

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

**Red Highlight** = Impossible Test Case

| Test                                           | Category Partition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------|----|--------|--------|---------------------|--------|---------------------|---------------------|-----|-------|-----------------------|-----|-----|----------------------|-----|-------|---------|----|--|--|-----|---|----------------------------------------|-----|----|--------------------------------------|----|--|--|-----|--------------------------|--------------------------------------------------------------------------------------------------|-----|----------------------------|---------------------------------|-----|---------------------------|------------------------------------------------|
| FilterGradesTest<br>.testFilterByValueLessThan | Categories: <ul style="list-style-type: none"><li>List length L</li><li>Grade value V</li><li>Number of existing grades fitting the filter G</li></ul> Test frames:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | <table><tr><td>V:</td><td></td><td></td></tr><tr><td>V1)</td><td>&lt; 0</td><td>[error]</td></tr><tr><td>V2)</td><td>0</td><td>[property nogrades]</td></tr><tr><td>V3)</td><td>1-100</td><td>[property somegrades]</td></tr><tr><td>V4)</td><td>101</td><td>[property allgrades]</td></tr><tr><td>V5)</td><td>&gt; 101</td><td>[error]</td></tr><tr><td>L:</td><td></td><td></td></tr><tr><td>L1)</td><td>0</td><td>[if not error, property nogradesexist]</td></tr><tr><td>L2)</td><td>&gt;0</td><td>[if not error, property gradesexist]</td></tr><tr><td>G:</td><td></td><td></td></tr><tr><td>G1)</td><td>No grades fit the filter</td><td>[if (gradesexist and (nogrades or somegrades)) or (nogradesexist and (somegrades or allgrades))]</td></tr><tr><td>G2)</td><td>Some grades fit the filter</td><td>[if gradesexist and somegrades]</td></tr><tr><td>G3)</td><td>All grades fit the filter</td><td>[if gradesexist and (somegrades or allgrades)]</td></tr></table> | V:                         |                                                                                                  |    | V1)    | < 0    | [error]             | V2)    | 0                   | [property nogrades] | V3) | 1-100 | [property somegrades] | V4) | 101 | [property allgrades] | V5) | > 101 | [error] | L: |  |  | L1) | 0 | [if not error, property nogradesexist] | L2) | >0 | [if not error, property gradesexist] | G: |  |  | G1) | No grades fit the filter | [if (gradesexist and (nogrades or somegrades)) or (nogradesexist and (somegrades or allgrades))] | G2) | Some grades fit the filter | [if gradesexist and somegrades] | G3) | All grades fit the filter | [if gradesexist and (somegrades or allgrades)] |
|                                                | V:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | < 0                        | [error]                                                                                          |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0                          | [property nogrades]                                                                              |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1-100                      | [property somegrades]                                                                            |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 101                        | [property allgrades]                                                                             |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | > 101                      | [error]                                                                                          |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | L:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | L1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0                          | [if not error, property nogradesexist]                                                           |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | L2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | >0                         | [if not error, property gradesexist]                                                             |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | G:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | G1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No grades fit the filter   | [if (gradesexist and (nogrades or somegrades)) or (nogradesexist and (somegrades or allgrades))] |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | G2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Some grades fit the filter | [if gradesexist and somegrades]                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | G3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All grades fit the filter  | [if gradesexist and (somegrades or allgrades)]                                                   |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | Test cases:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | <table><tr><th>Test Case ID</th><th>Variable values</th></tr><tr><td>V1</td><td>V = -1</td></tr><tr><td>V2L1G1</td><td>V = 0, L = 0, G = 0</td></tr><tr><td>V2L2G1</td><td>V = 0, L = 5, G = 0</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Test Case ID               | Variable values                                                                                  | V1 | V = -1 | V2L1G1 | V = 0, L = 0, G = 0 | V2L2G1 | V = 0, L = 5, G = 0 |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | Test Case ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Variable values            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | V = -1                     |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                | V2L1G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | V = 0, L = 0, G = 0        |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| V2L2G1                                         | V = 0, L = 5, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                                                                                                  |    |        |        |                     |        |                     |                     |     |       |                       |     |     |                      |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |

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|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----|--|--|-----|------|---------|-----|----|----------------------|-----|------|-----------------------|-----|-----|---------------------|-----|-------|---------|----|--|--|-----|---|----------------------------------------|-----|----|--------------------------------------|----|--|--|-----|--------------------------|--------------------------------------------------------------------------------------------------|-----|----------------------------|---------------------------------|-----|---------------------------|------------------------------------------------|
|                                                   | V3L1G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | V = 50, L = 0, G = 0                                                                             |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                   | V3L2G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | V = 20, L = 5, G = 0                                                                             |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                   | V3L2G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | V = 85, L = 5, G = 3                                                                             |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                   | V3L2G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | V = 98, L = 5, G = 5                                                                             |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                   | V4L1G1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | V = 101, L = 0, G = 0                                                                            |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                   | V4L2G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | V = 101, L = 5, G = 5                                                                            |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
|                                                   | V5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V = 102                                                                                          |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| FilterGradesTest<br>.testFilterByValueGreaterThan | <p>Categories:</p> <ul style="list-style-type: none"> <li>List length L</li> <li>Grade value V</li> <li>Number of existing grades fitting the filter G</li> </ul> <p>Test frames:</p> <table> <tr> <td>V:</td><td></td><td></td></tr> <tr> <td>V1)</td><td>&lt; -1</td><td>[error]</td></tr> <tr> <td>V2)</td><td>-1</td><td>[property allgrades]</td></tr> <tr> <td>V3)</td><td>0-99</td><td>[property somegrades]</td></tr> <tr> <td>V4)</td><td>100</td><td>[property nogrades]</td></tr> <tr> <td>V5)</td><td>&gt; 100</td><td>[error]</td></tr> <tr> <td>L:</td><td></td><td></td></tr> <tr> <td>L1)</td><td>0</td><td>[if not error, property nogradesexist]</td></tr> <tr> <td>L2)</td><td>&gt;0</td><td>[if not error, property gradesexist]</td></tr> <tr> <td>G:</td><td></td><td></td></tr> <tr> <td>G1)</td><td>No grades fit the filter</td><td>[if (gradesexist and (nogrades or somegrades)) or (nogradesexist and (somegrades or allgrades))]</td></tr> <tr> <td>G2)</td><td>Some grades fit the filter</td><td>[if gradesexist and somegrades]</td></tr> <tr> <td>G3)</td><td>All grades fit the filter</td><td>[if gradesexist and (somegrades or allgrades)]</td></tr> </table> |                                                                                                  | V: |  |  | V1) | < -1 | [error] | V2) | -1 | [property allgrades] | V3) | 0-99 | [property somegrades] | V4) | 100 | [property nogrades] | V5) | > 100 | [error] | L: |  |  | L1) | 0 | [if not error, property nogradesexist] | L2) | >0 | [if not error, property gradesexist] | G: |  |  | G1) | No grades fit the filter | [if (gradesexist and (nogrades or somegrades)) or (nogradesexist and (somegrades or allgrades))] | G2) | Some grades fit the filter | [if gradesexist and somegrades] | G3) | All grades fit the filter | [if gradesexist and (somegrades or allgrades)] |
| V:                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| V1)                                               | < -1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | [error]                                                                                          |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| V2)                                               | -1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | [property allgrades]                                                                             |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| V3)                                               | 0-99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | [property somegrades]                                                                            |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| V4)                                               | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | [property nogrades]                                                                              |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| V5)                                               | > 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [error]                                                                                          |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| L:                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| L1)                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | [if not error, property nogradesexist]                                                           |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| L2)                                               | >0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | [if not error, property gradesexist]                                                             |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| G:                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                  |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| G1)                                               | No grades fit the filter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | [if (gradesexist and (nogrades or somegrades)) or (nogradesexist and (somegrades or allgrades))] |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| G2)                                               | Some grades fit the filter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | [if gradesexist and somegrades]                                                                  |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |
| G3)                                               | All grades fit the filter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | [if gradesexist and (somegrades or allgrades)]                                                   |    |  |  |     |      |         |     |    |                      |     |      |                       |     |     |                     |     |       |         |    |  |  |     |   |                                        |     |    |                                      |    |  |  |     |                          |                                                                                                  |     |                            |                                 |     |                           |                                                |

