

# Homework 6: Practice with Orthogonal Arrays

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## 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.

Answer:

There will be  $3(\text{OS}) * 3(\text{Browser}) * 2(\text{Student Type}) * 2(\text{Student Location}) = 36$  test cases for exhaustive testing.

2. What are the factors and levels for each factor?

Answer:

Operating System is a factor with 3 levels

Browser is a factor with 3 levels

Student Type is a factor with 2 levels

Student Location is a factor with 2 levels.

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

Answer:

We need 9 test cases for Pairwise Orthogonal Array Testing

4. Select and show the proper Orthogonal Array

Answer:

We can select L9 for this question.

Orthogonal Array is as follows:

Test , OS, Browser, Student Type, Student Location

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

Answer:

Test	OS	Browser	Student Type	Student Location
1	OSX	Safari	U	C
2	OSX	Firefox	G	R
3	OSX	Chrome	U	C
4	Linux	Safari	G	R
5	Linux	Firefox	U	C
6	Linux	Chrome	G	R
7	Windows 10	Safari	U	C
8	Windows 10	Firefox	G	R
9	Windows 10	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?

Answer:

There are in total  $2*2*2*2 = 16$  combinations

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

Answer:

To cover all combinations of one variable we will need 2 tests

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

Answer:

We can use L8 for this question. It will have 8 test cases

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

Answer:

We will use L8 for this scenario

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

Answer:

It will 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.

**Answer these questions:**

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

Answer:

Total combinations are  $3 \times 4 \times 3 = 36$

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

Answer:

Minimum number of testcases for pairwise testing can be 9 test cases

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

Answer:

We can use L9 for this questions.

It will be as follows:

Test, Type of System, Book Type, Language

## 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?

Answer:

Total combinations are  $5 \times 3 \times 3 = 45$

2. Which orthogonal array should you use?

Answer:

We can use L9 for this question

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)

Answer:

We need to run 4 tests to run all combinations of two variables

Honor Pledge:

"I pledge my honor that I have abided by the Stevens Honor System."