

KEY: **Orange Highlight** = Test added during this milestone

**Red Highlight** = Impossible Test Case

| Test                             | Equivalence class partitioning(Wect, Sect, Wrect, Srect)  |    |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
|----------------------------------|---|----|---|---|-------|----|----|-------|----|----|----|---|---|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
| SetUniqueListTest<br>.testAsSet  | <ul style="list-style-type: none"><li>Variables:<ul style="list-style-type: none"><li>List length L</li></ul></li><li>Equivalence classes<ul style="list-style-type: none"><li>L1: L = 0</li><li>L2: L &gt; 0</li></ul></li><li>Thus, wect and sect are both covered by using an empty list and a nonempty<ul style="list-style-type: none"><li>This is already done</li></ul></li><li>Wrect and Srect would involve L &lt; 0 but this is not possible</li><li>Wrect and srect are covered by testing of a null variable list</li></ul>   |    |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testAdd    | <ul style="list-style-type: none"><li>Variables:<ul style="list-style-type: none"><li>List length L</li><li>Object O</li></ul></li><li>Equivalence classes<ul style="list-style-type: none"><li>L1: L = 0</li><li>L2: L &gt; 0</li><li>O1: O does not already exist in list</li><li>O2: O already exists in list</li></ul></li><li>Wect<ul style="list-style-type: none"><li><table><tr><th>ID</th><th>L</th><th>O</th></tr><tr><td>WECT1</td><td>L1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>O2</td></tr></table></li></ul></li><li>Sect<ul style="list-style-type: none"><li><table><tr><th>ID</th><th>L</th><th>I</th></tr><tr><td>SECT1</td><td>L1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>O2</td></tr><tr><td>SECT4</td><td>L2</td><td>O2</td></tr></table></li></ul></li><li><ul style="list-style-type: none"><li>Wrect and Srect would involve L &lt; 0 but this is not possible</li><li>Wrect and srect are covered by testing of a null variable list</li></ul></li></ul> | ID | L | O | WECT1 | L1 | O1 | WECT2 | L2 | O2 | ID | L | I | SECT1 | L1 | O1 | SECT2 | L2 | O1 | SECT3 | L1 | O2 | SECT4 | L2 | O2 |
| ID                               | L   | O  |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT1                            | L1  | O1 |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                            | L2  | O2 |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                               | L   | I  |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                            | L1  | O1 |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                            | L2  | O1 |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                            | L1  | O2 |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                            | L2  | O2 |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testAddAll | <ul style="list-style-type: none"><li>Variables:<ul style="list-style-type: none"><li>List length L</li><li>List of objects O</li></ul></li><li>Equivalence classes</li></ul>   |    |   |   |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |

|                               | <ul style="list-style-type: none"><li>○ L1: L = 0</li><li>○ L2: L &gt; 0</li><li>○ O1: O can be fully inserted into list without duplicates</li><li>○ O2: O can be partially inserted into list without duplicates</li><li>○ O3: O cannot be inserted at all into list without duplicate</li><li>● Wect<ul style="list-style-type: none"><li>○<table><tr><th>ID</th><th>L</th><th>O</th></tr><tr><td>WECT1</td><td>L1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>O2</td></tr><tr><td>WECT3</td><td>L1</td><td>O3</td></tr></table></li></ul></li><li>● Sect<ul style="list-style-type: none"><li>○<table><tr><th>ID</th><th>L</th><th>I</th></tr><tr><td>SECT1</td><td>L1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>O2</td></tr><tr><td>SECT4</td><td>L2</td><td>O2</td></tr><tr><td>SECT5</td><td>L1</td><td>O3</td></tr><tr><td>SECT6</td><td>L2</td><td>O3</td></tr></table></li><li>○</li></ul></li><li>● Wrect and Srect would involve L &lt; 0 but this is not possible</li><li>● Wrect and srect are also covered by testing of a null variable list</li></ul> | ID | L | O | WECT1 | L1 | O1 | WECT2 | L2 | O2 | WECT3 | L1 | O3 | ID | L | I | SECT1 | L1 | O1 | SECT2 | L2 | O1 | SECT3 | L1 | O2 | SECT4 | L2 | O2 | SECT5 | L1 | O3 | SECT6 | L2 | O3 |
|-------------------------------|---|----|---|---|-------|----|----|-------|----|----|-------|----|----|----|---|---|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
| ID                            | L   | O  |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT1                         | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                         | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT3                         | L1  | O3 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                            | L   | I  |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                         | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                         | L2  | O1 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                         | L1  | O2 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                         | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT5                         | L1  | O3 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT6                         | L2  | O3 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testSet | <ul style="list-style-type: none"><li>● Variables:<ul style="list-style-type: none"><li>○ List length L</li><li>○ Index I</li><li>○ Object O</li></ul></li><li>● Equivalence classes<ul style="list-style-type: none"><li>○ L1: L = 0</li><li>○ L2: L &gt; 0</li><li>○ I1: I &lt; 0</li><li>○ I2: I &gt;= 0 &amp;&amp; I &lt; L</li><li>○ I3: I &gt;= L</li><li>○ O1: O is not a duplicate</li><li>○ O2: O is a duplicate</li></ul></li><li>● Wect<ul style="list-style-type: none"><li>○<table><tr><th>ID</th><th>L</th><th>I</th><th>O</th></tr></table></li></ul></li></ul>  | ID | L | I | O     |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                            | L   | I  | O |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |

|                                  |   |       |    |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
|----------------------------------|---|-------|----|----|----|-------|----|----|----|-------|----|----|----|----|---|---|---|-------|----|----|----|-------|----|----|----|-------|----|----|----|-------|----|----|----|-------|----|----|----|-------|----|----|----|-------|----|----|----|-------|----|----|----|-------|----|----|----|--------|----|----|----|--------|----|----|----|--------|----|----|----|
|                                  | <table><tr><td>WECT1</td><td>L1</td><td>I1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>I2</td><td>O2</td></tr><tr><td>WECT3</td><td>L1</td><td>I3</td><td>O1</td></tr></table> <ul style="list-style-type: none"><li>• Sect<ul style="list-style-type: none"><li>◦<table><tr><td>ID</td><td>L</td><td>I</td><td>O</td></tr><tr><td>SECT1</td><td>L1</td><td>I1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>I1</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>I2</td><td>O1</td></tr><tr><td>SECT4</td><td>L2</td><td>I2</td><td>O1</td></tr><tr><td>SECT5</td><td>L1</td><td>I3</td><td>O1</td></tr><tr><td>SECT6</td><td>L2</td><td>I3</td><td>O1</td></tr><tr><td>SECT7</td><td>L1</td><td>I1</td><td>O2</td></tr><tr><td>SECT8</td><td>L2</td><td>I1</td><td>O2</td></tr><tr><td>SECT9</td><td>L1</td><td>I2</td><td>O2</td></tr><tr><td>SECT10</td><td>L2</td><td>I2</td><td>O2</td></tr><tr><td>SECT11</td><td>L1</td><td>I3</td><td>O2</td></tr><tr><td>SECT12</td><td>L2</td><td>I3</td><td>O2</td></tr></table><ul style="list-style-type: none"><li>◦<ul style="list-style-type: none"><li>• Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li><li>• Wrect and srect are covered by testing of a null variable list</li></ul></li></ul></li></ul></li></ul> | WECT1 | L1 | I1 | O1 | WECT2 | L2 | I2 | O2 | WECT3 | L1 | I3 | O1 | ID | L | I | O | SECT1 | L1 | I1 | O1 | SECT2 | L2 | I1 | O1 | SECT3 | L1 | I2 | O1 | SECT4 | L2 | I2 | O1 | SECT5 | L1 | I3 | O1 | SECT6 | L2 | I3 | O1 | SECT7 | L1 | I1 | O2 | SECT8 | L2 | I1 | O2 | SECT9 | L1 | I2 | O2 | SECT10 | L2 | I2 | O2 | SECT11 | L1 | I3 | O2 | SECT12 | L2 | I3 | O2 |
| WECT1                            | L1  | I1    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| WECT2                            | L2  | I2    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| WECT3                            | L1  | I3    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| ID                               | L   | I     | O  |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT1                            | L1  | I1    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT2                            | L2  | I1    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT3                            | L1  | I2    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT4                            | L2  | I2    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT5                            | L1  | I3    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT6                            | L2  | I3    | O1 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT7                            | L1  | I1    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT8                            | L2  | I1    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT9                            | L1  | I2    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT10                           | L2  | I2    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT11                           | L1  | I3    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SECT12                           | L2  | I3    | O2 |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| SetUniqueListTest<br>.testRemove | <ul style="list-style-type: none"><li>• Variables:<ul style="list-style-type: none"><li>◦ List length L</li><li>◦ Index I</li></ul></li><li>• Equivalence classes<ul style="list-style-type: none"><li>◦ L1: <math>L = 0</math></li><li>◦ L2: <math>L &gt; 0</math></li><li>◦ I1: <math>I &lt; 0</math></li><li>◦ I2: <math>I \geq 0 \ \&amp;\&amp; \ I &lt; L</math></li><li>◦ I3: <math>I \geq L</math></li></ul></li><li>• Wect<ul style="list-style-type: none"><li>◦<table><tr><td>ID</td><td>L</td><td>I</td></tr></table></li></ul></li></ul>  | ID    | L  | I  |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |
| ID                               | L   | I     |    |    |    |       |    |    |    |       |    |    |    |    |   |   |   |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |       |    |    |    |        |    |    |    |        |    |    |    |        |    |    |    |

