Stat 100B Extra Credit

Question: Starbucks is test marketing two new menu items for the holidays. To find out if they have the same popularity, 4 stores are randomly chosen to sell the items. The data below shows the sales of each item at each Starbucks after a week of sales in thousands of dollars.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Item 1 | Item 2 | Total |
| Starbucks 1 | 280 | 270 | 550 |
| Starbucks 2 | 290 | 290 | 580 |
| Starbucks 3 | 430 | 310 | 740 |
| Starbucks 4 | 310 | 280 | 590 |
| Total | 1310 | 1150 | G = 2460 |

Source: Sarah Ruckman

Type of design: Randomized Block Design

Experimental Unit: Starbucks

Factor(s): The items and Starbucks stores

Number of Levels: 2 and 4

Treatment: Items

Number of Treatments: 2

Response: week of sales in thousands of dollars for each item

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | df | SS | MS | F |
| Treatment | 1 | 3200 | 3200 | 2.133 |
| Block | 3 | 10850 | 3616.667 | 2.411 |
| Error | 3 | 4500 | 1500 |  |
| Total | 7 | 18550 |  |  |

|  |  |
| --- | --- |
| **Treatment:**  H0: μ1 = μ2  Ha: At least one μi differs, i = 1, 2  *t.s.* = *F*= 2.133  *c.v.* = *Fα, (k-1), (k-1)(b-1)* = *F*0.05, 1, 3 = 10.13  Do Not Reject H0 since *t.s.* < *c.v.*  There is insufficient evidence to suggest a difference in item sales. | **Block:**  H0: μ1 = μ2 = μ3 = μ4  Ha: At least one μi differs, i = 1, 2, 3, 4  *t.s.* = F = 2.411  *c.v.* = *Fα, (b-1), (k-1)(b-1)* = F0.05, 3, 3 = 9.28  Do Not Reject H0 since *t.s.*< *c.v.*  There is insufficient evidence to suggest a difference in Starbucks stores sales per item.  *ie.* Blocking was not necessary. |