Topic #4 – Category Partition Testing Method

Instructor: Jerry Gao, Ph.D., Professor
San Jose State University

Topic #4 – Decision Table Testing Method

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TOPIC #4 – CATEGORY PARTITION TEST METHOD

What is category partition testing method?

Category Partition Method **[CPM**] is a specification based testing technique helping the testers create test cases by refining the functional specification of a program into test requirements.

The idea behind **category partition** testing is to divide the input domains of a component into N different disjoint partitions and select one value from each input domain to create a test case.

This method emphasizes both the specification **coverage** and **error detection** aspects of testing

TOPIC #4 – CATEGORY PARTITION TEST METHOD

Main Characteristics

- The test specification is concise and uniform representation of test information for a function
- The partition can be easily modified and gives the tester a logical way to control the volume the tests.
- The generator tool provides an automated way to produce thorough tests which avoids impossible or undesirable tests.

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Category Partition Systematic Method

According to T.J Ostrand and M.J.Balcer , he proposed a systematic method consisting of the following steps :

- ✓Decompose function specifications into functional units.
- ✓Identify parameters and environment conditions.
- ✓Find categories of information.
- ✓Partition each category into choices.
- ✓Write test specification for each unit.
- ✓Produce test frames.
- ✓Generate test cases.

Partition Testing Example

Example 1 : Test Specification for ATM – PIN Number

Partition:

PIN

Wrong PIN [property mismatch]
Correct PIN [property match]
Withdraw amount
Multiple of 20 [if match]
[property correct]
Less than 20 [if match]
[property wrong]
Greater than 20 but not multiple of 20
[if match]
[property wrong]

An Example of using Category Partition Method

Example 2:
Test a command-line program that supports “find” operation as follows:

Command: find
Syntax: find <pattern> <file>

Function Specifications:
The find command is used to locate one or more instances of a given pattern in a text file.

- All lines in the file that contain the pattern are written to standard output.
- A line containing the pattern is written only once, regardless of the no. of times the pattern occurs in it.
- The pattern is any sequence of characters whose length does not exceed the maximum length of a line in the file.
- To include a blank in the pattern, the entire pattern must be enclosed in quotes (“). To include a quotation mark in the pattern, two quotes in a row (“ ”) must be used.

An Example of using Category Partition Method

Examples:

- find john myfile
  - displays lines in the file myfile which contain *john*
- find “john smith” myfile
  - display lines in the file myfile which contains john smith.
- find “john” ” smith” myfile
  - display lines in the file which contains john” smith.

When file is considered as a parameter, we need to consider the following:- no. of occurrences of the pattern in the file.- no. of occurrences of the pattern in a line that contains it.- maximum line length in the file

An Example of using Category Partition Method

Test specification for Find command:

Parameters :

1. **Pattern Size:**
   - ✓ empty
   - ✓ single character
   - ✓ many character
   - ✓ longer than any line in the file

2. **Quoting:**
   - ✓ Pattern is quoted
   - ✓ Pattern is not quoted
   - ✓ Pattern is improperly quoted

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An Example of using Category Partition Method

Test specification for Find command:

Parameters:

1. **Embedded blanks:**
   - ✓ No embedded blank
   - ✓ One embedded blank
   - ✓ Several embedded blanks

2. **Embedded quotes:**
   - ✓ No embedded quotes
   - ✓ One embedded quotes
   - ✓ Several embedded quotes

Parameters:

File name:

- ✓ Good File name
- ✓ No File name
- ✓ Omitted

Environment:

(only for the pattern)

File access environment:

- ✓ File not accessible
- ✓ File can't read
- ✓ File can't open

An Example of using Category Partition Method

Parameters:

Environment: (only for the pattern)

1. **No. of occurrences of pattern in the file:**
   - ✓ None
   - ✓ Exactly one
   - ✓ More than one

2. **Pattern occurrences on target line:**
   - ✓ One
   - ✓ None
   - ✓ More than one

