

Boundary Value Analysis

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What is Boundary value analysis?

- **Boundary value analysis** is a test case design technique to **test boundary value between partitions** (both valid boundary partition and invalid boundary partition).
- A **boundary value** is an **input or output value** on the border of an equivalence partition, includes **minimum** and **maximum** values at inside and outside boundaries.
- Normally Boundary value analysis is part of stress and **negative testing**.
- 'Boundary value analysis' testing technique is used to identify **errors at boundaries** rather than finding those exist in center of input domain.

Contd...

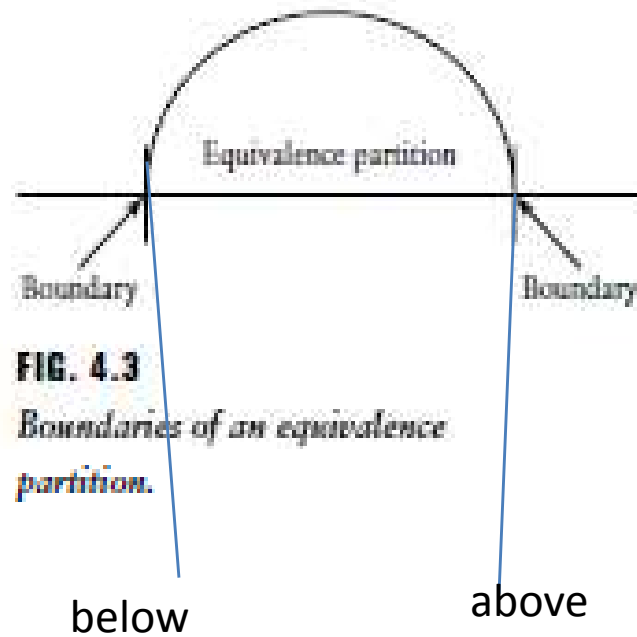


FIG. 4.3

Boundaries of an equivalence partition.

many defects occur directly on, and above and below, the edges of equivalence classes.

Example

Input value for a variable lies between -1 to 4

-4 -3 **-2** | **-1** 0 1 2 3 **4** | **5**

invalid class

valid class

invalid class

Minimum	-1
Minimum-1	-2
Maximum	4
Maximum+1	5

Contd..

Equivalence class Partition	Boundary value Analysis
Directs the tester to select test cases from any element of an equivalence class.	boundary value analysis requires that the tester select elements close to the edges, so that both the upper and lower edges of an equivalence class are covered by test cases.
-3,-1,5	-2,-1,4,5

List of Conditions

- 1. If the input condition is specified as **range of values** , develop **valid test cases** for the **ends of the range**, and **invalid test cases** for possibilities just **above** and **below the ends** of the range.

Example

Input value for a variable must lie in the range of -1.0 to +1.0

Valid test cases: -1.0 to +1.0

invalid test cases: -1.1 to +1.1

Contd..

2. If an input condition for the software-under-test is specified as a *number of values*, develop valid test cases for the **minimum** and **maximum numbers** as well as invalid test cases that include **one lesser** and **one greater** than the maximum and minimum.

Example

A house can have one to four owners

Valid test cases	Invalid test cases
Minimum: 1	One lesser than minimum=0
Maximum:4	One greater than maximum=5

Contd...

3. If the input or output of the software-under-test is an ordered set, such as a table or a linear list, develop tests that focus on the first and last elements of the set.

An Example of the Application of Equivalence Class Partitioning and Boundary Value Analysis

The input specification for the module states that a widget identifier should consist of **3–15 alphanumeric characters** of which the **first two must be letters**. We have three separate conditions that apply to the input:

- (i) it must consist of **alphanumeric characters**,
- (ii) the range for the total number of characters is between **3 and 15**, and,
- (iii) the **first two characters** must be **letters**.