|                                     |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
|-------------------------------------|---|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
|                                     | <table><tr><td>WECT1</td><td>L1</td><td>I1</td></tr><tr><td>WECT2</td><td>L2</td><td>I2</td></tr><tr><td>WECT3</td><td>L1</td><td>I3</td></tr></table> <ul style="list-style-type: none"><li>• Sect<ul style="list-style-type: none"><li>◦<table><tr><td>ID</td><td>L</td><td>I</td></tr><tr><td>SECT1</td><td>L1</td><td>I1</td></tr><tr><td>SECT2</td><td>L2</td><td>I1</td></tr><tr><td>SECT3</td><td>L1</td><td>I2</td></tr><tr><td>SECT4</td><td>L2</td><td>I2</td></tr><tr><td>SECT5</td><td>L1</td><td>I3</td></tr><tr><td>SECT6</td><td>L2</td><td>I3</td></tr></table></li></ul></li><li>◦<ul style="list-style-type: none"><li>• Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li><li>• Wrect and srect are covered by WECT1, WECT3, SECT1, SECT2, SECT5, and SECT6</li><li>• Wrect and srect are also covered by testing of a null variable list</li></ul></li></ul> | WECT1 | L1 | I1 | WECT2 | L2 | I2 | WECT3 | L1 | I3 | ID    | L  | I  | SECT1 | L1 | I1 | SECT2 | L2 | I1 | SECT3 | L1 | I2 | SECT4 | L2 | I2 | SECT5 | L1 | I3 | SECT6 | L2 | I3 |
| WECT1                               | L1  | I1    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                               | L2  | I2    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT3                               | L1  | I3    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                                  | L   | I     |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                               | L1  | I1    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                               | L2  | I1    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                               | L1  | I2    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                               | L2  | I2    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT5                               | L1  | I3    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT6                               | L2  | I3    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testRemovelf  |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testRemoveAll | <ul style="list-style-type: none"><li>• Variables:<ul style="list-style-type: none"><li>◦ List length L</li><li>◦ List of objects O</li></ul></li><li>• Equivalence classes<ul style="list-style-type: none"><li>◦ L1: <math>L = 0</math></li><li>◦ L2: <math>L &gt; 0</math></li><li>◦ O1: O can be fully removed from list</li><li>◦ O2: O can be partially removed from list</li><li>◦ O3: No elements of O exist in list</li></ul></li><li>• Wect<ul style="list-style-type: none"><li>◦<table><tr><td>ID</td><td>L</td><td>O</td></tr><tr><td>WECT1</td><td>L1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>O2</td></tr><tr><td>WECT3</td><td>L1</td><td>O3</td></tr></table></li></ul></li><li>• Sect</li></ul>   | ID    | L  | O  | WECT1 | L1 | O1 | WECT2 | L2 | O2 | WECT3 | L1 | O3 |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                                  | L   | O     |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT1                               | L1  | O1    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                               | L2  | O2    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT3                               | L1  | O3    |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |

|                                     |   |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
|-------------------------------------|---|----|---|---|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
|                                     | <ul style="list-style-type: none"><li>○<table><tr><td>ID</td><td>L</td><td>I</td></tr><tr><td>SECT1</td><td>L1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>O2</td></tr><tr><td>SECT4</td><td>L2</td><td>O2</td></tr><tr><td>SECT5</td><td>L1</td><td>O3</td></tr><tr><td>SECT6</td><td>L2</td><td>O3</td></tr></table></li><li>○<ul style="list-style-type: none"><li>● Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li><li>● Wrect and srect are also covered by testing of a null variable list</li></ul></li></ul>  | ID | L | I | SECT1 | L1 | O1 | SECT2 | L2 | O1 | SECT3 | L1 | O2 | SECT4 | L2 | O2 | SECT5 | L1 | O3 | SECT6 | L2 | O3 |       |    |    |       |    |    |       |    |    |
| ID                                  | L   | I  |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                               | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                               | L2  | O1 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                               | L1  | O2 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                               | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT5                               | L1  | O3 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT6                               | L2  | O3 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testRetainAll | <ul style="list-style-type: none"><li>● Variables:<ul style="list-style-type: none"><li>○ List length L</li><li>○ List of objects O</li></ul></li><li>● Equivalence classes<ul style="list-style-type: none"><li>○ L1: <math>L = 0</math></li><li>○ L2: <math>L &gt; 0</math></li><li>○ O1: All elements of O exist in list</li><li>○ O2: Some elements of O exist in list</li><li>○ O3: No elements of O exist in list</li></ul></li><li>● Wect<ul style="list-style-type: none"><li>○<table><tr><td>ID</td><td>L</td><td>O</td></tr><tr><td>WECT1</td><td>L1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>O2</td></tr><tr><td>WECT3</td><td>L1</td><td>O3</td></tr></table></li></ul></li><li>● Sect<ul style="list-style-type: none"><li>○<table><tr><td>ID</td><td>L</td><td>I</td></tr><tr><td>SECT1</td><td>L1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>O2</td></tr><tr><td>SECT4</td><td>L2</td><td>O2</td></tr><tr><td>SECT5</td><td>L1</td><td>O3</td></tr></table></li></ul></li></ul> | ID | L | O | WECT1 | L1 | O1 | WECT2 | L2 | O2 | WECT3 | L1 | O3 | ID    | L  | I  | SECT1 | L1 | O1 | SECT2 | L2 | O1 | SECT3 | L1 | O2 | SECT4 | L2 | O2 | SECT5 | L1 | O3 |
| ID                                  | L   | O  |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT1                               | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                               | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT3                               | L1  | O3 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                                  | L   | I  |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                               | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                               | L2  | O1 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                               | L1  | O2 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                               | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT5                               | L1  | O3 |   |   |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |       |    |    |