|                                               | <p>Test cases:</p> <table><tr><th>Test Case ID</th><th>Variable values</th></tr><tr><td>V1</td><td>V = -2</td></tr><tr><td>V2L1G1</td><td>V = -1, L = 0, G = 0</td></tr><tr><td>V2L2G3</td><td>V = -1, L = 5, G = 5</td></tr><tr><td>V3L1G1</td><td>V = 89, L = 0, G = 0</td></tr><tr><td>V3L2G1</td><td>V = 98, L = 5, G = 0</td></tr><tr><td>V3L2G2</td><td>V = 89, L = 5, G = 2</td></tr><tr><td>V3L2G3</td><td>V = 20, L = 5, G = 5</td></tr><tr><td>V4L1G1</td><td>V = 100, L = 0, G = 0</td></tr><tr><td>V4L2G1</td><td>V = 100, L = 5, G = 0</td></tr><tr><td>V5</td><td>V = 101</td></tr></table>                                                                                                                                           | Test Case ID                           | Variable values | V1 | V = -2 | V2L1G1 | V = -1, L = 0, G = 0 | V2L2G3 | V = -1, L = 5, G = 5 | V3L1G1                | V = 89, L = 0, G = 0 | V3L2G1 | V = 98, L = 5, G = 0 | V3L2G2 | V = 89, L = 5, G = 2 | V3L2G3 | V = 20, L = 5, G = 5 | V4L1G1 | V = 100, L = 0, G = 0                  | V4L2G1 | V = 100, L = 5, G = 0 | V5                                   | V = 101 |  |  |     |                   |                                  |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------|----|--------|--------|----------------------|--------|----------------------|-----------------------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------------------------|--------|-----------------------|--------------------------------------|---------|--|--|-----|-------------------|----------------------------------|
| Test Case ID                                  | Variable values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V1                                            | V = -2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V2L1G1                                        | V = -1, L = 0, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V2L2G3                                        | V = -1, L = 5, G = 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V3L1G1                                        | V = 89, L = 0, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V3L2G1                                        | V = 98, L = 5, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V3L2G2                                        | V = 89, L = 5, G = 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V3L2G3                                        | V = 20, L = 5, G = 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V4L1G1                                        | V = 100, L = 0, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V4L2G1                                        | V = 100, L = 5, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V5                                            | V = 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| FilterGradesTest<br>.testFilterByValueEqualTo | <p>Categories:</p> <ul style="list-style-type: none"><li>List length L</li><li>Grade value V</li><li>Number of existing grades fitting the filter G</li></ul> <p>Test frames:</p> <table><tr><td>V:</td><td></td><td></td></tr><tr><td>V1)</td><td>&lt; 0</td><td>[error]</td></tr><tr><td>V2)</td><td>0-99</td><td>[property somegrades]</td></tr><tr><td>V3)</td><td>&gt; 100</td><td>[error]</td></tr><tr><td>L:</td><td></td><td></td></tr><tr><td>L1)</td><td>0</td><td>[if not error, property nogradesexist]</td></tr><tr><td>L2)</td><td>&gt;0</td><td>[if not error, property gradesexist]</td></tr><tr><td>G:</td><td></td><td></td></tr><tr><td>G1)</td><td>No grades fit the</td><td>[if nogradesexist or somegrades]</td></tr></table> | V:                                     |                 |    | V1)    | < 0    | [error]              | V2)    | 0-99                 | [property somegrades] | V3)                  | > 100  | [error]              | L:     |                      |        | L1)                  | 0      | [if not error, property nogradesexist] | L2)    | >0                    | [if not error, property gradesexist] | G:      |  |  | G1) | No grades fit the | [if nogradesexist or somegrades] |
| V:                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V1)                                           | < 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | [error]                                |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V2)                                           | 0-99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | [property somegrades]                  |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| V3)                                           | > 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | [error]                                |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| L:                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| L1)                                           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | [if not error, property nogradesexist] |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| L2)                                           | >0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | [if not error, property gradesexist]   |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| G:                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |
| G1)                                           | No grades fit the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | [if nogradesexist or somegrades]       |                 |    |        |        |                      |        |                      |                       |                      |        |                      |        |                      |        |                      |        |                                        |        |                       |                                      |         |  |  |     |                   |                                  |

|        |                                                                                                                                                                                                                                                                                                                                                                  |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|--------------|-----------------|----|--------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|----|---------|
|        |                                                                                                                                                                                                                                                                                                                                                                  | filter                     |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | G2)                                                                                                                                                                                                                                                                                                                                                              | Some grades fit the filter | [if gradesexist and somegrades] |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | G3)                                                                                                                                                                                                                                                                                                                                                              | All grades fit the filter  | [if gradesexist and somegrades] |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | Test cases:                                                                                                                                                                                                                                                                                                                                                      |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | <table><tr><td>Test Case ID</td><td>Variable values</td></tr><tr><td>V1</td><td>V = -1</td></tr><tr><td>V2L1G1</td><td>V = 90, L = 0, G = 0</td></tr><tr><td>V2L2G1</td><td>V = 50, L = 5, G = 0</td></tr><tr><td>V2L2G2</td><td>V = 90, L = 5, G = 1</td></tr><tr><td>V2L2G3</td><td>V = 90, L = 5, G = 5</td></tr><tr><td>V3</td><td>V = 101</td></tr></table> |                            |                                 | Test Case ID | Variable values | V1 | V = -1 | V2L1G1 | V = 90, L = 0, G = 0 | V2L2G1 | V = 50, L = 5, G = 0 | V2L2G2 | V = 90, L = 5, G = 1 | V2L2G3 | V = 90, L = 5, G = 5 | V3 | V = 101 |
|        | Test Case ID                                                                                                                                                                                                                                                                                                                                                     | Variable values            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | V1                                                                                                                                                                                                                                                                                                                                                               | V = -1                     |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | V2L1G1                                                                                                                                                                                                                                                                                                                                                           | V = 90, L = 0, G = 0       |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | V2L2G1                                                                                                                                                                                                                                                                                                                                                           | V = 50, L = 5, G = 0       |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        | V2L2G2                                                                                                                                                                                                                                                                                                                                                           | V = 90, L = 5, G = 1       |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
| V2L2G3 | V = 90, L = 5, G = 5                                                                                                                                                                                                                                                                                                                                             |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
| V3     | V = 101                                                                                                                                                                                                                                                                                                                                                          |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        |                                                                                                                                                                                                                                                                                                                                                                  |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        |                                                                                                                                                                                                                                                                                                                                                                  |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        |                                                                                                                                                                                                                                                                                                                                                                  |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        |                                                                                                                                                                                                                                                                                                                                                                  |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |
|        |                                                                                                                                                                                                                                                                                                                                                                  |                            |                                 |              |                 |    |        |        |                      |        |                      |        |                      |        |                      |    |         |

