
HOMEWORK 6

Practice with Orthogonal Arrays

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The Software Engineering Department at Stevens Institute of Technology is launching a new website to help students plan their class schedules. We need to support the following configurations:

Part 1:

The Software Engineering Department at Stevens Institute of Technology is launching a new website to help students plan their class schedules. We need to support the following configurations:

1. What is the total number of test cases for exhaustive testing? Show the exhaustive list of all combinations.

$$3 * 3 * 2 * 2 = 36 \text{ Test cases}$$

{OSX, Safari, U, C}	{OSX, Firefox, U, R}	{OSX, Chrome, G, R}
{OSX, Safari, U, R}	{OSX, Firefox, U, C}	{OSX, Chrome, G, C}
{OSX, Safari, G, C}	{OSX, Firefox, G, R}	{OSX, Chrome, U, C}
{OSX, Safari, G, R}	{OSX, Firefox, G, C}	{OSX, Chrome, U, C}
{Linux, Safari, U, C}	{Linux, Firefox, U, R}	{Linux, Chrome, G, R}
{Linux, Safari, U, R}	{Linux, Firefox, U, C}	{Linux, Chrome, G, C}
{Linux, Safari, G, C}	{Linux, Firefox, G, R}	{Linux, Chrome, U, C}
{Linux, Safari, G, R}	{Linux, Firefox, G, C}	{Linux, Chrome, U, C}
{Win10, Safari, U, C}	{Win10, Firefox, U, R}	{Win10, Chrome, G, R}
{Win10, Safari, U, R}	{Win10, Firefox, U, C}	{Win10, Chrome, G, C}
{Win10, Safari, G, C}	{Win10, Firefox, G, R}	{Win10, Chrome, U, C}
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2. What are the factors and levels for each factor?
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HOMEWORK 6

4 factors -> Operating System, Browser, Student Type, Student Location

Levels: 2 with 2 items (Student Type and Location) ; 2 with 3 items (Operating System and Browser)

3. How many test cases do we need for Pairwise Orthogonal Array Testing?

9 Test cases

4. Select and show the proper Orthogonal Array

Experimental trial	Process parameters			
	A	B	C	D
1	1	1	1	1
2	1	2	2	2
3	1	3	3	3
4	2	1	2	3
5	2	2	3	1
6	2	3	1	2
7	3	1	3	2
8	3	2	1	3
9	3	3	2	1

5. Populate and show the Orthogonal Array with the appropriate values for this problem

	Operating System	Browser	Student Type	Student Location
1	OSX	Safari	U	
2	OSX	Chrome		R
3	OSX	Firefox	G	C
4	Win10	Chrome	G	
5	Win10	Firefox	U	R
6	Win10	Safari		C
7	Linux	Chrome	U	C

HOMEWORK 6

8	Linux	Safari		C
9	Linux	Firefox		

Part 2:

You are selling a bicycle store support application. It has the following configuration options: 1) On-line sales or retail in-store 2) USA or Canada stores 3) Payment by Visa or American Express Only (no cash) 4) Selling bicycles only or doing maintenance and sales.

1. How many combinations of these 4 variables are there?
Online sales/retail -> 2
USA/Canada -> 2
Visa/AmEx -> 2
Selling Bicycles/M&S -> 2
 $2 * 2 * 2 * 2 = 16$ combinations
2. How many tests do you need to cover all combinations of any one variable?
4 tests at minimum
3. What is the orthogonal array which you can use for this problem? How many test cases does it represent?
 L_8
4. If you had 7 variables with 2 values each, which array would you use?
 L_8
5. How many test cases does an L_8 array represent?
8 test cases

Part 3:

Your company provides online books for various readers. The ones you need to worry about are Kindle, iPad and Zok. There are 4 different classes of books you need to worry about - textbooks (which have lots of equations), poetry (where the formatting is extremely important), graphic novels, and regular novels. They also can be ordered in three different languages, English, Spanish, and Japanese.

1. What is the total number of test cases for all combinations?
 $3 * 4 * 3 = 36$ test cases
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2. What is the minimum number of tests for pairwise testing? (this is a simple calculation).
 $3 * 4 = 12$ tests
 3. You decide to use orthogonal arrays to help with your testing. Which table should you use?
 L_{16}

Part 4:

We need to do some configuration testing on a new version of an application. There are 5 different operating systems we need to test on, 3 different browsers, and 3 different languages (English, Spanish, and Martian)

1. How many combinations are there of these variables?
 $5 * 3 * 3 = 45$ Combinations
 2. Which orthogonal array should you use?
 L_{25}
 3. How many individual tests do you need to run for all combinations of two variables? (Not the minimum number of tests for any pair of variables)
25 Tests since L_{25}
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