# Equivalence Partitioning and Boundary Value Analysis – An Example

Example: Identifiers of 3 – 15 alphanumeric characters, in which the first two must be letters. Apply the equivalence partitioning and boundary value analysis techniques to identify suitable test inputs for testing the above specification.

1. Apply Equivalence Partitioning to identify input equivalence classes
2. Use Boundary Value Analysis to refine the results of equivalence partitioning
3. Select actual input values that cover all the equivalence classes and the boundaries

# Apply Equivalence Partitioning to identify input equivalence classes

* + Input constraints/conditions (each with equivalence classes):
    - Alphanumeric characters
    - Identifier length between 3 and 15 characters
    - First two letters

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| **Condition** | **Valid Equivalence Classes** | **Invalid Equivalence Classes** |
| Input alphanumeric | Only letters [a-z][A-Z] and numbers [0-9] | Characters that are not alphanumeric |
| Identifier length | The identifiers has between 3 and 15 characters [3 – 15] | The identifier has less than 3 characters i.e. <3  The identifier has more than 15 characters i.e. >15 |
| First two letters | The first two characters are letters [a-z][A-Z] | The first two characters are not letters (i.e. either numbers or any other characters, but letters) |

# Use Boundary Value Analysis to refine the results of equivalence partitioning

* + Input constraints (each with equivalence classes/boundary conditions):
    - Alphanumeric characters
    - *Identifier length between 3 and 15 characters* (min - 1, min, min +1, max-1, max, max + 1)
    - First two letters

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| **Condition** | **Invalid Equivalence Class** | **Valid Equivalence Class** | **Invalid Equivalence Class** |
| Identifier length | The identifier has less than 3 characters i.e.  <3 | The identifier has between 3 and 15  characters [3 – 15] | The identifier has more than 15 characters i.e. >15 |

The values obtained using the boundary value analysis are:

* 2, 3, 4
* 14, 15, 16

# Select actual input values that cover all the equivalence classes and the boundaries

**Functionality tested: Identifiers**

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| **Test Case Identifier** | **Input value** | **Valid equivalence classes and boundary covered** | **Invalid equivalence classes and boundary covered** |
| 1 | qwe1 | * Only letters [a-z][A-Z] and numbers [0-9] * The identifier has between 3 and 15 characters [3 – 15]   + Boundary covered: above lower boundary,   i.e. 4 (see page 1)  - The first two characters are letters [a-z][A-Z] |  |
| 2 | fe3 | * Only letters [a-z][A-Z] and numbers [0-9] * The identifier has between 3 and 15 characters [3 – 15]   + Boundary covered: lower boundary,   i.e. 3 (see page 1)  - The first two characters are letters [a-z][A-Z] |  |
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| **Test Case Identifier** | **Input value** | **Valid equivalence classes and boundary covered** | **Invalid equivalence classes and boundary covered** |
| 3 | ab123456789qwer | * Only letters [a-z][A-Z] and numbers [0-9] * The identifier has between 3 and 15 characters [3 – 15]   + Boundary covered: upper boundary,   i.e. 15 (see page 1)  - The first two characters are letters [a-z][A-Z] |  |
| 4 | ab123456789qwe | * Only letters [a-z][A-Z] and numbers [0-9] * The identifier has between 3 and 15 characters [3 – 15]   + Boundary covered: below the upper boundary,   i.e. 14 (see page 1)  - The first two characters are letters [a-z][A-Z] |  |
| 5 | aS14356 | * Only letters [a-z][A-Z] and numbers [0-9] * The identifier has between 3 and 15 characters [3 – 15] * The first two characters are letters [a-z][A-Z] |  |
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| **Test Case Identifier** | **Input value** | **Valid equivalence classes and boundary covered** | **Invalid equivalence classes and boundary covered** |
| 6 | qw@ |  | - Characters that are not alphanumeric |
| 7 | 12a |  | - The first two characters are not letters (i.e. either numbers or any other characters, but letters) |
| 8 | ab |  | * The identifier has less than 3 characters i.e. <3   + Boundary covered: below (i.e. lower than) the lower boundary i.e. 2 (see page 1) |
| 9 | ab123456789qwert |  | * The identifier has more than 15 characters i.e. >15   + Boundary covered: above (i.e. higher than) the upper boundary i.e. 16 (see page 1) |