|                                           |                                                                                                                                            |                                  |                                        |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------|
| FilterGradesTest<br>.testFilterByCategory | Categories:                                                                                                                                |                                  |                                        |
|                                           | <ul style="list-style-type: none"><li>List length L</li><li>Grade value V</li><li>Number of existing grades fitting the filter G</li></ul> |                                  |                                        |
|                                           | Test frames:                                                                                                                               |                                  |                                        |
|                                           | V:                                                                                                                                         |                                  |                                        |
|                                           | V1)                                                                                                                                        | Not existent in possible grades  | [error]                                |
|                                           | V2)                                                                                                                                        | Existent in possible grades      | [validgrade]                           |
|                                           | L:                                                                                                                                         |                                  |                                        |
|                                           | L1)                                                                                                                                        | 0                                | [if not error, property nogradesexist] |
|                                           | L2)                                                                                                                                        | >0                               | [if not error, property gradesexist]   |
|                                           | G:                                                                                                                                         |                                  |                                        |
| G1)                                       | No grades fit the                                                                                                                          | [if nogradesexist or validgrade] |                                        |

|                                                   |                                                                                                                                                      |                                   |                                        |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------|
|                                                   |                                                                                                                                                      | filter                            |                                        |
|                                                   | G2)                                                                                                                                                  | Some grades fit the filter        | [if gradesexist and validgrade]        |
|                                                   | G3)                                                                                                                                                  | All grades fit the filter         | [if gradesexist and validgrade]        |
|                                                   | Test cases:                                                                                                                                          |                                   |                                        |
|                                                   | Test Case ID                                                                                                                                         | Variable values                   |                                        |
|                                                   | V1                                                                                                                                                   | V = 'X'                           |                                        |
|                                                   | V2L1G1                                                                                                                                               | V = 'A', L = 0, G = 0             |                                        |
|                                                   | V2L2G1                                                                                                                                               | V = 'F', L = 5, G = 0             |                                        |
|                                                   | V2L2G2                                                                                                                                               | V = 'A', L = 5, G = 2             |                                        |
|                                                   | V2L2G3                                                                                                                                               | V = 'A', L = 5, G = 5             |                                        |
| FilterGradesTest<br>.testFilterByOccurrencesScore | Categories:                                                                                                                                          |                                   |                                        |
|                                                   | <ul style="list-style-type: none"><li>List length L</li><li>Number of occurrences N</li><li>Number of existing grades fitting the filter G</li></ul> |                                   |                                        |
|                                                   | Test frames:                                                                                                                                         |                                   |                                        |
|                                                   | N:                                                                                                                                                   |                                   |                                        |
|                                                   | N1)                                                                                                                                                  | N < 1                             | [error]                                |
|                                                   | N2)                                                                                                                                                  | N > 1 && N <= L                   | [validnumber]                          |
|                                                   | N3)                                                                                                                                                  | N > L                             | [error]                                |
|                                                   | L:                                                                                                                                                   |                                   |                                        |
|                                                   | L1)                                                                                                                                                  | 0                                 | [if not error, property nogradesexist] |
|                                                   | L2)                                                                                                                                                  | >0                                | [if not error, property gradesexist]   |
| G:                                                |                                                                                                                                                      |                                   |                                        |
| G1)                                               | No grades fit the filter                                                                                                                             | [if nogradesexist or validnumber] |                                        |

|                                                                                                                                                      |                                                   |                                   |                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------|----------------------------------------|
|                                                                                                                                                      | G2)                                               | Some grades fit the filter        | [if gradesexist and validnumber]       |
|                                                                                                                                                      | G3)                                               | All grades fit the filter         | [if gradesexist and validnumber]       |
|                                                                                                                                                      | Test cases:                                       |                                   |                                        |
|                                                                                                                                                      | Test Case ID                                      | Variable values                   |                                        |
|                                                                                                                                                      | N1                                                | N = -1                            |                                        |
|                                                                                                                                                      | N2L1G1                                            | N = 1, L = 0, G = 0               |                                        |
|                                                                                                                                                      | N2L2G1                                            | N = 2, L = 5, G = 0               |                                        |
|                                                                                                                                                      | N2L2G2                                            | N = 1, L = 5, G = 5               |                                        |
|                                                                                                                                                      | N2L2G3                                            | N = 5, L = 5, G = 5               |                                        |
|                                                                                                                                                      | FilterGradesTest<br>.testFilterByOccurrencesGrade | Categories:                       |                                        |
| <ul style="list-style-type: none"><li>List length L</li><li>Number of occurrences N</li><li>Number of existing grades fitting the filter G</li></ul> |                                                   |                                   |                                        |
| Test frames:                                                                                                                                         |                                                   |                                   |                                        |
| N:                                                                                                                                                   |                                                   |                                   |                                        |
| N1)                                                                                                                                                  |                                                   | N < 1                             | [error]                                |
| N2)                                                                                                                                                  |                                                   | N > 1 && N <= L                   | [validnumber]                          |
| N3)                                                                                                                                                  |                                                   | N > L                             | [error]                                |
| L:                                                                                                                                                   |                                                   |                                   |                                        |
| L1)                                                                                                                                                  |                                                   | 0                                 | [if not error, property nogradesexist] |
| L2)                                                                                                                                                  |                                                   | >0                                | [if not error, property gradesexist]   |
| G:                                                                                                                                                   |                                                   |                                   |                                        |
| G1)                                                                                                                                                  | No grades fit the filter                          | [if nogradesexist or validnumber] |                                        |
| G2)                                                                                                                                                  | Some grades fit the filter                        | [if gradesexist and validnumber]  |                                        |

