Week 2 R Training #1 – Factorial Design

Factorial Design

In a **factorial design**, there are more than one factors under consideration in the experiment. The test subjects are assigned to treatment levels of every factor combinations at random.

**Example**

A fast food franchise is test marketing 3 new menu items in both East and West Coasts of continental United States. To find out if they the same popularity, 12 franchisee restaurants from each Coast are randomly chosen for participation in the study. In accordance with the factorial design, within the 12 restaurants from East Coast, 4 are randomly chosen to test market the first new menu item, another 4 for the second menu item, and the remaining 4 for the last menu item. The 12 restaurants from the West Coast are arranged likewise.

**Problem**

Suppose the following tables represent the sales figures of the 3 new menu items after a week of test marketing. Each row in the upper table represents the sales figures of 3 different East Coast restaurants. The lower half represents West Coast restaurants. At .05 level of significance, test whether the [mean](http://www.r-tutor.com/node/35) sales volume for the new menu items are all equal. Decide also whether the mean sales volume of the two coastal regions differs.