INVESTMENT ALLOCATION

DATA OVERVIEW

- ***Problem Statement***: The task involves analyzing an investment allocation problem using a dataset that outlines various investment options, their returns, and constraints. The objective is to maximize the actual return while adhering to specified constraints.

A brokerage firm has been instructed by a client to invest $250,000. The client requests the firm select whatever stocks and bonds they believe are well-rated, but with the following guidelines:

- Municipal bonds constitute at least 20% of investment.
- At least 40% of the investment is placed in tech stocks.
- No more than 50% of the amount invested in municipal bonds should be high risk.

The table below lists the rate of return for five different investment options.

Investment	Rate of Return (%)
L.A. Municipal Bond	5.3
Thompson Electronics, Inc.	6.8
United Aerospace Corp.	4.9
Palmer Technologies	8.4
HDN Stock (high risk)	11.8

- ***Key Variables***

1. Objective (max): The goal is to maximize the return on investment.
2. Actual Return**:** The actual return values for different investment options.
3. Constraints Table**:** Includes various constraints that need to be satisfied.

STEPS TO SOLVE THE PROBLEM

1. Define the Objective Function**:** Maximize the total return.
2. Set Up Constraints**:** Include all budget and logical constraints.
3. Use Solver (Simplex LP): Apply the Simplex Linear Programming method to find the optimal solution.

CONSTRAINTS

- **Budget Constraints:**
  - x5 <= 50 * x1
  - x5 - 50 * x1 <= 0
- **Logical Constraints:**
  - x5 <= 250,000
  - x5 >= 50,000
  - x5 <= 175,000
  - x5 >= 0

INVESTMENT OPTIONS

- **x1:** Return of 0.053, Budget of 50,000, Actual Return of 20,300
- **x2:** Return of 0.068, Budget of 0, Actual Return calculated using SUMPRODUCT
- **x3:** Return of 0.049, Budget of 0
- **x4:** Return of 0.084, Budget of 175,000
- **x5:** Return of 0.118, Budget of 25,000

CONCLUSION

The dataset provides a structured approach to investment allocation with the objective of maximizing returns while adhering to specified constraints. By using the Simplex LP solver, the optimal investment strategy can be determined, ensuring that all constraints are satisfied.