**Mathematical Model**

INPUTS:

Decision Variables

Objective:

The objective is to **minimize** the total cost, which includes:

* **Holding Costs**: The cost of storing excess inventory.
* **Backorder Costs**: The cost of unfulfilled demand (i.e., when demand exceeds available stock).

The total cost to minimize is:

nstraints:

**Inventory Balance Constraint:**

This ensures that the stock after the order meets or exceeds the demand.

**Reorder Level Constraint:**

This ensures that the order quantity meets or exceeds the reorder level.

**Non-Negativity Constraint:**

This ensures that the order quantity cannot be negative.

**Non-Negativity for Backorders:**

This ensures that backorder quantities cannot be negative.