CENG 437 – Software Quality Management - HW4

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1. Orthogonal Array Method

Variables	Values
X	True, False
Y	0, 3
Z	P, Q, R

Factors = 3(X, Y, Z), Levels = 3(Z takes three different value), Runs = 9

$$L_{Runs}(Levels^{Factors)} = L_9(3^3)$$

	Factors		
Runs	**1**	**2**	**3**
1	1	1	1
2	1	2	2
3	1	3	3
4	2	1	2
5	2	2	3
6	2	3	1
7	3	1	3
8	3	2	1
9	3	3	2

X: 1 = True, 2 = False

Y: 1 = 0, 2 = 3

Z: 1 = P, 2 = Q, 3 = R

Test Case ID	X	Y	Z
TC_1	True	0	P
TC_2	True	3	Q
TC_3	True	3	R
TC_4	False	0	Q
TC_5	False	3	R
TC_6	False	3	P
TC_7	3	0	R
TC_8	3	3	P
TC_9	3	3	Q

Test Case ID	X	Y	Z
TC_1	True	0	P
TC_2	True	3	Q
TC_3	True	3	R
TC_4	False	0	Q
TC_5	False	3	R
TC_6	False	0	P
TC_7	False	0	R
TC_8	False	3	P
TC_9	True	0	Q

2. IPO Algorithm

X -> { True, False } Y -> { 0, 3 } Z -> { P, Q, R }

Step 1 and 2: Create T and π_3

T = (X x Y) =

(True, 0)
(True, 3)
(False, 0)
(False, 3)

Z x (X x Y) = π_3 =

(True, P)	(True, Q)	(True, R)
(False, P)	(False, Q)	(False, R)
(0, P)	(0, Q)	(0, R)
(3, P)	(3, Q)	(3, R)

Step 3: Add P, Q and R.

T =

(True, 0, P)
(True, 3, Q)
(False, 0, R)
(False, 3,)

π_3 =

(True, P)	(True, Q)	(True, R)
(False, P)	(False, Q)	(False, R)
(0, P)	(0, Q)	(0, R)
(3, P)	(3, Q)	(3, R)

Step 4: Select P for (False, 3).

T =

(True, 0, P)
(True, 3, Q)
(False, 0, R)
(False, 3, P)

π_3 =

(True, P)	(True, Q)	(True, R)
(False, P)	(False, Q)	(False, R)
(0, P)	(0, Q)	(0, R)
(3, P)	(3, Q)	(3, R)

Step 5: Combine remained test pairs.

$$T = \begin{bmatrix} (\text{True}, 0, P) \\ (\text{True}, 3, Q) \\ (\text{False}, 0, R) \\ (\text{False}, 3, P) \\ (\text{True}, 3, R) \\ (\text{False}, 0, Q) \end{bmatrix} \qquad \pi_3 = \begin{bmatrix} (\text{True}, P) & (\text{True}, Q) & (\text{True}, R) \\ (\text{False}, P) & (\text{False}, Q) & (\text{False}, R) \\ (0, P) & (0, Q) & (0, R) \\ (3, P) & (3, Q) & (3, R) \end{bmatrix}$$

_IPO Algorithm supports our results for Orthogonal Array Method since we have created these 6 test cases in our table.