obtained successfully as expected. |
| 15.4. Move 3 | Move the disk 2 from peg 1 to peg 3 | Move allowed  Moves: 14  Move stored | Output obtained successfully as expected. |
| 15.5. Move 4 | Move the disk 1 from peg 2 to peg 3 | Move allowed  Moves: 15  Move stored | Output obtained successfully as expected. |

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| **Requirement to test** | **Test Data Input/User Action** | **Expected Outcomes** | **Actual Outcomes** |
| * 1. Play a completed game from a list of stored moves using animation controlled by a timer. | Run “Towers of Hanoi’ program | Moves: 0 | Output obtained successfully as expected. |
| 16.2. Move 1 | Move the disk 1 from peg 1 to peg 2 | Move allowed  Moves: 1  Move stored | Output obtained successfully as expected. |
| 16.3. Move 2 | Move disk 2 from peg 1 to peg 3 | Move allowed  Moves: 2  Move stored | Output obtained successfully as expected. |
| 16.4. Move 3 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 3  Move stored | Output obtained successfully as expected. |
| 16.5. Move 4 | Move disk 3 from peg 1 to peg 2 | Move allowed  Moves: 4  Move stored | Output obtained successfully as expected. |
| 16.6. Move 5 | Move disk 1 from peg 3 to peg 1 | Move allowed  Moves: 5  Move stored | Output obtained successfully as expected. |
| 16.7. Move 6 | Move disk 2 from peg 3 to peg 2 | Move allowed  Moves: 6  Move stored | Output obtained successfully as expected. |
| 16.8. Move 7 | Move disk 1 from peg 1 to peg 2 | Move allowed  Moves: 7  Move stored | Output obtained successfully as expected. |
| 16.9. Move 8 | Move disk 4 from peg 1 to peg 3 | Move allowed  Moves: 8  Move stored | Output obtained successfully as expected. |
| 16.10. Move 9 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 9  Move stored | Output obtained successfully as expected. |
| 16.11 Move 10 | Move disk 2 from peg 2 to peg 1 | Move allowed  Moves: 10  Move stored | Output obtained successfully as expected. |
| 16.12 Move 11 | Move disk 1 from peg 3 to peg 1 | Move allowed  Moves: 11  Move stored | Output obtained successfully as expected. |
| 16.13 Move 12 | Move disk 3 from peg 2 to peg 3 | Move allowed  Moves: 12  Move stored | Output obtained successfully as expected. |
| 16.14 Move 13 | Move disk 1 from peg 1 to peg 2 | Move allowed  Moves: 13  Move stored | Output obtained successfully as expected. |
| 16.15 Move 14 | Move disk 2 from peg 1 to peg 3 | Move allowed  Moves: 14  Move stored | Output obtained successfully as expected. |
| 16.16 Move 15 | Move disk 1 from peg 2 to peg 3 | Move allowed  Moves: 15  Move stored | Output obtained successfully as expected. |
| 16.17 Play animation | Click on the ‘Animate’ button | Reset the position of disks to first peg  Start animation of the moves. | Output obtained successfully as expected. |