|  |  |  |
| --- | --- | --- |
| Nodes & Edges (i) | Def (i) | Use (i) |
| 0 | {} | {} |
| 1 | {} | {} |
| (1,2), (1,3) | {} | {} |
| 2 | {data, empty} | {elem} |
| 3 | {} | {elem} |
| (3,4), (3,5) | {} | {elem} |
| 4 | {} | {} |
| 5 | {} | {data, elem} |
| (5,6), (5,7) | {} | {data, elem} |
| 6 | {tmp, data, elem} | {data, elem, tmp} |
| (6,7) | {} | {} |
| 7 | {} | {} |
| (7,8), (7,9) | {} | {} |
| 8 | {} | {elem} |
| 9 | {position} | {elem, position} |
| (9,10), (9,11) | {} | {position} |
| 10 | {previousValue, children[0].data} | {children[0].data, elem, previousValue} |
| (10,1) | {} | {previousValue} |
| 11 | {} | {nChildren, capacity, children[position]} |
| (11,12), (11,15) | {} | {nChildren, capacity, children[position]} |
| 12 | {} | {elem, children[position-1]} |
| (12,13), (12,14) | {} | {elem, children[position-1]}} |
| 13 | {} | {elem, position} |
| 14 | {} | {children[position-1], elem} |
| 15 | {} | {nChildren, capacity, elem, children[position]} |
| (15,16), (15,17) | {} | {nChildren, capacity, elem, children[position]} |
| 17 | {} | {position, capacity, elem, children[position]} |
| (17,16), (17,18) | {} | {nChildren, capacity, elem, children[position]} |
| 18 | {} | {position, capacity} |
| (18,19), (18,20) | {} | {position, capacity} |
| 19 | {} | {children[position-1], elem} |
| 20 | {} | {children[position], elem} |

2. Edge-Pair Coverage

|  |
| --- |
| Edge-Pair |
| [0,1,2],[0,1,3],[1,3,4],[1,3,5],[3,5,6],[3,5,7],[5,6,7],[5,7,8,],[5,7,9],[6,7,8],[6,7,9],[7,9,10],[7,9,11],[9,11,12],[9,11,15],[11,12,13],[11,12,14],[11,15,16],[11,15,17],[15,17,16],[15,17,18],[17,18,19],[17,18,20] |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Test Case Values  (ArrayNTree A, Capacity c, T Elem) | Expected Value | Test Path | Requirements covered |
| T1 | ([], 2, null) | [] | [0,1,2] | [0,1,2] |
| T2 | ([1], 2, 1) | [1] | [0,1,3,4] | [0,1,2],[0,1,3],[1,3,4] |
| T3 | ([2], 2, 1) | [1:[2]] | [0,1,3,5,6,7,8] | [0,1,3],[1,3,5],[5,6,7],[6,7,8] |
| T4 | ([1,2], 2, 3) | [1:[2][3]] | [0,1,3,5,7,9,11,12,13] | [0,1,3],[1,3,5],[3,5,7],[5,7,9],[7,9,11],[9,11,12],[11,12,13] |
| T5 | ([2,3], 2, 1) | [1:[2][3]] | [0,1,3,5,6,7,9,10] | [0,1,3],[1,3,5],[3,5,6],[5,6,7],[6,7,9],[7,9,10] |
| T6 | ([2:[7][11][15:[16][19]]], 5, 18) | [[2:[7][11][15:[16][18][19]]] | [0,1,3,5,7,9,11,12,14] | [0,1,3],[1,3,5],[3,5,7][5,7,9],[7,9,11],[9,11,12],[11,12,14] |
| T7 | ([2:[7][11][15:[18][19]][25]],5,20) | [2:[7][11][15:[18][19]][29][25]] | [0,1,3,5,7,9,11,15,16] | [0,1,3],[1,3,5],[3,5,7][5,7,9],[7,9,11],[9,11,15],[11,15,16] |
| T8 | ([2:[7][11][15:[16][19]]], 3, 18) | [2:[7][11][15:[16][18][19]]] | [0,1,3,5,7,9,11,15,17,18,19] | [0,1,3],[1,3,5],[3,5,7][5,7,9],[7,9,11],[11,15,17],[15,17,18],[17,18,19] |
| T9 | ([2:[7][11:[16][19]][20]], 3, 18) | [2:[7][11:[16][18][19]][20]] | [0,1,3,5,7,9,11,15,17,18,20] | [0,1,3],[1,3,5],[3,5,7][5,7,9],[7,9,11],[11,15,17],[15,17,18],[17,18,20] |