|                                    |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
|------------------------------------|---|-------|----|----|-------|----|----|-------|----|----|----|---|---|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
|                                    | <table><tr><td>SECT6</td><td>L2</td><td>O3</td></tr></table> <ul style="list-style-type: none"><li>○</li><li>• Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li><li>• Wrect and srect are also covered by testing of a null variable list</li></ul>   | SECT6 | L2 | O3 |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT6                              | L2  | O3    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testClear    | <ul style="list-style-type: none"><li>• Variables:<ul style="list-style-type: none"><li>○ List length L</li></ul></li><li>• Equivalence classes<ul style="list-style-type: none"><li>○ L1: <math>L = 0</math></li><li>○ L2: <math>L &gt; 0</math></li></ul></li><li>• Thus, wect and sect are both covered by using an empty list and a nonempty<ul style="list-style-type: none"><li>○ This is already done</li></ul></li><li>• Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li><li>• Wrect and srect are covered by testing of a null variable list</li></ul>  |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testContains | <ul style="list-style-type: none"><li>• Variables:<ul style="list-style-type: none"><li>○ List length L</li><li>○ Object O</li></ul></li><li>• Equivalence classes<ul style="list-style-type: none"><li>○ L1: <math>L = 0</math></li><li>○ L2: <math>L &gt; 0</math></li><li>○ O1: O is in list</li><li>○ O2: O is not in list</li></ul></li><li>• Wect<ul style="list-style-type: none"><li>○<table><tr><td>ID</td><td>L</td><td>O</td></tr><tr><td>WECT1</td><td>L1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>O2</td></tr></table></li></ul></li><li>• Sect<ul style="list-style-type: none"><li>○<table><tr><td>ID</td><td>L</td><td>I</td></tr><tr><td>SECT1</td><td>L1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>O2</td></tr><tr><td>SECT4</td><td>L2</td><td>O2</td></tr></table></li><li>○</li></ul></li><li>• Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li><li>• Wrect and srect are covered by WECT1, SECT1</li><li>• Wrect and srect are also covered by testing of a null variable list</li></ul> | ID    | L  | O  | WECT1 | L1 | O1 | WECT2 | L2 | O2 | ID | L | I | SECT1 | L1 | O1 | SECT2 | L2 | O1 | SECT3 | L1 | O2 | SECT4 | L2 | O2 |
| ID                                 | L   | O     |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT1                              | L1  | O1    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                              | L2  | O2    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                                 | L   | I     |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                              | L1  | O1    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                              | L2  | O1    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                              | L1  | O2    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                              | L2  | O2    |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest                  | <ul style="list-style-type: none"><li>• Variables:</li></ul>  |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |

|  |   |    |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
|--|---|----|---|---|-------|----|----|-------|----|----|-------|----|----|----|---|---|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
| .testContainsAll                       | <ul style="list-style-type: none"><li><ul style="list-style-type: none"><li>List length L</li><li>List of objects O</li></ul></li><li>Equivalence classes<ul style="list-style-type: none"><li>L1: L = 0</li><li>L2: L &gt; 0</li><li>O1: All elements of O exist in list</li><li>O2: Not all elements of O exist in list</li></ul></li><li>Wect<ul style="list-style-type: none"><li><table><tr><td>ID</td><td>L</td><td>O</td></tr><tr><td>WECT1</td><td>L1</td><td>O1</td></tr><tr><td>WECT2</td><td>L2</td><td>O2</td></tr><tr><td>WECT3</td><td>L1</td><td>O3</td></tr></table></li></ul></li><li>Sect<ul style="list-style-type: none"><li><table><tr><td>ID</td><td>L</td><td>I</td></tr><tr><td>SECT1</td><td>L1</td><td>O1</td></tr><tr><td>SECT2</td><td>L2</td><td>O1</td></tr><tr><td>SECT3</td><td>L1</td><td>O2</td></tr><tr><td>SECT4</td><td>L2</td><td>O2</td></tr></table></li></ul></li><li></li><li>Wrect and Srect would involve L &lt; 0 but this is not possible</li><li>Wrect and srect are also covered by testing of a null variable list</li></ul> | ID | L | O | WECT1 | L1 | O1 | WECT2 | L2 | O2 | WECT3 | L1 | O3 | ID | L | I | SECT1 | L1 | O1 | SECT2 | L2 | O1 | SECT3 | L1 | O2 | SECT4 | L2 | O2 |
| ID                                     | L   | O  |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT1                                  | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT2                                  | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| WECT3                                  | L1  | O3 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| ID                                     | L   | I  |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT1                                  | L1  | O1 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT2                                  | L2  | O1 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT3                                  | L1  | O2 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SECT4                                  | L2  | O2 |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testIterator     | <ul style="list-style-type: none"><li>Variables:<ul style="list-style-type: none"><li>List length L</li></ul></li><li>Equivalence classes<ul style="list-style-type: none"><li>L1: L = 0</li><li>L2: L &gt; 0</li></ul></li><li>Thus, wect and sect are both covered by using an empty list and a nonempty<ul style="list-style-type: none"><li>This is already done</li></ul></li><li>Wrect and Srect would involve L &lt; 0 but this is not possible</li><li>Wrect and srect are covered by testing of a null variable list</li></ul>   |    |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |
| SetUniqueListTest<br>.testListIterator | <ul style="list-style-type: none"><li>Variables:<ul style="list-style-type: none"><li>List length L</li></ul></li><li>Equivalence classes<ul style="list-style-type: none"><li>L1: L = 0</li><li>L2: L &gt; 0</li></ul></li><li>Thus, wect and sect are both covered by using an empty list and a nonempty</li></ul>  |    |   |   |       |    |    |       |    |    |       |    |    |    |   |   |       |    |    |       |    |    |       |    |    |       |    |    |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>○ This is already done</li> <li>● Wrect and Srect would involve <math>L &lt; 0</math> but this is not possible</li> <li>● Wrect and srect are covered by testing of a null variable list</li> </ul> |
|--|--|

| Test                          | Boundary Value Analysis   |       |             |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
|-------------------------------|---|-------|-------------|---|---|---------------|-------|---|-------------|---------------|-------|---|-------------|---------------|-------|-----|-------------|---------------|-------|-------|-------------|---------------|-------|-------|-------------|----|---|---|---|----------------|-------|----|-------------|----------------|-------|---|-------------|----------------|-------|---|-------------|-----|-------|-----|-------------|
| SetUniqueListTest<br>.testSet | <ul style="list-style-type: none"><li>Variables:<ul style="list-style-type: none"><li>List length L</li><li>Index I</li><li>Object O</li></ul></li><li>Test Set<ul style="list-style-type: none"><li>BVL: {nom: L = 0, nom: L &gt; 0}</li><li>BVI: {min-: I = -1, min: I = 0, min+: I = 1, nom: 1 &lt; I &lt; L, max-: I = L - 2, max: I = L - 1, max+: I = L}</li><li>BVO: {nom: O is unique, nom: O is not unique}</li></ul></li><li>BVA (basic)<ul style="list-style-type: none"><table><tr><th>ID</th><th>L</th><th>I</th><th>O</th></tr><tr><td>BVA (basic) 1</td><td>L &gt; 0</td><td>0</td><td>O is unique</td></tr><tr><td>BVA (basic) 2</td><td>L &gt; 0</td><td>1</td><td>O is unique</td></tr><tr><td>BVA (basic) 3</td><td>L &gt; 0</td><td>nom</td><td>O is unique</td></tr><tr><td>BVA (basic) 4</td><td>L &gt; 0</td><td>L - 2</td><td>O is unique</td></tr><tr><td>BVA (basic) 5</td><td>L &gt; 0</td><td>L - 1</td><td>O is unique</td></tr></table></ul></li><li>BVA (robust)<ul style="list-style-type: none"><table><tr><th>ID</th><th>L</th><th>I</th><th>O</th></tr><tr><td>BVA (robust) 1</td><td>L &gt; 0</td><td>-1</td><td>O is unique</td></tr><tr><td>BVA (robust) 2</td><td>L &gt; 0</td><td>0</td><td>O is unique</td></tr><tr><td>BVA (robust) 3</td><td>L &gt; 0</td><td>1</td><td>O is unique</td></tr><tr><td>BVA</td><td>L &gt; 0</td><td>nom</td><td>O is unique</td></tr></table></ul></li></ul> | ID    | L           | I | O | BVA (basic) 1 | L > 0 | 0 | O is unique | BVA (basic) 2 | L > 0 | 1 | O is unique | BVA (basic) 3 | L > 0 | nom | O is unique | BVA (basic) 4 | L > 0 | L - 2 | O is unique | BVA (basic) 5 | L > 0 | L - 1 | O is unique | ID | L | I | O | BVA (robust) 1 | L > 0 | -1 | O is unique | BVA (robust) 2 | L > 0 | 0 | O is unique | BVA (robust) 3 | L > 0 | 1 | O is unique | BVA | L > 0 | nom | O is unique |
| ID                            | L   | I     | O           |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (basic) 1                 | L > 0   | 0     | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (basic) 2                 | L > 0   | 1     | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (basic) 3                 | L > 0   | nom   | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (basic) 4                 | L > 0   | L - 2 | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (basic) 5                 | L > 0   | L - 1 | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| ID                            | L   | I     | O           |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (robust) 1                | L > 0   | -1    | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (robust) 2                | L > 0   | 0     | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA (robust) 3                | L > 0   | 1     | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |
| BVA                           | L > 0   | nom   | O is unique |   |   |               |       |   |             |               |       |   |             |               |       |     |             |               |       |       |             |               |       |       |             |    |   |   |   |                |       |    |             |                |       |   |             |                |       |   |             |     |       |     |             |