|                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------|----------------------------------|--------------|-----------------|----------------------------------------|--------|--------|--------------------------------------|--------------|---------------------|--------|---------------------|--------|---------------------|----|-------|
|                                                              | <table><tr><td>G3)</td><td>All grades fit the filter</td><td>[if gradesexist and validnumber]</td></tr></table> <p>Test cases:</p> <table><tr><td>Test Case ID</td><td>Variable values</td></tr><tr><td>N1</td><td>N = -1</td></tr><tr><td>N2L1G1</td><td>N = 1, L = 0, G = 0</td></tr><tr><td>N2L2G1</td><td>N = 3, L = 5, G = 0</td></tr><tr><td>N2L2G2</td><td>N = 2, L = 5, G = 2</td></tr><tr><td>N2L2G3</td><td>N = 5, L = 5, G = 5</td></tr><tr><td>N3</td><td>N = 6</td></tr></table> | G3)                                    | All grades fit the filter | [if gradesexist and validnumber] | Test Case ID | Variable values | N1                                     | N = -1 | N2L1G1 | N = 1, L = 0, G = 0                  | N2L2G1       | N = 3, L = 5, G = 0 | N2L2G2 | N = 2, L = 5, G = 2 | N2L2G3 | N = 5, L = 5, G = 5 | N3 | N = 6 |
| G3)                                                          | All grades fit the filter                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | [if gradesexist and validnumber]       |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| Test Case ID                                                 | Variable values                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| N1                                                           | N = -1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| N2L1G1                                                       | N = 1, L = 0, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| N2L2G1                                                       | N = 3, L = 5, G = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| N2L2G2                                                       | N = 2, L = 5, G = 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| N2L2G3                                                       | N = 5, L = 5, G = 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| N3                                                           | N = 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| FilterGradesTest<br>.testShowResults                         | <p>Categories:</p> <ul style="list-style-type: none"><li>List length L</li></ul> <p>Test frames:</p> <table><tr><td>L:</td><td></td><td></td></tr><tr><td>L1)</td><td>0</td><td>[if not error, property nogradesexist]</td></tr><tr><td>L2)</td><td>&gt;0</td><td>[if not error, property gradesexist]</td></tr></table> <p>Test cases:</p> <table><tr><td>Test Case ID</td><td>Variable values</td></tr><tr><td>L1</td><td>L = 0</td></tr><tr><td>L2</td><td>L = 5</td></tr></table>         | L:                                     |                           |                                  | L1)          | 0               | [if not error, property nogradesexist] | L2)    | >0     | [if not error, property gradesexist] | Test Case ID | Variable values     | L1     | L = 0               | L2     | L = 5               |    |       |
| L:                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| L1)                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | [if not error, property nogradesexist] |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| L2)                                                          | >0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | [if not error, property gradesexist]   |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| Test Case ID                                                 | Variable values                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| L1                                                           | L = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| L2                                                           | L = 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |
| FilterGradesTest<br>.testNumOccurrencesDoubleList<br>OfGrade | <p>Categories:</p> <ul style="list-style-type: none"><li>List length L</li><li>Grade value to find occurrences of V</li><li>Number of existing grades fitting the filter G</li></ul> <p>Test frames:</p>                                                                                                                                                                                                                                                                                      |                                        |                           |                                  |              |                 |                                        |        |        |                                      |              |                     |        |                     |        |                     |    |       |

|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------|--------------|-----------------|----|----------|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|----|-----------|
|                                                                | V:                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V1)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $V < 0$                  | [error]                                |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V2)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $0 \leq V \leq 100$      | [validvalue]                           |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V3)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $V > 100$                | [error]                                |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | L:                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | L1)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                        | [if not error, property nogradesexist] |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | L2)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | >0                       | [if not error, property gradesexist]   |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | G:                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | G1)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No occurrences found     | [if nogradesexist or validvalue]       |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | G2)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Some occurrences found   | [if gradesexist and validvalue]        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | G3)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Max occurrences found    | [if gradesexist and validvalue]        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | Test cases:                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | <table><tr><td>Test Case ID</td><td>Variable values</td></tr><tr><td>V1</td><td><math>V = -1</math></td></tr><tr><td>V2L1G1</td><td><math>V = 90.1, L = 0, G = 0</math></td></tr><tr><td>V2L2G1</td><td><math>V = 85.0, L = 5, G = 0</math></td></tr><tr><td>V2L2G2</td><td><math>V = 90.1, L = 5, G = 1</math></td></tr><tr><td>V2L2G3</td><td><math>V = 90.1, L = 5, G = 5</math></td></tr><tr><td>V3</td><td><math>V = 101</math></td></tr></table> |                          |                                        | Test Case ID | Variable values | V1 | $V = -1$ | V2L1G1 | $V = 90.1, L = 0, G = 0$ | V2L2G1 | $V = 85.0, L = 5, G = 0$ | V2L2G2 | $V = 90.1, L = 5, G = 1$ | V2L2G3 | $V = 90.1, L = 5, G = 5$ | V3 | $V = 101$ |
|                                                                | Test Case ID                                                                                                                                                                                                                                                                                                                                                                                                                                           | Variable values          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V1                                                                                                                                                                                                                                                                                                                                                                                                                                                     | $V = -1$                 |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V2L1G1                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $V = 90.1, L = 0, G = 0$ |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V2L2G1                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $V = 85.0, L = 5, G = 0$ |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V2L2G2                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $V = 90.1, L = 5, G = 1$ |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                | V2L2G3                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $V = 90.1, L = 5, G = 5$ |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
| V3                                                             | $V = 101$                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |
| FilterGradesTest<br>.testNumOccurencesCharacterList<br>OfGrade | Categories: <ul style="list-style-type: none"><li>List length L</li><li>Grade to find occurrences of V</li><li>Number of existing grades fitting the filter G</li></ul> Test frames:                                                                                                                                                                                                                                                                   |                          |                                        |              |                 |    |          |        |                          |        |                          |        |                          |        |                          |    |           |



|     |                                 |                                        |
|-----|---------------------------------|----------------------------------------|
| V:  |                                 |                                        |
| V1) | Not existent in possible grades | [error]                                |
| V2) | Existent in possible grades     | [validvalue]                           |
| L:  |                                 |                                        |
| L1) | 0                               | [if not error, property nogradesexist] |
| L2) | >0                              | [if not error, property gradesexist]   |
| G:  |                                 |                                        |
| G1) | No occurrences found            | [if nogradesexist or validvalue]       |
| G2) | Some occurrences found          | [if gradesexist and validvalue]        |
| G3) | Max occurrences found           | [if gradesexist and validvalue]        |

Test cases:

| Test Case ID | Variable values       |
|--------------|-----------------------|
| V1           | V = -1                |
| V2L1G1       | V = 'A', L = 0, G = 0 |
| V2L2G1       | V = 'F', L = 5, G = 0 |
| V2L2G2       | V = 'A', L = 5, G = 2 |
| V2L2G3       | V = 'A', L = 5, G = 5 |

### Test cases:

| Test Case ID | Variable values       |
|--------------|-----------------------|
| V1           | V = -1                |
| V2L1G1       | V = 'A', L = 0, G = 0 |
| V2L2G1       | V = 'F', L = 5, G = 0 |
| V2L2G2       | V = 'A', L = 5, G = 2 |
| V2L2G3       | V = 'A', L = 5, G = 5 |

|                     |                                                                                                                                                                                                                                       |          |            |        |         |           |        |      |           |          |            |        |         |           |        |      |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|--------|---------|-----------|--------|------|-----------|----------|------------|--------|---------|-----------|--------|------|
| Test                | Data Flow Coverage                                                                                                                                                                                                                    |          |            |        |         |           |        |      |           |          |            |        |         |           |        |      |
| Filter Grade sTest. | <ul style="list-style-type: none"> <li> <table border="1"> <tr> <td>Criterion</td> <td>listToMa</td> <td>filtervalu</td> <td>filter</td> <td>emptyLi</td> <td>resultLis</td> <td>Progra</td> <td>Test</td> </tr> </table> </li> </ul> |          |            |        |         |           |        |      | Criterion | listToMa | filtervalu | filter | emptyLi | resultLis | Progra | Test |
|                     | Criterion                                                                                                                                                                                                                             | listToMa | filtervalu | filter | emptyLi | resultLis | Progra | Test |           |          |            |        |         |           |        |      |

