**Background:**

NCK Services Co. is examining its annual payroll to implement salary raises. The company is committed to fair and equitable compensation for all employees but faces a challenge in how to distribute raises.

Current Salary Structure:

|  |  |
| --- | --- |
| **Position** | **Salary** |
| President | $100,000 |
| Manager | $50,000 |
| Secretary | $40,000 |
| Maintenance Worker | $10,000 |

Descriptive Statistical Analysis:

|  |  |
| --- | --- |
| Mean Salary | $50,000 |
| Salary Range | $90,000 |
| Variance | $1,050,000,000 |
| Standard Deviation (SD) | $32,400 |

**Scenario:**

The company initially considered a flat 5% raise across all salaries. However, this approach leads to an increase in both the mean salary and the SD, exacerbating income inequality. The top earner receives 50% of the new money, while the bottom earner gets only 5%.

Task: Your objective is to propose an alternative raise strategy that aims to reduce income inequality while ensuring a fair distribution of the increased payroll budget.

**Questions:**

1. Analysis of the Current Strategy:

Explain how a flat 5% raise affects income inequality, using variance and SD as your reference points.

Illustrate the impact of the flat 5% raise on the salary distribution (Hint: Consider how the mean and SD change).

1. Alternative Raise Strategies:

Propose at least two alternative raise strategies.

For each strategy, explain how it could potentially lead to a more equitable salary distribution.

Discuss the expected impact of your proposed strategies on the company's variance and SD of salaries.

1. Visualization and Interpretation:

If possible, provide a visual representation (e.g., a box plot) to compare the effects of different raise strategies on salary distribution.

Interpret your findings and justify why your proposed strategy(s) could be more equitable.

**Goal:**

Through this exercise, you will apply your understanding of variance and standard deviation to a real-world problem, demonstrating how these statistical measures can inform more equitable decision-making in a business context.