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SSW-567-HW06

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:

- Operating System: Mac OSX, Linux, and Windows 10
 - {OSX, Linux, Win10}
- Browser: Safari, Firefox, and Chrome
 - Note: Safari, Firefox, and Chrome are available on Mac OSX, Linux, and Windows 10
 - {Safari, Firefox, Chrome}
- Student Type: Undergraduate and Graduate
 - {U,G}
- Student Location: On Campus or Remote
 - {C,R}

Answer these questions:

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

A - Operating System (3) - {OSX, Linux, Win10}

B - Browser (3) - {Safari, Firefox, Chrome}

C - Student Type (2) - {U,G}

D - Student Location (2) - {C,R}

4 Factor: A has 3 levels, B has 3 levels, C has 2 levels, D has 2 levels

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

OSX:Safari:U:C

OSX:Safari:U:R

OSX:Safari:G:C

OSX:Safari:G:R

OSX:Firefox:U:C

OSX:Firefox:U:R
OSX:Firefox:G:C
OSX:Firefox:G:R
OSX:Chrome:U:C
OSX:Chrome:U:R
OSX:Chrome:G:C
OSX:Chrome:G:R
Linux:Safari:U:C
Linux:Safari:U:R
Linux:Safari:G:C
Linux:Safari:G:R
Linux:Firefox:U:C
Linux:Firefox:U:R
Linux:Firefox:G:C
Linux:Firefox:G:R
Linux:Chrome:U:C
Linux:Chrome:U:R
Linux:Chrome:G:C
Linux:Chrome:G:R
Win10:Safari:U:C
Win10:Safari:U:R
Win10:Safari:G:C
Win10:Safari:G:R
Win10:Firefox:U:C
Win10:Firefox:U:R
Win10:Firefox:G:C
Win10:Firefox:G:R
Win10:Chrome:U:C
Win10:Chrome:U:R
Win10:Chrome:G:C
Win10:Chrome:G:R

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

At minimum we need $3 \times 3 = 9$ cases

3. Select and show the proper Orthogonal Array

L9 is the smallest Array that will fit 4 variables, 2 with 3 values and 2 with 2 values

Experiment Number	Column			
	1	2	3	4
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

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

Operating System	Browser	Student	Location
OSX	Safari	u	c
OSX	Firefox	g	r
OSX	Chrome	u	c
Linux	Safari	g	c
Linux	Firefox	u	r
Linux	Chrome	g	c
Win10	Safari	u	c
Win10	Firefox	g	r
Win10	Chrome	u	c

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

Answer these questions:

1. How many combinations of these 4 variables are there?

There are 4 variable with 2 values each, therefore $2 \times 2 \times 2 \times 2 = 16$ possible combinations

2. How many tests do you need to cover all combinations of any one variable?

At minimum you'll need 8 test to cover all combinations of any one variable

Store	Location	Payment	Service
On-line Sales	USA	Visa	Bicycles
On-line Sales	USA	Visa	Maintenance and Sales
On-line Sales	USA	American Express	Bicycles
On-line Sales	USA	American Express	Maintenance and Sales
On-line Sales	Canada	Visa	Bicycles
On-line Sales	Canada	Visa	Maintenance and Sales
On-line Sales	Canada	American Express	Bicycles
On-line Sales	Canada	American Express	Maintenance and Sales
Retail In-store	USA	Visa	Bicycles
Retail In-store	USA	Visa	Maintenance and Sales
Retail In-store	USA	American Express	Bicycles
Retail In-store	USA	American Express	Maintenance and Sales
Retail In-store	Canada	Visa	Bicycles
Retail In-store	Canada	Visa	Maintenance and Sales

Retail In-store	Canada	American Express	Bicycles
Retail In-store	Canada	American Express	Maintenance and Sales

3. What is the orthogonal array which you can use for this problem? How many test cases does it represent?

The array I would use for this problem is an L9 array because it can represent 4 variables with 3 values each and it can represent 9 test cases.

4. If you had 7 variables with 2 values each, which array would you use?

I would use an L8 Array

5. How many test cases does an L8 array represent?

L8 represents 8 Test Cases

Experiment Number	1	2	3	4	5	6	7
1	1	1	1	1	1	1	1
2	1	1	1	2	2	2	2
3	1	2	2	1	1	2	2
4	1	2	2	2	2	1	1
5	2	1	2	1	2	1	2
6	2	1	2	2	1	2	1
7	2	2	1	1	2	2	1
8	2	2	1	2	1	1	2

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.

Answer these questions:

1. What is the total number of test cases for all combinations?

There are 3 variables, 1 variable has 4 values, 2 variables have 4 values

$3 \times 4 \times 3 = 36$ total test cases

2. **What is the minimum number of tests for pairwise testing? (this is a simple calculation).**

The minimum number of test for pairwise testing is $3 \times 4 = 12$ cases.

3. **You decide to use orthogonal arrays to help with your testing. Which table should you use?**

I should choose an L12 array

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)

Answer these questions:

1. **How many combinations are there of these variables?**

$$5 \times 3 \times 3 = 45$$

2. **Which orthogonal array should you use?**

$$5 \times 3 = 15$$

L16 array

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)**

I would need to run 18 test for any two combinations

OS	Browser	Lang
1	1	1
1	1	2
1	1	3
1	2	1
1	2	2
1	2	3
1	3	1
1	3	2
1	3	3
2	1	1
2	1	2

2	1	3
2	2	1
2	2	2
2	2	3
2	3	1
2	3	2
2	3	3
3	1	1
3	1	2
3	1	3
3	2	1
3	2	2
3	2	3
3	3	1
3	3	2
3	3	3
4	1	1
4	1	2
4	1	3
4	2	1
4	2	2
4	2	3
4	3	1
4	3	2
4	3	3
5	1	1
5	1	2
5	1	3
5	2	1
5	2	2
5	2	3
5	3	1
5	3	2
5	3	3