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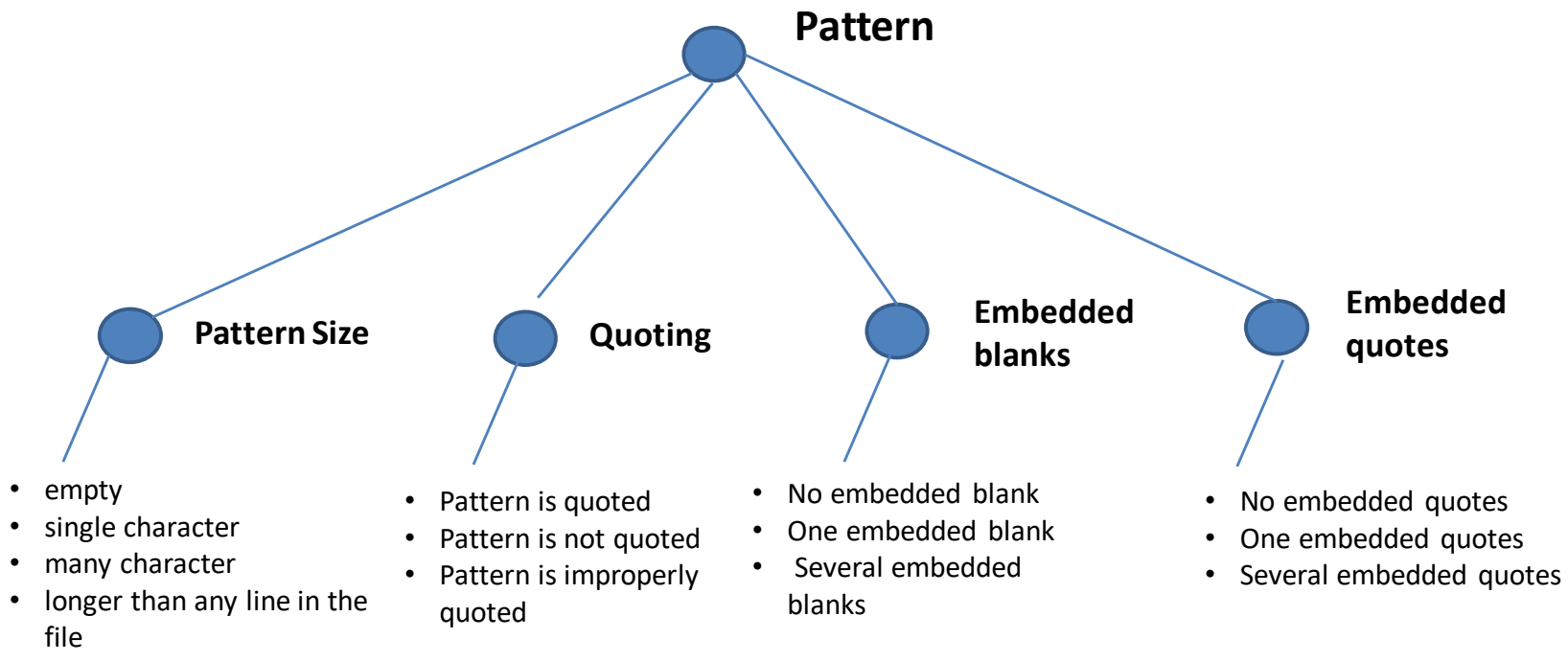
An Example of using Category Partition Method



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An Example of using Category Partition Method

Example 2 :

- Specification: The program prompts the user for a positive integer in the range 1 to 20 and then for a string of characters of that length. The program then prompts for a character and returns the position in the string at which the character was first found or a message indicating that the character was not present in the string. The user has the option to search for more characters.

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An Example of using Category Partition Method

Example 2:

Parameters and Categories

- Three parameters: integer x (length), the string a, and the character c
- For x the categories are "in-range" (1-20) or "out-of-range"
- Categories for a: minimal, maximal, intermediate length
- Categories for c: character appears at the beginning, middle, end of string, or does not occur in the string

An Example of using Category Partition Method

Example 2:

Formal Test Specifications

x:		
1)	0	[error]
2)	1	[property stringok, length1]
3)	2-19	[property stringok, midlength]
4)	20	[property stringok, length20]
5)	21	[error]
a:		
1)	Length 1	[if stringok and length1]
2)	Length 2-19	[if stringok and midlength]
3)	Length 20	[if stringok and length20]
c:		
1)	At first position in string	[if stringok]
2)	At last position in string	[if stringok and not length1]
3)	In middle of string	[if stringok and not length1]
4)	Not in string	[if stringok]

An Example of using Category Partition Method

Example 2:

Test Frames and Cases

x 1	x = 0
x 2a1c1	x = 1, a = 'A', c = 'A'
x 2a1c4	x = 1, a = 'A', c = 'B'
x 3a2c1	x = 7, a = 'ABCDEFG', c = 'A'
x 3a2c2	x = 7, a = 'ABCDEFG', c = 'G'
x 3a2c3	x = 7, a = 'ABCDEFG', c = 'D'
x 3a2c4	x = 7, a = 'ABCDEFG', c = 'X'
x 4a3c1	x = 20, a = 'ABCDEFGHIJKLMNOPQRST', c = 'A'
x 4a3c2	x = 20, a = 'ABCDEFGHIJKLMNOPQRST', c = 'T'
x 4a3c3	x = 20, a = 'ABCDEFGHIJKLMNOPQRST', c = 'J'
x 4a3c4	x = 20, a = 'ABCDEFGHIJKLMNOPQRST', c = 'X'
x 5	x = 21

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Category Partition Testing Summary

Advantage:

- The tester can modify the test specification whenever necessary
- Reduce the number of test cases.
- Provides logical way to control the volume of tests.
- Language or implementation independent

Test Coverage:

- Each of the categorized partition has a test case derived from it.
- Test frames are generated which consist of maximum combination of choices in the category that is being partitioned.

Limitations:

- Lack of systematic methods to partition input domains of a component for the given non-formal function specification.
- Does not unearth bugs due to incorrect specifications.

Challenges:

- Identifying the parameters and environments, conditions and categories requires experienced tester.