Software Test

Lesson 11
Test Preparation – Exercise Pairwise
v1.3

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Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Basics
    - Variable 1 with V_1 (three) values: A, B, C
    - Variable 2 with V_2 (two) values: X, Y
    - Variable 3 with V_3 (two) values: 0, 1
    - Possible combinations: V_1 x V_2 x V_3 = 3 x 2 x 2 = 12
  - Building a table
    - For each variable one column
    - If Variable 1 has V_1 possible values, Variable 2 has V_2 possible values, at least V_1 x V_2 rows are needed

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 1st Step
    - Insert each value of Variable 1 in the first column V_2 times, after each value insert a blank row
    - In the second column, list all the values of Variable 2, so they pair with each value of Variable 1

1st Step –

Test Case	Variable 1	Variable 2	Variable 3			
1	A	X				
2	A	Y				
3	B	X				
4	B	Y				
5	C	X				
6	C	Y				

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 2nd Step
    - Insert the values of Variable 3 in the third column, so that they build pairs with the values of Variable 2

2nd Step –

Test Case	Variable 1	Variable 2	Variable 3
1	A	X	1
2	A	Y	0
3	B	X	0
4	B	Y	1
5	C	X	1
6	C	Y	0

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 3rd Step
    - Adding a fourth Variable 4 with two possible values E and F in the fourth column
    - E and F must be positioned in each “AA”, “BB”, and “CC” block
    - Finally all pairs with Variable 2 and Variable 3 should be created

3rd Step –

Test Case	Variable 1	Variable 2	Variable 3	Variable 4
1	A	X	1	E
2	A	Y	0	F
3	B	X	0	F
4	B	Y	1	E
5	C	X	1	F
6	C	Y	0	E

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 4th Step
    - Adding another Variable 5 with two possible values G and H in the fifth column with a first guess
    - With the proposed solution we meet all pairs with Variable 1, Variable 2, and Variable 3, but we miss with Variable 4

4th Step –

Test Case	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5
1	A	X	1	E	G
2	A	Y	0	F	H
3	B	X	0	F	H
4	B	Y	1	E	G
5	C	X	1	F	H
6	C	Y	0	E	G

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 5th Step
    - We try to update
      - Flip change the order in the BB section from “GH” to “HG”
      - CC section is fine after the update
    - So we successfully added the fifth Variable 5

5th Step –

Test Case	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5
1	A	X	1	E	G
2	A	Y	0	F	H
3	B	X	0	F	G
4	B	Y	1	E	H
5	C	X	1	F	H
6	C	Y	0	E	G

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 6th Step
    - Trying to add Variable 6 – not possible

6th Step –

Test Case	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	Variable 6
1	A	X	1	E	G	I
2	A	Y	0	F	H	J
3	B	X	0	F	G	J
4	B	Y	1	E	H	I
5	C	X	1	F	H	J
6	C	Y	0	E	G	I

Test Case	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	Variable 6
1	A	X	1	E	G	I
2	A	Y	0	F	H	J
3	B	X	0	F	G	I
4	B	Y	1	E	H	J
5	C	X	1	F	H	J
6	C	Y	0	E	G	I

Test Preparation
Test Case Design

- Combination Testing - All pair example [KBP02]
  - Building a table - 7th Step
    - Two new Test Cases – altogether 8 – are necessary in adding Variable 6
    - For Test Cases **7** and **8** the values of Variable 1, 2, 3, and 4 could be any valid
    - But finally 8 Test Cases are less than
      $V_1 \times V_2 \times V_3 \times V_4 \times V_5 \times V_6 = 3 \times 2^5 = 96$

7th Step –

Test Case	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	Variable 6
1	A	X	1	E	G	I
2	A	Y	0	F	H	J
7					G	J
3	B	X	0	F	G	I
4	B	Y	1	E	H	J
8					H	I
5	C	X	1	F	H	J
6	C	Y	0	E	G	I