3. Prime Path Coverage

|  |  |
| --- | --- |
|  | Prime Paths |
| [1]  [2]  [3]  [4]  [5]  [6]  [7]  [8]  [9]  [10]  [11]  [12]  [13]  [14]  [15]  [16]  [17]  [18]  [19]  [20] | **[1,2]!**, **[1,3,4]!**, **[1,3,5,7,8]!**, **[1,3,5,6,7,8]!**, **[1,3,5,7,9,10]!**, **[1,3,5,6,7,9,10]!**, **[1,3,5,7,9,11,12,13]!**, **[1,3,5,7,9,11,12,14]!**, **[1,3,5,6,7,9,11,12,13]!**, **[1,3,5,6,7,9,11,12,14]!**, **[1,3,5,7,9,11,15,16]!**, **[1,3,5,6,7,9,11,15,16]!**, [1,3,5,7,9,11,15,17,16]!, [1,3,5,6,7,9,11,15,17,16]!, **[1,3,5,7,9,11,15,17,18,19]!**, **[1,3,5,7,9,11,15,17,18,20]!**, **[1,3,5,6,7,9,11,15,17,18,19]!**, **[1,3,5,6,7,9,11,15,17,18,20]!** - [3,4]!, [3,5,7,8]!, [3,5,6,7,8]!, [3,5,7,9,10]!, [3,5,6,7,9,10]!, [3,5,7,9,11,12,13]!, [3,5,7,9,11,12,14]!, [3,5,6,7,9,11,12,13]!, [3,5,6,7,9,11,12,14]!, [3,5,7,9,11,15,16]!, [3,5,6,7,9,11,15,16]!, [3,5,7,9,11,15,17,16]!, [3,5,6,7,9,11,15,17,16]!, [3,5,7,9,11,15,17,18,19]!, [3,5,7,9,11,15,17,18,20]!, [3,5,6,7,9,11,15,17,18,19]!, [3,5,6,7,9,11,15,17,18,20]! - [5,7,8]!, [5,6,7,8]!, [5,7,9,10]!, [5,6,7,9,10]!, [5,7,9,11,12,13]!, [5,7,9,11,12,14]!, [5,6,7,9,11,12,13]!, [5,6,7,9,11,12,14]!, [5,7,9,11,15,16]!, [5,6,7,9,11,15,16]!, [5,7,9,11,15,17,16]!, [5,6,7,9,11,15,17,16]!, [5,7,9,11,15,17,18,19]!, [5,7,9,11,15,17,18,20]!, [5,6,7,9,11,15,17,18,19]!, [5,6,7,9,11,15,17,18,20]! [6,7,8]!, [6,7,9,10]!, [6,7,9,11,12,13]!, [6,7,9,11,12,14]!, [6,7,9,11,15,16]!, [6,7,9,11,15,17,16]!, [6,7,9,11,15,17,18,19]!, [6,7,9,11,15,17,18,20]! [7,8]!, [7,9,10]!, [7,9,11,12,13]!, [7,9,11,12,14]!, [7,9,11,15,16]!, [7,9,11,15,17,16]!, [7,9,11,15,17,18,19]!, [7,9,11,15,17,18,20]! - [9,10]!, [9,11,12,13]!, [9,11,12,14]!, [9,11,15,16]!, [9,11,15,17,16]!, [9,11,15,17,18,19]!, [9,11,15,17,18,20]! - [11,12,13]!, [11,12,14]!, [11,15,16]!, [11,15,17,16]!, [11,15,17,18,19]!, [11,15,17,18,20]! [12,13]!, [12,14]! -  -  [15,16]!, [15,17,16]!, [15,17,18,19]!, [15,17,18,20]! - [17,16]!, [17,18,19]!, [17,18,20]! [18,19]!, [18,20]!  -  - |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test Case Values  (ArrayNTree A, Capacity c, T Elem) | Expected Value | Test Path |
| T1 | ([], 2, null) | [] | [1,2] |
| T2 | ([1], 2, 1) | [1] | [1,3,4] |
| T3 | ([2], 2, 1) | [1:[2]] | [1,3,5,6,7,8] |
| T4 | ([1:[2]], 2, 3) | [1:[2][3]] | [1,3,5,7,9,11,12,13] |
| T5 | ([2:[3]], 2, 1) | [1:[2][3]] | [1,3,5,6,7,9,10] |
| T6 | ([2:[7][11][15:[16][19]]], 5, 18) | [[2:[7][11][15:[16][18][19]]] | [1,3,5,7,9,11,12,14] |
| T7 | ([2:[7][11][15:[18][19]][25]],5,20) | [2:[7][11][15:[18][19]][29][25]] | [1,3,5,7,9,11,15,16] |
| T8 | ([2:[7][11][15:[16][19]]], 3, 18) | [2:[7][11][15:[16][18][19]]] | [1,3,5,7,9,11,15,17,18,19] |
| T9 | ([2:[7][11:[16][19]][20]], 3, 18) | [2:[7][11:[16][18][19]][20]] | [1,3,5,7,9,11,15,17,18,20] |
| T10 | ([1], 2, 2) | [1:[2]] | [0,1,3,5,7,8] |
| T11 | ([1:[3]], 2, 2) | [1:[2][3]] | [0,1,3,5,7,9,10] |
| T12 |  |  |  |

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| --- | --- | --- |
| Prime Path | Covered by | |
| [1,2] | T1 |
| [1,3,4] | T2 |
| [1,3,5,7,8] | T10 |
| [1,3,5,6,7,8] | T3 |
| [1,3,5,7,9,10] | T11 |
| [1,3,5,6,7,9,10] | T5 |
| [1,3,5,7,9,11,12,13] | T4 |
| [1,3,5,7,9,11,12,14] | T6 |
| [1,3,5,6,7,9,11,12,13] |  |
| [1,3,5,6,7,9,11,12,14] |  |
| [1,3,5,7,9,11,15,16] | T7 |
| [1,3,5,6,7,9,11,15,16] |  |
| [1,3,5,7,9,11,15,17,18,19] | T8 |
| [1,3,5,7,9,11,15,17,18,20] | T9 |
| [1,3,5,6,7,9,11,15,17,18,19] |  |
| [1,3,5,6,7,9,11,15,17,18,20] |  |