|                           |                        |                                                                                                              |            |                 |            |                                                                                       |                                                       |                                                                                 |
|---------------------------|------------------------|--------------------------------------------------------------------------------------------------------------|------------|-----------------|------------|---------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------|
| testFilterByValueLessThan | n                      | nipulate                                                                                                     | e          |                 | st         | t                                                                                     | m Paths                                               | Inputs                                                                          |
|                           | All-def                | <254, 256, 258, 260, {262, 264, 266, 268}* 262>                                                              | <254, 256> | <256, 258, 260> | <258, 260> | <260, {262, 264, 266, 268}*, 262, 264, 266>                                           | <254, 256, 258, 260, {262, 264, 266, 268}*, 262, 274> | (listToManipulate = {grade1, grade2, grade3, grade4, grade5}, filterValue = 85) |
|                           | All-use                | <254, 256, 258, 260, {262, 264, 266, 268}* 262><br><254, 256, 258, 260, {262, 264, 266, 268}* 262, 264, 266> | <254, 256> | <256, 258, 260> | <258, 260> | <260, {262, 264, 266, 268}*, 262, 264, 266><br><260, {262, 264, 266, 268}*, 262, 274> | <254, 256, 258, 260, {262, 264, 266, 268}*, 262, 274> | (listToManipulate = {grade1, grade2, grade3, grade4, grade5}, filterValue = 85) |
|                           | All-P-user-some-C-uses | <254, 256, 258, 260, {262, 264, 266, 268}* 262>                                                              | <254, 256> | <256, 258, 260> | <258, 260> | <260, {262, 264, 266, 268}*, 262, 264, 266>                                           | <254, 256, 258, 260, {262, 264, 266, 268}*, 262, 274> | (listToManipulate = {grade1, grade2, grade3, grade4, grade5}, filterValue = 85) |
|                           | All-C-user-some-P-uses | <254, 256, 258, 260,                                                                                         | <254, 256> | <256, 258, 260> | <258, 260> | <260, {262, 264, 266,                                                                 | <254, 256, 258, 260,                                  | (listToManipulate = {grade1,                                                    |

|                                                        |                                                    |                                                                                                                    |             |                 |            |                                                                                             |                                                          |                                                                                    |
|--------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------|-----------------|------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                        |                                                    | {262, 264, 266, 268}*<br>262><br><254, 256, 258, 260, {262, 264, 266, 268}*<br>262, 264, 266>                      |             |                 |            | 268}*,<br>262, 264, 266><br><260, {262, 264, 266, 268}*,<br>262, 274>                       | {262, 264, 266, 268}*,<br>262, 274>                      | grade2, grade3, grade4, grade5},<br>filterValue = 85)                              |
|                                                        | All DU paths                                       | <254, 256, 258, 260, {262, 264, 266, 268}*<br>262><br><254, 256, 258, 260, {262, 264, 266, 268}*<br>262, 264, 266> | <254, 256>  | <256, 258, 260> | <258, 260> | <260, {262, 264, 266, 268}*,<br>262, 264, 266><br><260, {262, 264, 266, 268}*,<br>262, 274> | <254, 256, 258, 260, {262, 264, 266, 268}*,<br>262, 274> | (listToManipulate = {grade1, grade2, grade3, grade4, grade5},<br>filterValue = 85) |
| Filter GradesTest.<br>testFilterByValue<br>GreaterThan | <ul style="list-style-type: none"> <li></li> </ul> |                                                                                                                    |             |                 |            |                                                                                             |                                                          |                                                                                    |
|                                                        | Criterion                                          | listToManipulate                                                                                                   | filtervalue | filter          | emptyList  | resultList                                                                                  | Program Paths                                            | Test Inputs                                                                        |
|                                                        | All-def                                            | <277, 279, 281, 283, {285,                                                                                         | <277, 279>  | <279, 281, 283> | <281, 283> | <283, {285, 287, 289, 291}*,                                                                | <277, 279, 281, 283, {285,                               | (listToManipulate = {grade1,                                                       |

|  |                                |                                                                                                                                                                    |               |                       |               |                                                                                                                            |                                                                                 |                                                                                                                          |
|--|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|  |                                | 287,<br>289,<br>291}*<br>285>                                                                                                                                      |               |                       |               | 285,<br>287,<br>289>                                                                                                       | 287,<br>289,<br>291}*<br>285,<br>297>                                           | grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>89)                                                |
|  | All-use                        | <277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285><br><277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>287,<br>289> | <277,<br>279> | <279,<br>281,<br>283> | <281,<br>283> | <283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>287,<br>289><br><283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>297> | <277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>297> | (listToM<br>anipulat<br>e =<br>{grade1<br>,<br>grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>89) |
|  | All-P-us<br>er-some<br>-C-uses | <277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285>                                                                                            | <277,<br>279> | <279,<br>281,<br>283> | <281,<br>283> | <283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>287,<br>289>                                                            | <277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>297> | (listToM<br>anipulat<br>e =<br>{grade1<br>,<br>grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>89) |
|  | All-C-us<br>er-some<br>-P-uses | <277,<br>279,<br>281,<br>283,<br>{285,                                                                                                                             | <277,<br>279> | <279,<br>281,<br>283> | <281,<br>283> | <283,<br>{285,<br>287,<br>289,<br>291}*<br>285,                                                                            | <277,<br>279,<br>281,<br>283,<br>{285,                                          | (listToM<br>anipulat<br>e =<br>{grade1<br>,                                                                              |

|                                                                       |                 |                                                                                                                                                                    |                 |                       |               |                                                                                                                            |                                                                                 |                                                                                                                          |
|-----------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                                                                       |                 | 287,<br>289,<br>291}*<br>285><br><277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>287,<br>289>                                           |                 |                       |               | 285,<br>287,<br>289><br><283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>297>                                            | 287,<br>289,<br>291}*<br>285,<br>297>                                           | grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>89)                                                |
|                                                                       | All DU<br>paths | <277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285><br><277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>287,<br>289> | <277,<br>279>   | <279,<br>281,<br>283> | <281,<br>283> | <283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>287,<br>289><br><283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>297> | <277,<br>279,<br>281,<br>283,<br>{285,<br>287,<br>289,<br>291}*<br>285,<br>297> | (listToM<br>anipulat<br>e =<br>{grade1<br>,<br>grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>89) |
| Filter<br>Grade<br>sTest.<br>testFil<br>terBy<br>Value<br>Equal<br>To | ●               |                                                                                                                                                                    |                 |                       |               |                                                                                                                            |                                                                                 |                                                                                                                          |
|                                                                       | Criterion       | listToM<br>anipulat<br>e                                                                                                                                           | filterval<br>ue | filter                | emptyLi<br>st | resultLi<br>st                                                                                                             | Progra<br>m<br>Paths                                                            | Test<br>Inputs                                                                                                           |
|                                                                       | All-def         | <300,<br>302,<br>304,<br>306,<br>{308,                                                                                                                             | <300,<br>302>   | <302,<br>304,<br>306> | <304,<br>306> | <306,<br>{308,<br>310,<br>312,<br>314}*<br>306,                                                                            | <300,<br>302,<br>304,<br>306,<br>{308,                                          | (listToM<br>anipulat<br>e =<br>{grade1<br>,                                                                              |