|  |  |                   |         |         |             |
|--|--|-------------------|---------|---------|-------------|
|  |  | (robust) 4        |         |         |             |
|  |  | BVA<br>(robust) 5 | $L > 0$ | $L - 2$ | O is unique |
|  |  | BVA<br>(robust) 6 | $L > 0$ | $L - 1$ | O is unique |
|  |  | BVA<br>(robust) 7 | $L > 0$ | L       | O is unique |

| Test                             | Decision Table   |              |                                 |    |                 |     |     |   |   |     |     |     |                                 |     |     |     |                              |
|----------------------------------|--|--------------|---------------------------------|----|-----------------|-----|-----|---|---|-----|-----|-----|---------------------------------|-----|-----|-----|------------------------------|
| SetUniqueListTest<br>.testAdd    | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Object is unique?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Object is inserted without removal</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><th>Test Case ID</th><th>C1</th><th>C2</th><th>Expected Output</th></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Object inserted without removal</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>Object inserted with removal</td></tr></table></li></ul></li></ul> | Test Case ID | C1                              | C2 | Expected Output | TC1 | Y/T | - | - | TC2 | N/F | Y/T | Object inserted without removal | TC3 | N/F | N/F | Object inserted with removal |
| Test Case ID                     | C1   | C2           | Expected Output                 |    |                 |     |     |   |   |     |     |     |                                 |     |     |     |                              |
| TC1                              | Y/T  | -            | -                               |    |                 |     |     |   |   |     |     |     |                                 |     |     |     |                              |
| TC2                              | N/F  | Y/T          | Object inserted without removal |    |                 |     |     |   |   |     |     |     |                                 |     |     |     |                              |
| TC3                              | N/F  | N/F          | Object inserted with removal    |    |                 |     |     |   |   |     |     |     |                                 |     |     |     |                              |
| SetUniqueListTest<br>.testAddAll | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Objects are unique?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Objects are inserted without removals</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○</li></ul></li></ul>   |              |                                 |    |                 |     |     |   |   |     |     |     |                                 |     |     |     |                              |

|                              |   |              |                                  |  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
|------------------------------|---|--------------|----------------------------------|--|-----------------|-----------------|-----|-----|---|-----|-----|-----|----------------------------------|-----|-----|--|-------------------------------|-----|-----|-----|-------------------------------------|-----|-----|-----|---|-------|
|                              | <table><tr><td>Test Case ID</td><td>C1</td><td>C2</td><td>Expected Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Objects inserted without removal</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>Objects inserted with removal</td></tr></table> <ul style="list-style-type: none"><li>○</li></ul>   | Test Case ID | C1                               | C2                                     | Expected Output | TC1             | Y/T | -   | - | TC2 | N/F | Y/T | Objects inserted without removal | TC3 | N/F | N/F                                    | Objects inserted with removal |     |     |     |                                     |     |     |     |   |       |
| Test Case ID                 | C1  | C2           | Expected Output                  |  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC1                          | Y/T   | -            | -                                |  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC2                          | N/F   | Y/T          | Objects inserted without removal |  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC3                          | N/F   | N/F          | Objects inserted with removal    |  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| SetUniqueListTest.testSet    | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Index in range?</li><li>○ C3: Object is unique</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Object at index is set without removal</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><td>Test Case ID</td><td>C1</td><td>C2</td><td>C3</td><td>Expected Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Y/T</td><td>Object at index is set without removal</td></tr><tr><td>TC3</td><td>N/F</td><td>Y/T</td><td>N/F</td><td>Object at index is set with removal</td></tr><tr><td>TC4</td><td>N/F</td><td>N/F</td><td>-</td><td>Error</td></tr></table></li><li>○</li></ul></li></ul> | Test Case ID | C1                               | C2                                     | C3              | Expected Output | TC1 | Y/T | - | -   | -   | TC2 | N/F                              | Y/T | Y/T | Object at index is set without removal | TC3                           | N/F | Y/T | N/F | Object at index is set with removal | TC4 | N/F | N/F | - | Error |
| Test Case ID                 | C1  | C2           | C3                               | Expected Output                        |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC1                          | Y/T   | -            | -                                | -                                      |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC2                          | N/F   | Y/T          | Y/T                              | Object at index is set without removal |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC3                          | N/F   | Y/T          | N/F                              | Object at index is set with removal    |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| TC4                          | N/F   | N/F          | -                                | Error                                  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |
| SetUniqueListTest.testRemove | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Object in list?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Object removed</li></ul></li><li>● Table</li></ul>  |              |                                  |  |                 |                 |     |     |   |     |     |     |                                  |     |     |  |                               |     |     |     |                                     |     |     |     |   |       |

|                                 |   |              |                 |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
|---------------------------------|---|--------------|-----------------|----|-----------------|-----|-----|---|---|-----|-----|-----|-----------------|-----|-----|-----|-----------|
|                                 | <ul style="list-style-type: none"><li>○<table><tr><td>Test Case ID</td><td>C1</td><td>C2</td><td>Expected Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Object removed</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>No change</td></tr></table></li><li>○</li></ul>  | Test Case ID | C1              | C2 | Expected Output | TC1 | Y/T | - | - | TC2 | N/F | Y/T | Object removed  | TC3 | N/F | N/F | No change |
| Test Case ID                    | C1  | C2           | Expected Output |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC1                             | Y/T   | -            | -               |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC2                             | N/F   | Y/T          | Object removed  |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC3                             | N/F   | N/F          | No change       |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| SetUniqueListTest.testRemoveIf  | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Objects exist that should be removed?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Object removed</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><td>Test Case ID</td><td>C1</td><td>C2</td><td>Expected Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Objects removed</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>No change</td></tr></table></li><li>○</li></ul></li></ul> | Test Case ID | C1              | C2 | Expected Output | TC1 | Y/T | - | - | TC2 | N/F | Y/T | Objects removed | TC3 | N/F | N/F | No change |
| Test Case ID                    | C1  | C2           | Expected Output |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC1                             | Y/T   | -            | -               |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC2                             | N/F   | Y/T          | Objects removed |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC3                             | N/F   | N/F          | No change       |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| SetUniqueListTest.testRemoveAll | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Objects exist to be removed?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Objects removed</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><td>Test Case ID</td><td>C1</td><td>C2</td><td>Expected Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Objects removed</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>No</td></tr></table></li></ul></li></ul>                          | Test Case ID | C1              | C2 | Expected Output | TC1 | Y/T | - | - | TC2 | N/F | Y/T | Objects removed | TC3 | N/F | N/F | No        |
| Test Case ID                    | C1  | C2           | Expected Output |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC1                             | Y/T   | -            | -               |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC2                             | N/F   | Y/T          | Objects removed |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |
| TC3                             | N/F   | N/F          | No              |    |                 |     |     |   |   |     |     |     |                 |     |     |     |           |

