**Assignments on Paired Sample t-test**

Perform a paired t-test and interpret the results. Determine whether there is enough evidence to reject the null hypothesis and conclude that there is a significant difference. Assume a significance level (α) of 0.05 for all tests.

1. A pharmaceutical company is testing a new blood pressure medication. They measure the blood pressure of 20 individuals before and after they take the medication for six weeks. The goal is to determine if there is a significant change in blood pressure after taking the medication.

**Before Medication:**

130, 125, 140, 122, 128, 138, 135, 129, 132, 127, 134, 130, 131, 137, 126, 133, 128, 139, 136, 130

**After Medication:**

125, 120, 130, 118, 122, 132, 130, 124, 128, 123, 130, 125, 126, 131, 120, 129, 126, 134, 133, 125

2. A teacher believes that a new study technique helps improve students' exam scores. The teacher records the scores of 15 students before and after implementing the new study technique. Test the hypothesis that the new study technique leads to a significant increase in exam scores.

**Before Study Technique:**

78, 85, 92, 79, 88, 90, 84, 87, 82, 81, 89, 83, 86, 80, 91

**After Study Technique:**

85, 88, 95, 82, 91, 93, 87, 90, 86, 84, 92, 88, 89, 84, 93

3. A fitness trainer wants to determine if a new weight loss program is effective. She records the weight (in pounds) of 12 participants before they start the program and then again after 8 weeks. Test the hypothesis that the weight loss program leads to a significant reduction in weight.

**Before Weight Loss Program:**

180, 175, 190, 185, 200, 195, 182, 178, 188, 192, 180, 175

**After Weight Loss Program:**

175, 168, 185, 178, 195, 190, 172, 170, 180, 185, 172, 168

4. A psychologist is studying the effect of a new training program on reaction times. She records the reaction times (in milliseconds) of 15 participants before they undergo the training and then again after completing the training. Test the hypothesis that the training program leads to a significant improvement in reaction times.

**Before Training Program:**

300, 310, 290, 305, 315, 300, 295, 310, 298, 305, 315, 300, 312, 308, 298

**After Training Program:**

280, 290, 275, 300, 310, 285, 290, 295, 280, 290, 300, 292, 298, 292, 285