|  |                                    |                                                                                                                                                                    |               |                       |               |                                                                                                                            |                                                                                 |                                                                                                                          |
|--|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|  |                                    | 310,<br>312,<br>314}*<br>308>                                                                                                                                      |               |                       |               | 308,<br>310,<br>312>                                                                                                       | 310,<br>312,<br>314}*<br>308,<br>320>                                           | grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>90)                                                |
|  | All-use                            | <300,<br>302,<br>304,<br>306,<br>{308,<br>310,<br>312,<br>314}*<br>308><br><300,<br>302,<br>304,<br>306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>310,<br>312> | <300,<br>302> | <302,<br>304,<br>306> | <304,<br>306> | <306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>310,<br>312><br><306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>320> | <300,<br>302,<br>304,<br>306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>320> | (listToM<br>anipulat<br>e =<br>{grade1<br>,<br>grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>90) |
|  | All-P-us<br>er-som<br>e-C-use<br>s | <300,<br>302,<br>304,<br>306,<br>{308,<br>310,<br>312,<br>314}*<br>308>                                                                                            | <300,<br>302> | <302,<br>304,<br>306> | <304,<br>306> | <306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>310,<br>312>                                                            | <300,<br>302,<br>304,<br>306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>320> | (listToM<br>anipulat<br>e =<br>{grade1<br>,<br>grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>90) |
|  | All-C-us<br>er-som<br>e-P-use<br>s | <300,<br>302,<br>304,<br>306,<br>{308,                                                                                                                             | <300,<br>302> | <302,<br>304,<br>306> | <304,<br>306> | <306,<br>{308,<br>310,<br>312,<br>314}*<br>308,<br>320>                                                                    | <300,<br>302,<br>304,<br>306,<br>{308,                                          | (listToM<br>anipulat<br>e =<br>{grade1<br>,<br>grade2,<br>grade3,<br>grade4,<br>grade5}<br>,<br>filterVal<br>ue =<br>90) |



|  |                                    |                                                                                                                                                                    |               |                       |               |                                                                                                                            |                                                                                 |                                                                                                                                          |
|--|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|  |                                    |                                                                                                                                                                    |               |                       |               | 331,<br>333,<br>335>                                                                                                       | 333,<br>335,<br>337}*<br>331,<br>343>                                           | grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>,<br>filterCh<br>aracter<br>= 'A')                                                |
|  | All-use                            | <323,<br>325,<br>327,<br>329,<br>{331,<br>333,<br>335,<br>337}*<br>331><br><323,<br>325,<br>327,<br>329,<br>{331,<br>333,<br>335,<br>337}*<br>331,<br>333,<br>335> | <323,<br>325> | <325,<br>327,<br>329> | <327,<br>329> | <329,<br>{331,<br>333,<br>335,<br>337}*<br>331,<br>333,<br>335><br><329,<br>{331,<br>333,<br>335,<br>337}*<br>331,<br>343> | <323,<br>325,<br>327,<br>329,<br>{331,<br>333,<br>335,<br>337}*<br>331,<br>343> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>,<br>filterCh<br>aracter<br>= 'A') |
|  | All-P-u<br>ser-so<br>me-C-u<br>ses | <323,<br>325,<br>327,<br>329,<br>{331,<br>333,<br>335,<br>337}*<br>331>                                                                                            | <323,<br>325> | <325,<br>327,<br>329> | <327,<br>329> | <329,<br>{331,<br>333,<br>335,<br>337}*<br>331,<br>333,<br>335>                                                            | <323,<br>325,<br>327,<br>329,<br>{331,<br>333,<br>335,<br>337}*<br>331,<br>343> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>,<br>filterCh<br>aracter<br>= 'A') |



|                                        |   |                        |                                                                                                              |              |                 |            |                                                                                     |                                                      |                                                                                        |
|----------------------------------------|---|------------------------|--------------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|-------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------|
|                                        |   | All-C-user-some-P-uses | <323, 325, 327, 329, {331, 333, 335, 337}* 331><br><323, 325, 327, 329, {331, 333, 335, 337}* 331, 333, 335> | <323, 325>   | <325, 327, 329> | <327, 329> | <329, {331, 333, 335, 337}* 331, 333, 335><br><329, {331, 333, 335, 337}* 331, 343> | <323, 325, 327, 329, {331, 333, 335, 337}* 331, 343> | (listTo Manipulate = {grade 1, grade2, grade3, grade4, grade5}, filterCharacter = 'A') |
|                                        |   | All DU paths           | <323, 325, 327, 329, {331, 333, 335, 337}* 331><br><323, 325, 327, 329, {331, 333, 335, 337}* 331, 333, 335> | <323, 325>   | <325, 327, 329> | <327, 329> | <329, {331, 333, 335, 337}* 331, 333, 335><br><329, {331, 333, 335, 337}* 331, 343> | <323, 325, 327, 329, {331, 333, 335, 337}* 331, 343> | (listTo Manipulate = {grade 1, grade2, grade3, grade4, grade5}, filterCharacter = 'A') |
| Filter Grade sTest. testFilterBy Occur | • | Criterion              | listToManipulate                                                                                             | filterAmount | filter          | emptyList  | resultList                                                                          | Program Paths                                        | Test Inputs                                                                            |

|                |                                    |                                                                                                                                                                    |               |                       |               |                                                                                                                              |                                                                                 |                                                                                                                                      |
|----------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|---------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| ences<br>Score | All-def                            | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354>                                                                                            | <346,<br>348> | <348,<br>350,<br>352> | <350,<br>352> | <352,<br>{354,<br>356,<br>358,<br>360}*,<br>354,<br>356,<br>358>                                                             | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>},<br>filterA<br>mount<br>= 1) |
|                | All-use                            | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354><br><346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>356,<br>358> | <346,<br>348> | <348,<br>350,<br>352> | <350,<br>352> | <352,<br>{354,<br>356,<br>358,<br>360}*,<br>354,<br>356,<br>358><br><352,<br>{354,<br>356,<br>358,<br>360}*,<br>354,<br>366> | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>},<br>filterA<br>mount<br>= 1) |
|                | All-P-u<br>ser-so<br>me-C-u<br>ses | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354>                                                                                            | <346,<br>348> | <348,<br>350,<br>352> | <350,<br>352> | <352,<br>{354,<br>356,<br>358,<br>360}*,<br>354,<br>356,<br>358>                                                             | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,                                             |

|                                    |                                                                                                                                                                    |               |                       |               |                                                                                                                            |                                                                                 |                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                    |                                                                                                                                                                    |               |                       |               |                                                                                                                            |                                                                                 | grade5<br>,<br>filterA<br>mount<br>= 1)                                                                                              |
| All-C-u<br>ser-so<br>me-P-u<br>ses | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354><br><346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>356,<br>358> | <346,<br>348> | <348,<br>350,<br>352> | <350,<br>352> | <352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>356,<br>358><br><352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>},<br>filterA<br>mount<br>= 1) |
| All DU<br>paths                    | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354><br><346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>356,<br>358> | <346,<br>348> | <348,<br>350,<br>352> | <350,<br>352> | <352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>356,<br>358><br><352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | <346,<br>348,<br>350,<br>352,<br>{354,<br>356,<br>358,<br>360}*<br>354,<br>366> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>},<br>filterA<br>mount<br>= 1) |