|                                   | <table><tr><td></td><td></td><td></td><td>change</td></tr></table> <ul style="list-style-type: none"><li>○</li></ul>  |              |                  |    | change          |     |     |   |   |     |     |     |                  |     |     |     |            |
|-----------------------------------|---|--------------|------------------|----|-----------------|-----|-----|---|---|-----|-----|-----|------------------|-----|-----|-----|------------|
|                                   |   |              | change           |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| SetUniqueListTest.testRetainAll   | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Objects exist to be retained?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Objects retained</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><th>Test Case ID</th><th>C1</th><th>C2</th><th>Expected Output</th></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Objects retained</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>Empty List</td></tr></table></li><li>○</li></ul></li></ul> | Test Case ID | C1               | C2 | Expected Output | TC1 | Y/T | - | - | TC2 | N/F | Y/T | Objects retained | TC3 | N/F | N/F | Empty List |
| Test Case ID                      | C1  | C2           | Expected Output  |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| TC1                               | Y/T   | -            | -                |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| TC2                               | N/F   | Y/T          | Objects retained |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| TC3                               | N/F   | N/F          | Empty List       |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| SetUniqueListTest.testContains    | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Object in list?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Object found in list</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><th>Test Case ID</th><th>C1</th><th>C2</th><th>Expected Output</th></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>True</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>False</td></tr></table></li><li>○</li></ul></li></ul>                            | Test Case ID | C1               | C2 | Expected Output | TC1 | Y/T | - | - | TC2 | N/F | Y/T | True             | TC3 | N/F | N/F | False      |
| Test Case ID                      | C1  | C2           | Expected Output  |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| TC1                               | Y/T   | -            | -                |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| TC2                               | N/F   | Y/T          | True             |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| TC3                               | N/F   | N/F          | False            |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |
| SetUniqueListTest.testContainsAll | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Objects in list?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Objects found in list</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><th>Test</th><th>C1</th><th>C2</th><th>Expected</th></tr></table></li></ul></li></ul>   | Test         | C1               | C2 | Expected        |     |     |   |   |     |     |     |                  |     |     |     |            |
| Test                              | C1  | C2           | Expected         |    |                 |     |     |   |   |     |     |     |                  |     |     |     |            |

|                               |   |              |          |                 |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
|-------------------------------|---|--------------|----------|-----------------|----------|-----------------|-----|-----|---|-----|-----|-----|------|-----|-----|---------|-------|-----|-----|-----|-------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-------|
|                               | <table><tr><td>Case ID</td><td></td><td></td><td>d Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>True</td></tr><tr><td>TC3</td><td>N/F</td><td>N/F</td><td>False</td></tr></table> <ul style="list-style-type: none"><li>○</li></ul>   | Case ID      |          |                 | d Output | TC1             | Y/T | -   | - | TC2 | N/F | Y/T | True | TC3 | N/F | N/F     | False |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| Case ID                       |   |              | d Output |                 |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC1                           | Y/T   | -            | -        |                 |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC2                           | N/F   | Y/T          | True     |                 |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC3                           | N/F   | N/F          | False    |                 |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| SetUniqueListTest.testSublist | <ul style="list-style-type: none"><li>● Conditions<ul style="list-style-type: none"><li>○ C1: L &lt;= 0?</li><li>○ C2: Start index in range?</li><li>○ C3: End index in range?</li></ul></li><li>● Actions<ul style="list-style-type: none"><li>○ A1: Sublist is made</li></ul></li><li>● Table<ul style="list-style-type: none"><li>○<table><tr><td>Test Case ID</td><td>C1</td><td>C2</td><td>C3</td><td>Expected Output</td></tr><tr><td>TC1</td><td>Y/T</td><td>-</td><td>-</td><td>-</td></tr><tr><td>TC2</td><td>N/F</td><td>Y/T</td><td>Y/T</td><td>Sublist</td></tr><tr><td>TC3</td><td>N/F</td><td>Y/T</td><td>N/F</td><td>Error</td></tr><tr><td>TC4</td><td>N/F</td><td>N/F</td><td>Y/T</td><td>Error</td></tr><tr><td>TC5</td><td>N/F</td><td>N/F</td><td>N/F</td><td>Error</td></tr></table></li><li>○</li></ul></li></ul> | Test Case ID | C1       | C2              | C3       | Expected Output | TC1 | Y/T | - | -   | -   | TC2 | N/F  | Y/T | Y/T | Sublist | TC3   | N/F | Y/T | N/F | Error | TC4 | N/F | N/F | Y/T | Error | TC5 | N/F | N/F | N/F | Error |
| Test Case ID                  | C1  | C2           | C3       | Expected Output |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC1                           | Y/T   | -            | -        | -               |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC2                           | N/F   | Y/T          | Y/T      | Sublist         |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC3                           | N/F   | Y/T          | N/F      | Error           |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC4                           | N/F   | N/F          | Y/T      | Error           |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |
| TC5                           | N/F   | N/F          | N/F      | Error           |          |                 |     |     |   |     |     |     |      |     |     |         |       |     |     |     |       |     |     |     |     |       |     |     |     |     |       |

| Test                          | Data Flow Coverage |                        |                 |                 |                      |              |
|-------------------------------|--------------------|------------------------|-----------------|-----------------|----------------------|--------------|
| SetUniqueListTest<br>.testAdd | •                  |                        |                 |                 |                      |              |
|                               |                    | Criterion              | object          | sizeBefore      | Program Paths        | Test Inputs  |
|                               |                    | All-def                | <125, 127, 130> | <127, 130, 133> | <125, 127, 130, 133> | (object = 1) |
|                               |                    | All-use                | <125, 127, 130> | <127, 130, 133> | <125, 127, 130, 133> | (object = 1) |
|                               |                    | All-P-user-some-C-uses | <125, 127, 130> | <127, 130, 133> | <125, 127, 130, 133> | (object = 1) |

