Project Pitch Conner Toryfter

Problem Motivation:

Having spent over the past year working at Ians Pizza one issue we are always trying to minimize is our food waste. One factor that can help lower our overall waste is the amount of dough we have on hand. If we have an excess of dough we tend to make extra pizzas during hours that might be a bit slower, in order to not waste the dough, and lead to us having extra waste. The problem focuses on finding the optimal amount of dough to have on hand with the goal of minimizing waste for Ian's Pizza, which has become a cost and sustainability issue. Due to varying demand and the unpredictability of custom orders, excess dough often remains unused at the end of each day, in addition to the pizza slices which sometimes need to be counted as waste as well. The goal is to create an optimization model to minimize our waste while ensuring sufficient dough inventory for daily operations.

Discussion of Mathematical Model:

Objective:
The primary objective is to minimize daily waste by balancing dough production with demand forecasts. This will reduce both waste and costs associated with unused dough.

Decision Variables:
- X_d Amount of dough prepared each day (d)
- Y_d: Binary variable indicating if the additional dough is prepared mid-day on day (d)
- Z_d: Amount of dough allocated for 20-inch pizza orders on day d

Constraints:
- Demand Constraint: Ensure prepared dough meets daily demand forecasts.
- Waste Constraint: Minimize leftover dough after all orders are fulfilled each day.
- Storage Constraint: Limit dough that can be stored overnight.
- Labor Constraint: Restrict the number of mid-day dough preparations based on available staffing.

Proposed Analysis:

- **Sensitivity Analysis:** Assess how changes in demand estimates impact dough waste.
- **Model Variation**: Introduce a constraint that compares each type of dough not just the 20 inch ones.
- **Objective Variation**: Shift the objective to focus on minimizing the cost of waste by factoring in dough costs.

Data Gathering Plan:

- I should have access to all the data we will need for this to run smoothly including our sales projections, dough projections, previous waste totals, as well as other sales information that could be useful in minimizing our waste.

Data Requirements:

I believe that 3 months worth of data will be enough to figure out a solution to this problem.