|                                                                          |   |                        |                                                                                                              |              |                 |            |                                                                                     |                                                      |                                                                                  |
|--------------------------------------------------------------------------|---|------------------------|--------------------------------------------------------------------------------------------------------------|--------------|-----------------|------------|-------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------|
| Filter<br>Grade<br>sTest.<br>testFil<br>terBy<br>Occur<br>ences<br>Grade | • | Criterion              | listToManipulate                                                                                             | filterAmount | filter          | emptyList  | resultList                                                                          | Program Paths                                        | Test Inputs                                                                      |
|                                                                          |   | All-def                | <369, 371, 373, 375, {377, 379, 381, 383}* 377>                                                              | <369, 371>   | <371, 373, 375> | <373, 375> | <375, {377, 379, 381, 383}* 377, 379, 381>                                          | <369, 371, 373, 375, {377, 379, 381, 383}* 377, 389> | (listToManipulate = {grade 1, grade2, grade3, grade4, grade5}, filterAmount = 2) |
|                                                                          |   | All-use                | <369, 371, 373, 375, {377, 379, 381, 383}* 377><br><369, 371, 373, 375, {377, 379, 381, 383}* 377, 379, 381> | <369, 371>   | <371, 373, 375> | <373, 375> | <375, {377, 379, 381, 383}* 377, 379, 381><br><375, {377, 379, 381, 383}* 377, 389> | <369, 371, 373, 375, {377, 379, 381, 383}* 377, 389> | (listToManipulate = {grade 1, grade2, grade3, grade4, grade5}, filterAmount = 2) |
|                                                                          |   | All-P-user-some-C-uses | <369, 371, 373, 375, {377, 379,                                                                              | <369, 371>   | <371, 373, 375> | <373, 375> | <375, {377, 379, 381, 383}* 377,                                                    | <369, 371, 373, 375, {377, 379,                      | (listToManipulate = {grade 1, grade2                                             |

|  |                                    |                                                                                                                                                                    |               |                       |               |                                                                                                                            |                                                                                 |                                                                                                                                     |
|--|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|---------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  |                                    |                                                                                                                                                                    |               |                       |               | 379,<br>381>                                                                                                               | 381,<br>383}*<br>377,<br>389>                                                   | ,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>,<br>filterA<br>mount<br>= 2)                                                          |
|  | All-C-u<br>ser-so<br>me-P-u<br>ses | <369,<br>371,<br>373,<br>375,<br>{377,<br>379,<br>381,<br>383}*<br>377><br><369,<br>371,<br>373,<br>375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>379,<br>381> | <369,<br>371> | <371,<br>373,<br>375> | <373,<br>375> | <375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>379,<br>381><br><375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>389> | <369,<br>371,<br>373,<br>375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>389> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>,<br>filterA<br>mount<br>= 2) |
|  | All DU<br>paths                    | <369,<br>371,<br>373,<br>375,<br>{377,<br>379,<br>381,<br>383}*<br>377><br><369,<br>371,<br>373,<br>375,<br>{377,<br>379,<br>381,<br>383}*<br>377>                 | <369,<br>371> | <371,<br>373,<br>375> | <373,<br>375> | <375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>379,<br>381><br><375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>389> | <369,<br>371,<br>373,<br>375,<br>{377,<br>379,<br>381,<br>383}*<br>377,<br>389> | (listTo<br>Manipu<br>late =<br>{grade<br>1,<br>grade2<br>,<br>grade3<br>,<br>grade4<br>,<br>grade5<br>,<br>filterA<br>mount<br>= 2) |

|                                                      |   |                         |                                                                                                                                                 |                                                                                                                                                                                                                                                         |                                                                                                                                                 |                                                                                  |                                                                        |  |
|------------------------------------------------------|---|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------|--|
|                                                      |   | 377,<br>379,<br>381>    |                                                                                                                                                 |                                                                                                                                                                                                                                                         |                                                                                                                                                 |                                                                                  |                                                                        |  |
| Filter<br>Grade<br>sTest.<br>testSh<br>owRe<br>sults | ● | Criterion               | resultList                                                                                                                                      | resultStrin<br>g                                                                                                                                                                                                                                        | gradeStrin<br>g                                                                                                                                 | Program<br>Paths                                                                 | Test<br>Inputs                                                         |  |
|                                                      |   | All-def                 | <392, 394,<br>396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400>                                                                             | <394, 396,<br>398>                                                                                                                                                                                                                                      | <396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400, 402>                                                                                     | <392, 394,<br>396, 398,<br>400, 402>                                             | (resultList<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5}) |  |
|                                                      |   | All-use                 | <392, 394,<br>396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400><br><392, 394,<br>396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400, 402> | <394, 396,<br>398><br><394, 396,<br>398, {400,<br>402, 404,<br>406,<br>408}*<br>400, 402,<br>404><br><394, 396,<br>398, {400,<br>402, 404,<br>406,<br>408}*<br>400, 411><br><394, 396,<br>398, {400,<br>402, 404,<br>406,<br>408}*<br>400, 411,<br>413> | <396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400, 402><br><396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400, 402,<br>404, 406,<br>408> | <392, 394,<br>396, 398,<br>{400, 402,<br>404, 406,<br>408}*<br>400, 411,<br>413> | (resultList<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5}) |  |
|                                                      |   | All-P-user-<br>some-C-u | <392, 394,<br>396, 398,                                                                                                                         | <394, 396,<br>398>                                                                                                                                                                                                                                      | <396, 398,<br>{400, 402,                                                                                                                        | <392, 394,<br>396, 398,                                                          | (resultList<br>= {grade1,                                              |  |

|  |  |                             |                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                         |                                                                                                                     |                                                                 |                                                          |
|--|--|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------|
|  |  | ses                         | {400, 402, 404, 406, 408}*, 400>                                                                                                                                                       |                                                                                                                                                                                                                                                                                                         | 404, 406, 408}*, 400, 402>                                                                                          | 400, 402>                                                       | grade2, grade3, grade4, grade5))                         |
|  |  | All-C-user<br>-some-P-users | <392, 394, 396, 398, {400, 402, 404, 406, 408}*, 400><br><392, 394, 396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413> | <394, 396, 398><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404, 406, 408}*, 400, 402, 404, 406><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413> | <396, 398, {400, 402, 404, 406, 408}*, 400, 402><br><396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404, 406, 408> | <392, 394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413> | (resultList = {grade1, grade2, grade3, grade4, grade5})) |
|  |  | All DU paths                | <392, 394, 396, 398, {400, 402, 404, 406, 408}*, 400><br><392, 394, 396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413> | <394, 396, 398><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404><br><394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413>                                                                                                                                                             | <396, 398, {400, 402, 404, 406, 408}*, 400, 402><br><396, 398, {400, 402, 404, 406, 408}*, 400, 402, 404, 406, 408> | <392, 394, 396, 398, {400, 402, 404, 406, 408}*, 400, 411, 413> | (resultList = {grade1, grade2, grade3, grade4, grade5})) |