|                              |   |                        |                                   |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
|------------------------------|---|------------------------|-----------------------------------|-------------------------------|---|-------------------------|---------------|-----------------|-----------------------------------|----------------------|--------------|-------------------------------|-----------------------------------|---|-------------------------|------------|-----------------------------------|------------------------|------------|------------|-----------------------------------|--------------|------------|------------|-----------------------------------|
|                              | <table><tr><td>All-C-user-some-P-uses</td><td>&lt;125, 127, 130&gt;</td><td>&lt;127, 130, 133&gt;</td><td>&lt;125, 127, 130, 133&gt;</td><td>(object = 1)</td></tr><tr><td>All DU paths</td><td>&lt;125, 127, 130&gt;</td><td>&lt;127, 130, 133&gt;</td><td>&lt;125, 127, 130, 133&gt;</td><td>(object = 1)</td></tr></table>   | All-C-user-some-P-uses | <125, 127, 130>                   | <127, 130, 133>               | <125, 127, 130, 133>                              | (object = 1)            | All DU paths  | <125, 127, 130> | <127, 130, 133>                   | <125, 127, 130, 133> | (object = 1) |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All-C-user-some-P-uses       | <125, 127, 130>   | <127, 130, 133>        | <125, 127, 130, 133>              | (object = 1)                  |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All DU paths                 | <125, 127, 130>   | <127, 130, 133>        | <125, 127, 130, 133>              | (object = 1)                  |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| SetUniqueListTest.testAddAll | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>coll</td><td>Program Paths</td><td>Test Inputs</td></tr><tr><td>All-def</td><td>&lt;170, 171&gt;</td><td>&lt;170, 171&gt;</td><td>(coll = {1, 2, 3, 4, 5, 1, 2, 3})</td></tr><tr><td>All-use</td><td>&lt;170, 171&gt;</td><td>&lt;170, 171&gt;</td><td>(coll = {1, 2, 3, 4, 5, 1, 2, 3})</td></tr><tr><td>All-P-user-some-C-uses</td><td>&lt;170, 171&gt;</td><td>&lt;170, 171&gt;</td><td>(coll = {1, 2, 3, 4, 5, 1, 2, 3})</td></tr><tr><td>All-C-user-some-P-uses</td><td>&lt;170, 171&gt;</td><td>&lt;170, 171&gt;</td><td>(coll = {1, 2, 3, 4, 5, 1, 2, 3})</td></tr><tr><td>All DU paths</td><td>&lt;170, 171&gt;</td><td>&lt;170, 171&gt;</td><td>(coll = {1, 2, 3, 4, 5, 1, 2, 3})</td></tr></table></li></ul> | Criterion              | coll                              | Program Paths                 | Test Inputs                                       | All-def                 | <170, 171>    | <170, 171>      | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) | All-use              | <170, 171>   | <170, 171>                    | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) | All-P-user-some-C-uses                            | <170, 171>              | <170, 171> | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) | All-C-user-some-P-uses | <170, 171> | <170, 171> | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) | All DU paths | <170, 171> | <170, 171> | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) |
| Criterion                    | coll  | Program Paths          | Test Inputs                       |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All-def                      | <170, 171>  | <170, 171>             | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All-use                      | <170, 171>  | <170, 171>             | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All-P-user-some-C-uses       | <170, 171>  | <170, 171>             | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All-C-user-some-P-uses       | <170, 171>  | <170, 171>             | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All DU paths                 | <170, 171>  | <170, 171>             | (coll = {1, 2, 3, 4, 5, 1, 2, 3}) |                               |   |                         |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| SetUniqueListTest.testSet    | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>index</td><td>object</td><td>pos</td><td>removed</td><td>Program Paths</td><td>Test Inputs</td></tr><tr><td>All-def</td><td>&lt;213, 214, 215&gt;</td><td>&lt;213, 214&gt;</td><td>&lt;214, 215, {217, 220}* , 217&gt;</td><td>&lt;215, {217, 220}* , 217, 223&gt;</td><td>&lt;213, 214, 215, {217, 220}* , 217, 223, 224, 226&gt;</td><td>(index = 1, object = 5)</td></tr></table></li></ul>   | Criterion              | index                             | object                        | pos   | removed                 | Program Paths | Test Inputs     | All-def                           | <213, 214, 215>      | <213, 214>   | <214, 215, {217, 220}* , 217> | <215, {217, 220}* , 217, 223>     | <213, 214, 215, {217, 220}* , 217, 223, 224, 226> | (index = 1, object = 5) |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| Criterion                    | index   | object                 | pos                               | removed                       | Program Paths                                     | Test Inputs             |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |
| All-def                      | <213, 214, 215>   | <213, 214>             | <214, 215, {217, 220}* , 217>     | <215, {217, 220}* , 217, 223> | <213, 214, 215, {217, 220}* , 217, 223, 224, 226> | (index = 1, object = 5) |               |                 |                                   |                      |              |                               |                                   |   |                         |            |                                   |                        |            |            |                                   |              |            |            |                                   |

|  |  |                                    |  |   |   |  |   |                                  |
|--|--|------------------------------------|--|---|---|--|---|----------------------------------|
|  |  | All-use                            | <213,<br>214,<br>215><br><213,<br>214,<br>215,<br>{217,<br>220}*<br>217> | <213,<br>214><br><213,<br>214,<br>215><br><213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224> | <214,<br>215,<br>{217,<br>220}*<br>217><br><214,<br>215,<br>{217,<br>220}*> | <215,<br>{217,<br>220}*<br>217,<br>223><br><215,<br>{217,<br>220}*<br>217,<br>223,<br>224,<br>226> | <213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224,<br>226> | (index<br>= 1,<br>object<br>= 5) |
|  |  | All-P-u<br>ser-so<br>me-C-<br>uses | <213,<br>214,<br>215,<br>{217,<br>220}*<br>217>                          | <213,<br>214>   | <214,<br>215,<br>{217,<br>220}*<br>217>                                     | <215,<br>{217,<br>220}*<br>217,<br>223>  | <213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224,<br>226> | (index<br>= 1,<br>object<br>= 5) |
|  |  | All-C-u<br>ser-so<br>me-P-<br>uses | <213,<br>214,<br>215>  | <213,<br>214><br><213,<br>214,<br>215><br><213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224> | <214,<br>215,<br>{217,<br>220}*>  | <215,<br>{217,<br>220}*<br>217,<br>223><br><215,<br>{217,<br>220}*<br>217,<br>223,<br>224,<br>226> | <213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224,<br>226> | (index<br>= 1,<br>object<br>= 5) |
|  |  | All DU<br>paths                    | <213,<br>214,<br>215><br><213,<br>214,<br>215,<br>{217,<br>220}*<br>217> | <213,<br>214><br><213,<br>214,<br>215><br><213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224> | <214,<br>215,<br>{217,<br>220}*<br>217><br><214,<br>215,<br>{217,<br>220}*> | <215,<br>{217,<br>220}*<br>217,<br>223><br><215,<br>{217,<br>220}*<br>217,<br>223,<br>224,         | <213,<br>214,<br>215,<br>{217,<br>220}*<br>217,<br>223,<br>224,<br>226> | (index<br>= 1,<br>object<br>= 5) |

