Supplementary Problem 3: Cost Estimation – High-Low Method

As we've discussed, costs may exhibit varied cost behavior patterns. Cost estimation is the process of determining how a particular cost behaves. Chapter 2 in your text describes several methods of estimating costs. Some of these are relatively simple (e.g., account classification) while others are much more costly and/or complex (e.g., motion and time studies, regression). This supplementary problem describes another method of cost estimation – the high-low method.

In the high-low method, two data points are used to approximate fixed and variable costs. The two data points that will be used are selected by finding the high and low **activity levels** (NOT the cost levels) from the available data. Let us denote the high activity level and associated cost as A_{high} and C_{high}, respectively, and let us denote the low activity level and associated cost as A_{low} and C_{low}, respectively. These two data points are then used to compute fixed and variable costs as follows:

$$\text{Variable cost per unit} = \frac{\text{Change in the cost of the two activity levels}}{\text{Change in the activity level}} = \frac{C_{high} - C_{low}}{A_{high} - A_{low}}$$

This formula gives the variable cost per unit. Next, we need to compute the total variable cost at either the high or low activity level. Multiplying the variable cost per unit by the activity level at either the high or low point, we obtain the total variable cost. Finally, we obtain the estimate of fixed cost by subtracting total variable cost from total cost. Note: if you select the high activity level in the computation of total variable cost, you must use the total cost corresponding to the high activity level in determining fixed cost. You now have all the information necessary to develop a cost formula.

Note that this method is more objective than the account classification method while only slightly more complex. However, only two data points are used to estimate cost behavior, and to the extent that these data points are outliers, the cost estimation is flawed. Additionally, since only two data points are used in the estimation procedure, any information from all other data points between the two extreme activity levels is ignored. Given this weakness, statistical techniques (e.g., regression) may be employed.

Problem Assignment:

Eagle Manufacturing has incurred the following machine maintenance costs over the last twelve months.

Month	Machine Hours	Cost
January	10,000	$15,500
February	15,000	16,233
March	12,750	18,186
April	13,268	19,125
May	9,256	11,159
June	10,335	15,117
July	13,295	18,998
August	12,652	17,874
September	9,964	10,685
October	10,865	16,853
November	11,569	17,365
December	14,639	19,931

a. Use the high-low method to estimate the variable cost per machine hour and the fixed cost per month.
b. Develop a formula to express the cost behavior of Eagle's maintenance costs.
c. Predict the level of maintenance cost that would be incurred during a month when 13,000 machine hours are worked.
d. Predict the level of maintenance cost that would be incurred during a month when 45,000 machine hours are worked.