|                                                                                         |   |                                |                                                                                                                                                                                  |                                                                                                 |                                                                                                    |                                                          |                                                                                                      |
|-----------------------------------------------------------------------------------------|---|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|                                                                                         |   |                                | 400, 402,<br>404, 406><br><394, 396,<br>398, {400,<br>402, 404,<br>406,<br>408}* ,<br>400, 411><br><394, 396,<br>398, {400,<br>402, 404,<br>406,<br>408}* ,<br>400, 411,<br>413> |                                                                                                 |                                                                                                    |                                                          |                                                                                                      |
| Filter<br>Grade<br>sTest.<br>testN<br>umOc<br>curen<br>cesDo<br>ubleLi<br>stOfG<br>rade | • | Criterion                      | scoreToC<br>ount                                                                                                                                                                 | allGrades                                                                                       | scoreCou<br>nt                                                                                     | Program<br>Paths                                         | Test<br>Inputs                                                                                       |
|                                                                                         |   | All-def                        | <416, 418,<br>{420, 422,<br>424}* ,<br>420, 422>                                                                                                                                 | <416, 418,<br>{420, 422,<br>424}* ,<br>420>                                                     | <418,<br>{420, 422,<br>424}* ,<br>420, 422,<br>424>                                                | <416, 418,<br>{420, 422,<br>424}* ,<br>420, 422,<br>424> | (scoreToC<br>ount =<br>90.1,<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5}) |
|                                                                                         |   | All-use                        | <416, 418,<br>{420, 422,<br>424}* ,<br>420, 422>                                                                                                                                 | <416, 418,<br>{420, 422,<br>424}* ,<br>420><br><416, 418,<br>{420, 422,<br>424}* ,<br>420, 422> | <418,<br>{420, 422,<br>424}* ,<br>420, 422,<br>424><br><418,<br>{420, 422,<br>424}* ,<br>420, 428> | <416, 418,<br>{420, 422,<br>424}* ,<br>420, 428>         | (scoreToC<br>ount =<br>90.1,<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5}) |
|                                                                                         |   | All-P-user-<br>some-C-u<br>ses | <416, 418,<br>{420, 422,<br>424}* ,<br>420, 422>                                                                                                                                 | <416, 418,<br>{420, 422,<br>424}* ,<br>420>                                                     | <418,<br>{420, 422,<br>424}* ,<br>420, 422,<br>424>                                                | <416, 418,<br>{420, 422,<br>424}* ,<br>420, 422,<br>424> | (scoreToC<br>ount =<br>90.1,<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,                        |



|  |                                |                                                 |                                                                                               |                                                                                                  |                                                 |                                                                                                       |
|--|--------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------|
|  |                                |                                                 |                                                                                               |                                                                                                  |                                                 | grade4,<br>grade5}))                                                                                  |
|  | All-C-user<br>-some-P-u<br>ses | <416, 418,<br>{420, 422,<br>424}*,<br>420, 422> | <416, 418,<br>{420, 422,<br>424}*,<br>420><br><416, 418,<br>{420, 422,<br>424}*,<br>420, 422> | <418,<br>{420, 422,<br>424}*,<br>420, 422,<br>424><br><418,<br>{420, 422,<br>424}*,<br>420, 428> | <416, 418,<br>{420, 422,<br>424}*,<br>420, 428> | (scoreToC<br>ount =<br>90.1,<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5})) |
|  | All DU<br>paths                | <416, 418,<br>{420, 422,<br>424}*,<br>420, 422> | <416, 418,<br>{420, 422,<br>424}*,<br>420><br><416, 418,<br>{420, 422,<br>424}*,<br>420, 422> | <418,<br>{420, 422,<br>424}*,<br>420, 422,<br>424><br><418,<br>{420, 422,<br>424}*,<br>420, 428> | <416, 418,<br>{420, 422,<br>424}*,<br>420, 428> | (scoreToC<br>ount =<br>90.1,<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5})) |

|                                                                                                |                         |                          |                                                 |                                                                                               |                                                                                                  |                                                         |                                                                                                   |
|------------------------------------------------------------------------------------------------|-------------------------|--------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Filter<br>Grade<br>sTest.<br>testN<br>umOc<br>curen<br>cesCh<br>aracte<br>rListO<br>fGrad<br>e | ●                       |                          |                                                 |                                                                                               |                                                                                                  |                                                         |                                                                                                   |
|                                                                                                |                         | Criterion                | scoreToC<br>ount                                | allGrades                                                                                     | scoreCou<br>nt                                                                                   | Program<br>Paths                                        | Test<br>Inputs                                                                                    |
|                                                                                                |                         | All-def                  | <431, 433,<br>{435, 437,<br>439}*,<br>435, 437> | <431, 433,<br>{435, 437,<br>439}*,<br>435>                                                    | <433,<br>{435, 437,<br>439}*,<br>435, 437,<br>439>                                               | <431, 433,<br>{435, 437,<br>439}*,<br>435, 437,<br>439> | (scoreToC<br>ount = 'A',<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5})) |
|                                                                                                |                         | All-use                  | <431, 433,<br>{435, 437,<br>439}*,<br>435, 437> | <431, 433,<br>{435, 437,<br>439}*,<br>435><br><431, 433,<br>{435, 437,<br>439}*,<br>435, 437> | <433,<br>{435, 437,<br>439}*,<br>435, 437,<br>439><br><433,<br>{435, 437,<br>439}*,<br>435, 428> | <431, 433,<br>{435, 437,<br>439}*,<br>435, 428>         | (scoreToC<br>ount = 'A',<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5})) |
|                                                                                                | All-P-user-<br>some-C-u | <431, 433,<br>{435, 437, | <431, 433,<br>{435, 437,                        | <433,<br>{435, 437,                                                                           | <431, 433,<br>{435, 437,                                                                         | (scoreToC<br>ount = 'A',                                |                                                                                                   |

|  |  |                                |                                                  |                                                                                                 |                                                                                                    |                                                  |                                                                                                  |
|--|--|--------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------|
|  |  | ses                            | 439}* ,<br>435, 437>                             | 439}* ,<br>435>                                                                                 | 439}* ,<br>435, 437,<br>439>                                                                       | 439}* ,<br>435, 437,<br>439>                     | allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5})                             |
|  |  | All-C-user<br>-some-P-u<br>ses | <431, 433,<br>{435, 437,<br>439}* ,<br>435, 437> | <431, 433,<br>{435, 437,<br>439}* ,<br>435><br><431, 433,<br>{435, 437,<br>439}* ,<br>435, 437> | <433,<br>{435, 437,<br>439}* ,<br>435, 437,<br>439><br><433,<br>{435, 437,<br>439}* ,<br>435, 428> | <431, 433,<br>{435, 437,<br>439}* ,<br>435, 428> | (scoreToC<br>ount = 'A',<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5}) |
|  |  | All DU<br>paths                | <431, 433,<br>{435, 437,<br>439}* ,<br>435, 437> | <431, 433,<br>{435, 437,<br>439}* ,<br>435><br><431, 433,<br>{435, 437,<br>439}* ,<br>435, 437> | <433,<br>{435, 437,<br>439}* ,<br>435, 437,<br>439><br><433,<br>{435, 437,<br>439}* ,<br>435, 428> | <431, 433,<br>{435, 437,<br>439}* ,<br>435, 428> | (scoreToC<br>ount = 'A',<br>allGrades<br>= {grade1,<br>grade2,<br>grade3,<br>grade4,<br>grade5}) |