**Defect Report**

Defects expected for Test Cases 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14, 16, 18, 19

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| **No.** | **Description** | **Defect Class** | **Explanation** |
| 1 | The program gives an error if the number of elements is higher than expected | Data | The program expects to use an array with exactly 25 elements |
| 2 | The program gives an error if the number of elements is lower than expected | Data | The program expects to use an array with exactly 25 elements |
| 3 | Program fails if an x-value is < the lower bound | Algorithmic & Processing | Underflow  x < b violates b ≤ x ≤ a |
| 4 | Program fails if an x-value is > the upper bound | Algorithmic & Processing | Overflow  x > a violates b ≤ x ≤ a |
| 5 | Program fails if an x-value is completely invalid | Data / Module  / Typographical | Wrong data type in code |
| 6 | The program reprompts the user if a and/or b violates bounds (a = b) | Algorithmic & Processing | Upper bound must be strictly larger than the lower bound |
| 7 | The program reprompts the user if a and/or b violates bounds (AUB) | Algorithmic & Processing | Upper bound can be no larger than 5000.0 |
| 8 | The program reprompts the user if a and/or b is invalid | Algorithmic & Processing | Invalid data type in user input |
| 9 | The program reprompts the user if a and/or b violates bounds (BLB) | Algorithmic & Processing | Lower bound can be no smaller than 1.0 |
| 11 | The program reprompts the user if a & b violate bounds | Algorithmic & Processing | a and b must always satisfy  1.0 ≤ b < a ≤ 5000.0 |
| 13 | The program reprompts the user if a and/or b violates bounds (a < b) | Algorithmic & Processing | Upper bound must be strictly larger than the lower bound |
| 14 | The program reprompts the user if a and/or b violates bounds (a = b) | Algorithmic & Processing | Upper bound must be strictly larger than the lower bound |
| 16 | The program reprompts the user if a and/or b violates bounds (AUB/BLB) | Algorithmic & Processing | a and b must always satisfy  1.0 ≤ b < a ≤ 5000.0 |
| 18 | The program reprompts the user if a and/or b violates bounds (BLB) | Algorithmic & Processing | Lower bound can be no smaller than 1.0 |
| 19 | The program reprompts the user if a and/or b violates bounds (AUB) | Algorithmic & Processing | Upper bound can be no larger than 5000.0 |

Both the valid and invalid test cases were useful in defect analysis. Defects were clearly addressed when invalid input bounds or array values were present. The only outcome that differed from expectations was when a string was inputted for either bound instead of a valid number, the error message would get duplicated as many times as the length of string. Since we want to avoid an error situation anyway, this is not a major problem. Test screenshots of the C++ implementation are provided below.

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**Figure 9-1) Test Cases results**

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**Figure 9-2) Test Cases cont’d**

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**Figure 9-3) Duplicate error messages due to string length (Test Case 8)**