Problem Statement: 1 Evaluation of diet plans for weight loss

A health researcher wants to examine the effect of three different diets on weight loss in a sample of individuals. The diets under consideration are Diet A (low-carb), Diet B (low-fat), and Diet C (balanced). The researcher randomly assigns 30 participants to each diet group and measures their weight loss (in kilograms) after following the respective diet for 8 weeks. The researcher aims to determine if there is a significant difference in mean weight loss among the three diet groups using one-way ANOVA.

Diet Group   Weight Loss (kg)

Diet A   4.5, 5.1, 3.9, 4.8, 4.3, 5.2, 5.5, 4.2, 4.7, 3.8,

       4.9, 4.6, 4.1, 5.3, 4.4, 5.0, 4.0, 4.5, 5.4, 4.6,

       3.7, 5.1, 4.8, 3.6, 5.2, 4.3, 4.9, 4.7, 5.0, 4.4

Diet B   3.1, 3.5, 2.8, 3.3, 3.0, 3.7, 3.9, 2.7, 3.2, 2.5,

       3.6, 3.4, 2.9, 3.8, 3.1, 3.5, 2.6, 3.1, 3.7, 3.4,

       2.4, 3.5, 3.2, 2.3, 3.6, 3.0, 3.6, 3.4, 3.7, 3.3

Diet C   5.8, 6.2, 5.5, 6.0, 5.7, 6.5, 6.8, 5.4, 6.1, 5.3,

       6.2, 6.0, 5.6, 6.7, 5.9, 6.3, 5.2, 5.8, 6.6, 6.0,

       5.1, 6.4, 5.7, 5.0, 6.3, 5.6, 6.4, 6.1, 6.7, 5.9

In this example, each diet group (A, B, C) has 30 observations representing the weight loss of individuals following that particular diet. We'll use this data to perform a one-way ANOVA to determine if there are significant differences in mean weight loss among the three diet groups.

Problem Statement : 2 Analysis of Housing Prices by Neighborhood

A real estate agency wants to investigate whether there is a significant difference in housing prices among three different neighborhoods (Neighborhood A, Neighborhood B, Neighborhood C). They randomly select 25 houses from each neighborhood and record their sale prices (in thousands of dollars). The agency aims to determine if there are significant differences in mean housing prices across the three neighborhoods using one-way ANOVA.

Neighborhood   Sale Price ($000's)

Neighborhood A   350, 380, 365, 370, 360, 355, 375, 385, 370, 360,

355, 375, 380, 370, 360, 365, 370, 380, 365, 375,

370, 360, 370, 375, 380

Neighborhood B   320, 325, 310, 335, 330, 315, 320, 325, 330, 340,

330, 325, 310, 335, 320, 325, 330, 335, 320, 315,

330, 335, 325, 320, 330

Neighborhood C   380, 390, 385, 400, 395, 380, 385, 390, 395, 400,

390, 385, 400, 395, 380, 385, 390, 395, 380, 385,

390, 395, 400, 385, 390

In this example, each neighborhood (A, B, C) has 25 observations representing the sale prices of houses. We'll use this data to perform a one-way ANOVA to determine if there are significant differences in mean housing prices among the three neighborhoods.

Problem Statement : 3 Evaluation of Employee Performance by Department

A human resources department wants to assess whether there is a significant difference in employee performance ratings among three different departments (Department X, Department Y, Department Z). They randomly select 20 employees from each department and record their performance ratings (on a scale of 1 to 10). The department aims to determine if there are significant differences in mean performance ratings across the three departments using one-way ANOVA.

Department   Performance Rating

Department X   8, 7, 9, 8, 7, 8, 9, 7, 8, 7,

            8, 9, 7, 8, 7, 9, 8, 7, 8, 9

Department Y   6, 5, 7, 6, 5, 6, 7, 5, 6, 5,

            6, 7, 5, 6, 5, 7, 6, 5, 6, 7

Department Z   9, 8, 9, 10, 8, 9, 10, 8, 9, 8,

            9, 10, 8, 9, 10, 8, 9, 8, 9, 10

In this example, each department (X, Y, Z) has 20 observations representing the performance ratings of employees. We'll use this data to perform a one-way ANOVA to determine if there are significant differences in mean performance ratings among the three departments.