Black Box Testing

• Equivalence Classes
• Boundary Value Analysis
• Cause-Effect Graphing
• Error Guessing
  – Generating test cases bases on intuition

Equivalence Classes

• For each piece of the specification, generate one or more equivalence Class
• Label the classes as “Valid” or “Invalid”
• Generate one test case for each Invalid Equivalence class
• Generate a test case that Covers as many Valid Equivalence Classes as possible

Boundary Value Analysis

• Generate Equivalence Classes for BOTH input and output EC
• Generate test cases as specified in EC EXCEPT choose Boundaries for the test cases.
• Example: \(1 <= X <= 100\)
  – Use 1, 2, 99 =, 100 for valid EC
  – Use 0 and 101 for invalid EC.

Cause Effect Graphing

• Attempt to explore combinations of input conditions
• Technique which aids in selecting, in a systematic way, a high yield set of test cases
• **FORMAL** – language into which a natural language specification is translated.

Cause-Effect Graphing

1. Divide specification into small workable pieces
2. List
   a. Causes – input Equivalence Classes
   b. Effects – output Equivalence Classes
      (Assign a unique number to each)
3. The Semantic content of the specification is analyzed and transformed into a Boolean graph linking the causes to the effects.

4. The graph is annotated with constraints describing combinations of causes and/or effects that are impossible due to **syntactic** constraints
5. By methodically tracing state conditions in the graph, the graph is converted to a limited entry decision table
Cause-Effect Graphing

6. The columns in the decision table are converted into test cases.

Notation Identity
0 – absent state
1 – present state

IF A = 1
THEN B = 1

Notation Not

IF A = 1
THEN B = 0
ELSE B = 1

Notation OR

IF A = 1 OR B = 1 OR C = 1
THEN D = 1

Notation AND

IF A = 1 AND B = 1
then c = 1

Constraints