**Assignment 2**

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**Summary of Results**

**1. Test of Significance for Assembly Time**

* **Test Statistic (z)**: -2.53
* **Critical Value (z)**: 1.64
* **P-value**: 0.0057
* **Conclusion**: Reject the null hypothesis. There is significant evidence that the average assembly time has decreased after implementing the new training program (Di Leo & Sardanelli, 2020).

**2. Test of Significance for Graduate Students Study Hours**

* **Test Statistic (t)**: 1.72
* **Critical Value (t)**: 1.76
* **P-value**: 0.0536
* **Conclusion**: Fail to reject the null hypothesis. There is no significant evidence that graduate students study more than 25 hours per week.

**3. Simple Linear Regression Analysis**

* **Dependent Variable**: Score
* **Independent Variable**: Hours of Study
* **R-squared**: 0.598 (indicates that approximately 59.8% of the variability in scores can be explained by hours of study)
* **Regression Coefficient (Hours of Study)**: 7.48 (for each additional hour of study, the score increases by approximately 7.48 points)
* **Intercept**: 17.47
* **P-value for Hours of Study**: 0.000 (indicating a statistically significant relationship)

**4. Linear Optimization Results**

* **Optimal Production of Product A (x1)**: 0.0 units
* **Optimal Production of Product B (x2)**: 7.86 units
* **Optimal Production of Product C (x3)**: 30.71 units
* **Maximum Total Production**: 38.57 units
* **Status**: Optimal

**Insights**

* The training program appears to be effective in reducing assembly time.
* Graduate students' study hours are not significantly greater than 25 based on the sample.
* The regression analysis indicates a positive correlation between study hours and exam scores (Maulud & Abdulazeez, 2020).
* The production optimization suggests focusing on Product B and C for maximum output under the given machine constraints.

Reference

Di Leo, G., & Sardanelli, F. (2020). Statistical significance: p value, 0.05 threshold, and applications to radiomics—reasons for a conservative approach. *European radiology experimental*, *4*, 1-8.

Maulud, D., & Abdulazeez, A. M. (2020). A review on linear regression comprehensive in machine learning. *Journal of Applied Science and Technology Trends*, *1*(2), 140-147.