|                                    |  |                                     |                         |   |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
|------------------------------------|--|-------------------------------------|-------------------------|---|---------------|-------------|---------|---------------|--------------------|-------------------------|---|---------|-------------------------------------|-------------------------------------|-------------------------|---|--------------------------------|---------------|--------------------|-------------------------|---------------------------------|--------------------------------|---------------|-------------------------------------|-------------------------|-------------|-----------------|---------------|-------------------------------------|-------------------------|-------------|
|                                    | <table><tr><td></td><td></td><td>223,<br/>224&gt;</td><td></td><td>226&gt;</td><td></td><td></td></tr></table>   |                                     |                         | 223,<br>224>                                |               | 226>        |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
|                                    |  | 223,<br>224>                        |                         | 226>  |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| SetUniqueListTest<br>.testRemove   | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>index</td><td>result</td><td>Program Paths</td><td>Test Inputs</td></tr><tr><td>All-def</td><td>&lt;239,<br/>240&gt;</td><td>&lt;240,<br/>241&gt;</td><td>&lt;239, 240,<br/>241, 242&gt;</td><td>(index = 2)</td></tr><tr><td>All-use</td><td>&lt;239,<br/>240&gt;</td><td>&lt;240,<br/>241&gt;<br/>&lt;240, 241,<br/>242&gt;</td><td>&lt;239, 240,<br/>241, 242&gt;</td><td>(index = 2)</td></tr><tr><td>All-P-user-<br/>some-C-u<br/>ses</td><td>&lt;239,<br/>240&gt;</td><td>&lt;240,<br/>241&gt;</td><td>&lt;239, 240,<br/>241, 242&gt;</td><td>(index = 2)</td></tr><tr><td>All-C-user-<br/>some-P-us<br/>es</td><td>&lt;239,<br/>240&gt;</td><td>&lt;240,<br/>241&gt;<br/>&lt;240, 241,<br/>242&gt;</td><td>&lt;239, 240,<br/>241, 242&gt;</td><td>(index = 2)</td></tr><tr><td>All DU<br/>paths</td><td>&lt;239,<br/>240&gt;</td><td>&lt;240,<br/>241&gt;<br/>&lt;240, 241,<br/>242&gt;</td><td>&lt;239, 240,<br/>241, 242&gt;</td><td>(index = 2)</td></tr></table></li></ul> | Criterion                           | index                   | result                                      | Program Paths | Test Inputs | All-def | <239,<br>240> | <240,<br>241>      | <239, 240,<br>241, 242> | (index = 2)                                 | All-use | <239,<br>240>                       | <240,<br>241><br><240, 241,<br>242> | <239, 240,<br>241, 242> | (index = 2)                                 | All-P-user-<br>some-C-u<br>ses | <239,<br>240> | <240,<br>241>      | <239, 240,<br>241, 242> | (index = 2)                     | All-C-user-<br>some-P-us<br>es | <239,<br>240> | <240,<br>241><br><240, 241,<br>242> | <239, 240,<br>241, 242> | (index = 2) | All DU<br>paths | <239,<br>240> | <240,<br>241><br><240, 241,<br>242> | <239, 240,<br>241, 242> | (index = 2) |
| Criterion                          | index  | result                              | Program Paths           | Test Inputs                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-def                            | <239,<br>240>  | <240,<br>241>                       | <239, 240,<br>241, 242> | (index = 2)                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-use                            | <239,<br>240>  | <240,<br>241><br><240, 241,<br>242> | <239, 240,<br>241, 242> | (index = 2)                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-P-user-<br>some-C-u<br>ses     | <239,<br>240>  | <240,<br>241>                       | <239, 240,<br>241, 242> | (index = 2)                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-C-user-<br>some-P-us<br>es     | <239,<br>240>  | <240,<br>241><br><240, 241,<br>242> | <239, 240,<br>241, 242> | (index = 2)                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All DU<br>paths                    | <239,<br>240>  | <240,<br>241><br><240, 241,<br>242> | <239, 240,<br>241, 242> | (index = 2)                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| SetUniqueListTest<br>.testRemovelf | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>filter</td><td>result</td><td>Program Paths</td><td>Test Inputs</td></tr><tr><td>All-def</td><td>&lt;249,<br/>250&gt;</td><td>&lt;250, 251,<br/>252&gt;</td><td>&lt;249, 250,<br/>251, 252&gt;</td><td>(filter =<br/>(list<br/>element %<br/>2) == 0)</td></tr><tr><td>All-use</td><td>&lt;249,<br/>250&gt;<br/>&lt;249, 250,<br/>251&gt;</td><td>&lt;250, 251,<br/>252&gt;</td><td>&lt;249, 250,<br/>251, 252&gt;</td><td>(filter =<br/>(list<br/>element %<br/>2) == 0)</td></tr><tr><td>All-P-user-<br/>some-C-u<br/>ses</td><td>&lt;249,<br/>250&gt;</td><td>&lt;250, 251,<br/>252&gt;</td><td>&lt;249, 250,<br/>251, 252&gt;</td><td>(filter =<br/>(list<br/>element %</td></tr></table></li></ul>   | Criterion                           | filter                  | result                                      | Program Paths | Test Inputs | All-def | <249,<br>250> | <250, 251,<br>252> | <249, 250,<br>251, 252> | (filter =<br>(list<br>element %<br>2) == 0) | All-use | <249,<br>250><br><249, 250,<br>251> | <250, 251,<br>252>                  | <249, 250,<br>251, 252> | (filter =<br>(list<br>element %<br>2) == 0) | All-P-user-<br>some-C-u<br>ses | <249,<br>250> | <250, 251,<br>252> | <249, 250,<br>251, 252> | (filter =<br>(list<br>element % |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| Criterion                          | filter   | result                              | Program Paths           | Test Inputs                                 |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-def                            | <249,<br>250>  | <250, 251,<br>252>                  | <249, 250,<br>251, 252> | (filter =<br>(list<br>element %<br>2) == 0) |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-use                            | <249,<br>250><br><249, 250,<br>251>  | <250, 251,<br>252>                  | <249, 250,<br>251, 252> | (filter =<br>(list<br>element %<br>2) == 0) |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |
| All-P-user-<br>some-C-u<br>ses     | <249,<br>250>  | <250, 251,<br>252>                  | <249, 250,<br>251, 252> | (filter =<br>(list<br>element %             |               |             |         |               |                    |                         |   |         |                                     |                                     |                         |   |                                |               |                    |                         |                                 |                                |               |                                     |                         |             |                 |               |                                     |                         |             |



|  |  |                        |                               |                 |                      |                                    |
|--|--|------------------------|-------------------------------|-----------------|----------------------|------------------------------------|
|  |  |                        |                               |                 |                      | 2) == 0)                           |
|  |  | All-C-user-some-P-uses | <249, 250><br><249, 250, 251> | <250, 251, 252> | <249, 250, 251, 252> | (filter = (list element % 2) == 0) |
|  |  | All DU paths           | <249, 250><br><249, 250, 251> | <250, 252>      | <249, 250, 251, 252> | (filter = (list element % 2) == 0) |

|                                     |   |                        |                              |  |                         |                                   |                       |
|-------------------------------------|---|------------------------|------------------------------|--|-------------------------|-----------------------------------|-----------------------|
| SetUniqueListTest<br>.testRemoveAll | • | Criterion              | coll                         | result   | name                    | Program Paths                     | Test Inputs           |
|                                     |   | All-def                | <256, 257, {258, 259}*, 258> | <257, {258, 259}*, 258, 259>                                 | <258, {259, 258}*, 259> | <256, 257, {258, 259}*, 258, 261> | (coll = {2, 3, 4, 6}) |
|                                     |   | All-use                | <256, 257, {258, 259}*, 258> | <257, {258, 259}*, 258, 259><br><257, {258, 259}*, 258, 261> | <258, {259, 258}*, 259> | <256, 257, {258, 259}*, 258, 261> | (coll = {2, 3, 4, 6}) |
|                                     |   | All-P-user-some-C-uses | <256, 257, {258, 259}*, 258> | <257, {258, 259}*, 258, 259>                                 | <258, {259, 258}*, 259> | <256, 257, {258, 259}*, 258, 261> | (coll = {2, 3, 4, 6}) |
|                                     |   | All-C-user-some-P-uses | <256, 257, {258, 259}*, 258> | <257, {258, 259}*, 258, 259><br><257, {258, 259}*, 258, 261> | <258, {259, 258}*, 259> | <256, 257, {258, 259}*, 258, 261> | (coll = {2, 3, 4, 6}) |
|                                     |   |                        |                              |  |                         |                                   |                       |

