**HW 06: Practice with Orthogonal Array Testing**

**Part 1:**

**Given Information:**

OS: {OSX, Linux, Win10}

Browser: {Safari, Firefox, Chrome}

Student Type: {U, G}

Student Location: {C, R}

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

* Total number of test cases for exhaustive testing:

3 Operating Systems X 3 Browsers X 2 Student types X 2 Student locations = 36 test cases

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **OS** | **Browser** | **Student Type** | **Student Location** |
| 1. | OSX | Safari | U | R |
| 2. | OSX | Safari | U | C |
| 3. | OSX | Safari | G | R |
| 4. | OSX | Safari | G | C |
| 5. | OSX | Firefox | U | R |
| 6. | OSX | Firefox | U | C |
| 7. | OSX | Firefox | G | R |
| 8. | OSX | Firefox | G | C |
| 9. | OSX | Chrome | U | R |
| 10. | OSX | Chrome | U | C |
| 11. | OSX | Chrome | G | R |
| 12. | OSX | Chrome | G | C |
| 13. | Linux | Safari | U | R |
| 14. | Linux | Safari | U | C |
| 15. | Linux | Safari | G | R |
| 16. | Linux | Safari | G | C |
| 17. | Linux | Firefox | U | R |
| 18. | Linux | Firefox | U | C |
| 19. | Linux | Firefox | G | R |
| 20. | Linux | Firefox | G | C |
| 21. | Linux | Chrome | U | R |
| 22. | Linux | Chrome | U | C |
| 23. | Linux | Chrome | G | R |
| 24. | Linux | Chrome | G | C |
| 25. | Win10 | Safari | U | R |
| 26. | Win10 | Safari | U | C |
| 27. | Win10 | Safari | G | R |
| 28. | Win10 | Safari | G | C |
| 29. | Win10 | Firefox | U | R |
| 30. | Win10 | Firefox | U | C |
| 31. | Win10 | Firefox | G | R |
| 32. | Win10 | Firefox | G | C |
| 33. | Win10 | Chrome | U | R |
| 34. | Win10 | Chrome | U | C |
| 35. | Win10 | Chrome | G | R |
| 36. | Win10 | Chrome | G | C |

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

* 4 Factors (2 with 3 Levels and 2 with 2 levels)
  + Factor => OS
    - Levels => OSX, Linux, Win10
  + Factor => Browser
    - Levels => Safari, Firefox, Chrome
  + Factor => Student Type
    - Levels => U, G
  + Factor => Student Location
    - Levels => C, R

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

* Since 2 variables have 3 values each, Hence, total 9 tests (3 X 3) and L9 Array will be used.

1. Select and show the proper Orthogonal testing?

* Since there are 9 tests, L9 array will be used.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Testcases | Process Parameters | | | |
|  | A | B | C | D |
| 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 1 | 1 | 1 |
| 3 | 0 | 2 | 0 | 0 |
| 4 | 1 | 0 | 1 | 1 |
| 5 | 1 | 1 | 0 | 0 |
| 6 | 1 | 2 | 1 | 1 |
| 7 | 2 | 0 | 0 | 0 |
| 8 | 2 | 1 | 1 | 1 |
| 9 | 2 | 2 | 0 | 0 |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Testcases | Process Parameters | | | |
|  | OS | Browser | Student Type | Student Location |
| 1 | OSX | Safari | U | R |
| 2 | OSX | Firefox | G | C |
| 3 | OSX | Chrome | U | R |
| 4 | Linux | Safari | G | C |
| 5 | Linux | Firefox | U | R |
| 6 | Linux | Chrome | G | C |
| 7 | Win10 | Safari | U | R |
| 8 | Win10 | Firefox | G | C |
| 9 | Win10 | Chrome | U | R |

**Part 2:**

**Given Information:**

Sale Types: {On-Line [O], Retail in-store [R]}

Store Location: {USA, Canada}

Payment mode: {Visa, American Express}

Service: {Selling, Maintenance and Sales}

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

* 2 Sale types \* 2 Store Location \* 2 Payment mode \* 2 Service = 16 Configurations

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

* 4 combinations

1. What is the orthogonal array which you can use for this problem? How many testcases does it represent?

* 4 variables with 2 values each would require L8 array.

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

* 7 variables with 2 value each would still require L8 array.

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

* 8 test cases

**Part 3:**

**Given Information:**

Provider: {Kindle, iPad, Zok}

Classes of Book: {Textbooks, Poetry, Graphic Novels, Regular Novels}

Languages: {English, Spanish, Japanese}

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

* 3 Providers \* 4 Classes of Book \* 3 Languages = 36 Combinations

1. What is the minimum number of tests for pairwise testing?

* 3 \* 4 = 12 tests (minimum)

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

* With 3 variables, 2 variables with 3 values and 1 variable with 4 values, L12 array table will be used

**Part 4:**

**Given Information:**

Variables: {OS, Browser, Languages}

Values: {5, 3, 3}

1. How many combinations are there of these variables?

* 5 OS \* 3 Browser \* 3 Languages = 45 Combinations

1. Which orthogonal array should you use?

* With 3 variables (2 variables with 3 values and 1 variable with 5 values) then 3\*5 = 15 tests and method used is orthogonal pair wise. Hence, according to Taguchi Orthogonal Array design for five level factors, L25 orthogonal array will be used.

1. How many individual tests do you need to run for all combinations of two variables?

* 3\*5 = L15