**Problem Statement:** Using the cross-validation technique determine the exponential regression model which can best predict the promo lift.

**Approach:**

1. Divide the dataset in into Training and Validation set using the rand function. Copy and paste this vector as values so that the vector does not refresh every time.
2. Map the division column from the original dataset to one dummy variable for each department as we do not have an intercept in this data.
3. Create and initialize variables for Alpha (α) and Price Elasticity (PE) having subscript ‘k’ where ‘k’ corresponds to the division.
4. Calculate the predicted lift for every record using the exponential regression formula corresponding to every division.
5. Calculate the weighted error squares for every record in the dataset.
6. Calculate the sum of the weighted errors for the training data.
7. Minimize this sum of error using the solver by changing the α and PE variables.
8. Calculate the sum of the weighted errors for the validation data.
9. Create the results table using the VLOOKUP formula.

**Calculating the predicted lift:**

1. **Model 1 with 4 Alpha, 4PE:**

Calculate the SUMPRODUCT of the **α**s with the divisions and multiply it with the exponent of discount times the SUMPRODUCT of PEs with the divisions.

1. **Model 2 with 4 Alpha, 1PE:**

Calculate the SUMPRODUCT of the **α**s with the divisions and multiply it with the exponent of discount times the PE.

1. **Model 3 with 1 Alpha, 4PE:**

Multiply the alpha with the exponent of the discount times the SUMPRODUCT of PEs with the divisions.

1. **Model 4 with 1 Alpha, 1PE:**

Multiply the alpha with the exponent of the discount times the PE.

**Calibrating the Alpha and PE variables based on the training set using the WASE loss function:**

1. Using the SUMIF function of the EXCEL calculate the sum of weighted squared errors for the training set.
2. Use solver to minimize the sum of training errors by modifying the variables.
3. Calculate the sum of the square errors using the SUMIF function for the validation set.