|                                     |   |  |                                      |  |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
|-------------------------------------|---|--|--------------------------------------|--|-----------------------------|-------------|---------|-----------------|--|--|----------------------------------|--|-----------------------------|--|--------------------------------------|-----------------------|--------------------------------|---------------|---------------|--------------------------------------|-----------------------|--------------------------------|---------------|---------------------------------|--------------------------------------|-----------------------|-----------------|---------------|--|--------------------------------------|-----------------------|
|                                     | <table><tr><td></td><td></td><td>259}*,<br/>258,<br/>261&gt;</td><td></td><td></td><td></td></tr><tr><td>All DU<br/>paths</td><td>&lt;256,<br/>257,<br/>{258,<br/>259}*,<br/>258&gt;</td><td>&lt;257,<br/>{258,<br/>259}*,<br/>258,<br/>259&gt;<br/>&lt;257,<br/>{258,<br/>259}*,<br/>258,<br/>261&gt;</td><td>&lt;258,<br/>{259,<br/>258}*,<br/>259&gt;</td><td>&lt;256,<br/>257,<br/>{258,<br/>259}*,<br/>258,<br/>261&gt;</td><td>(coll =<br/>{2, 3, 4,<br/>6})</td></tr></table>  |  |                                      | 259}*,<br>258,<br>261>                           |                             |             |         | All DU<br>paths | <256,<br>257,<br>{258,<br>259}*,<br>258> | <257,<br>{258,<br>259}*,<br>258,<br>259><br><257,<br>{258,<br>259}*,<br>258,<br>261> | <258,<br>{259,<br>258}*,<br>259> | <256,<br>257,<br>{258,<br>259}*,<br>258,<br>261> | (coll =<br>{2, 3, 4,<br>6}) |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
|                                     |   | 259}*,<br>258,<br>261>   |                                      |  |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| All DU<br>paths                     | <256,<br>257,<br>{258,<br>259}*,<br>258>  | <257,<br>{258,<br>259}*,<br>258,<br>259><br><257,<br>{258,<br>259}*,<br>258,<br>261> | <258,<br>{259,<br>258}*,<br>259>     | <256,<br>257,<br>{258,<br>259}*,<br>258,<br>261> | (coll =<br>{2, 3, 4,<br>6}) |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| SetUniqueListTest<br>.testRetainAll | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>coll</td><td>result</td><td>Program<br/>Paths</td><td>Test Inputs</td></tr><tr><td>All-def</td><td>&lt;274,<br/>275&gt;</td><td>&lt;275,<br/>276&gt;</td><td>&lt;274, 275,<br/>276, 279,<br/>281, 285&gt;</td><td>(coll = {1,<br/>5, 7})</td></tr><tr><td>All-use</td><td>&lt;274,<br/>275&gt;</td><td>&lt;275,<br/>276&gt;<br/>&lt;275, 276,<br/>279, 281,<br/>285&gt;</td><td>&lt;274, 275,<br/>276, 279,<br/>281, 285&gt;</td><td>(coll = {1,<br/>5, 7})</td></tr><tr><td>All-P-user-<br/>some-C-u<br/>ses</td><td>&lt;274,<br/>275&gt;</td><td>&lt;275,<br/>276&gt;</td><td>&lt;274, 275,<br/>276, 279,<br/>281, 285&gt;</td><td>(coll = {1,<br/>5, 7})</td></tr><tr><td>All-C-user-<br/>some-P-us<br/>es</td><td>&lt;274,<br/>275&gt;</td><td>&lt;275, 276,<br/>279, 281,<br/>285&gt;</td><td>&lt;274, 275,<br/>276, 279,<br/>281, 285&gt;</td><td>(coll = {1,<br/>5, 7})</td></tr><tr><td>All DU<br/>paths</td><td>&lt;274,<br/>275&gt;</td><td>&lt;275,<br/>276&gt;<br/>&lt;275, 276,<br/>279, 281,<br/>285&gt;</td><td>&lt;274, 275,<br/>276, 279,<br/>281, 285&gt;</td><td>(coll = {1,<br/>5, 7})</td></tr></table></li></ul> | Criterion  | coll                                 | result   | Program<br>Paths            | Test Inputs | All-def | <274,<br>275>   | <275,<br>276>                            | <274, 275,<br>276, 279,<br>281, 285>   | (coll = {1,<br>5, 7})            | All-use  | <274,<br>275>               | <275,<br>276><br><275, 276,<br>279, 281,<br>285> | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7}) | All-P-user-<br>some-C-u<br>ses | <274,<br>275> | <275,<br>276> | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7}) | All-C-user-<br>some-P-us<br>es | <274,<br>275> | <275, 276,<br>279, 281,<br>285> | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7}) | All DU<br>paths | <274,<br>275> | <275,<br>276><br><275, 276,<br>279, 281,<br>285> | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7}) |
| Criterion                           | coll  | result   | Program<br>Paths                     | Test Inputs                                      |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| All-def                             | <274,<br>275>   | <275,<br>276>  | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7})                            |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| All-use                             | <274,<br>275>   | <275,<br>276><br><275, 276,<br>279, 281,<br>285>                                     | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7})                            |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| All-P-user-<br>some-C-u<br>ses      | <274,<br>275>   | <275,<br>276>  | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7})                            |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| All-C-user-<br>some-P-us<br>es      | <274,<br>275>   | <275, 276,<br>279, 281,<br>285>  | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7})                            |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| All DU<br>paths                     | <274,<br>275>   | <275,<br>276><br><275, 276,<br>279, 281,<br>285>                                     | <274, 275,<br>276, 279,<br>281, 285> | (coll = {1,<br>5, 7})                            |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| SetUniqueListTest<br>.testContains  | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>object</td><td>Program<br/>Paths</td><td>Test Inputs</td></tr></table></li></ul>   | Criterion  | object                               | Program<br>Paths                                 | Test Inputs                 |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |
| Criterion                           | object  | Program<br>Paths   | Test Inputs                          |  |                             |             |         |                 |  |  |                                  |  |                             |  |                                      |                       |                                |               |               |                                      |                       |                                |               |                                 |                                      |                       |                 |               |  |                                      |                       |

|                                       |   |               |                 |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
|---------------------------------------|---|---------------|-----------------|---------------|--------------|---------|------------|------------|-----------------|------------------------|------------|------------|-----------------|------------------------|------------|------------|-----------------|------------------------|------------|------------|-----------------|--------------|------------|------------|-----------------|
|                                       | <table><tr><td>All-def</td><td>&lt;295, 296&gt;</td><td>&lt;295, 296&gt;</td><td>(object = 1)</td></tr><tr><td>All-use</td><td>&lt;295, 296&gt;</td><td>&lt;295, 296&gt;</td><td>(object = 1)</td></tr><tr><td>All-P-user-some-C-uses</td><td>&lt;295, 296&gt;</td><td>&lt;295, 296&gt;</td><td>(object = 1)</td></tr><tr><td>All-C-user-some-P-uses</td><td>&lt;295, 296&gt;</td><td>&lt;295, 296&gt;</td><td>(object = 1)</td></tr><tr><td>All DU paths</td><td>&lt;295, 296&gt;</td><td>&lt;295, 296&gt;</td><td>(object = 1)</td></tr></table>  | All-def       | <295, 296>      | <295, 296>    | (object = 1) | All-use | <295, 296> | <295, 296> | (object = 1)    | All-P-user-some-C-uses | <295, 296> | <295, 296> | (object = 1)    | All-C-user-some-P-uses | <295, 296> | <295, 296> | (object = 1)    | All DU paths           | <295, 296> | <295, 296> | (object = 1)    |              |            |            |                 |
| All-def                               | <295, 296>  | <295, 296>    | (object = 1)    |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-use                               | <295, 296>  | <295, 296>    | (object = 1)    |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-P-user-some-C-uses                | <295, 296>  | <295, 296>    | (object = 1)    |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-C-user-some-P-uses                | <295, 296>  | <295, 296>    | (object = 1)    |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All DU paths                          | <295, 296>  | <295, 296>    | (object = 1)    |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| SetUniqueListTest<br>.testContainsAll | <ul style="list-style-type: none"><li><table><tr><td>Criterion</td><td>coll</td><td>Program Paths</td><td>Test Inputs</td></tr><tr><td>All-def</td><td>&lt;300, 301&gt;</td><td>&lt;300, 301&gt;</td><td>(coll = {1, 5})</td></tr><tr><td>All-use</td><td>&lt;300, 301&gt;</td><td>&lt;300, 301&gt;</td><td>(coll = {1, 5})</td></tr><tr><td>All-P-user-some-C-uses</td><td>&lt;300, 301&gt;</td><td>&lt;300, 301&gt;</td><td>(coll = {1, 5})</td></tr><tr><td>All-C-user-some-P-uses</td><td>&lt;300, 301&gt;</td><td>&lt;300, 301&gt;</td><td>(coll = {1, 5})</td></tr><tr><td>All DU paths</td><td>&lt;300, 301&gt;</td><td>&lt;300, 301&gt;</td><td>(coll = {1, 5})</td></tr></table></li></ul> | Criterion     | coll            | Program Paths | Test Inputs  | All-def | <300, 301> | <300, 301> | (coll = {1, 5}) | All-use                | <300, 301> | <300, 301> | (coll = {1, 5}) | All-P-user-some-C-uses | <300, 301> | <300, 301> | (coll = {1, 5}) | All-C-user-some-P-uses | <300, 301> | <300, 301> | (coll = {1, 5}) | All DU paths | <300, 301> | <300, 301> | (coll = {1, 5}) |
| Criterion                             | coll  | Program Paths | Test Inputs     |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-def                               | <300, 301>  | <300, 301>    | (coll = {1, 5}) |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-use                               | <300, 301>  | <300, 301>    | (coll = {1, 5}) |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-P-user-some-C-uses                | <300, 301>  | <300, 301>    | (coll = {1, 5}) |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All-C-user-some-P-uses                | <300, 301>  | <300, 301>    | (coll = {1, 5}) |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |
| All DU paths                          | <300, 301>  | <300, 301>    | (coll = {1, 5}) |               |              |         |            |            |                 |                        |            |            |                 |                        |            |            |                 |                        |            |            |                 |              |            |            |                 |