Practice Problem #1: Mathematical Modeling Review

Annapolis Coffee Roastery is trying to decide their fall coffee roasting line up to be put into storage. They have five different coffee roasts they can sell: Ethiopian, Colombian, Hawaiian, Kenyan, and Mexican. Their warehouse can store up to 1,800 pounds of beans, and their roasting machine roasts beans in exactly 100 lb. batches. Also, it costs Annapolis Coffee Roastery $100 to roast a single batch of coffee. Ethiopian beans can be sold for $12 per pound, Colombian for $20 per pound, Hawaiian for $10 per pound, Kenyan for $18 per pound, and Mexican for $14 per pound. Annapolis Coffee Roastery wants to make sure that they roast atleast 200 lbs. and no more than 800 lbs. of coffee beans from Africa and atleast 100 lbs. and no more than 1,200 lbs. of coffee beans from North America.

1   Concrete Model:

Formulate the coffee roasting problem above as a **concrete** mathematical programming model to maximize Annapolis Coffee Roastery's profits. Clearly define and describe all decision variables, constraints, and the objective.

2   Abstract Model:

Formulate the coffee roasting problem as an **abstract** mathematical programming model. Clearly define and describe all sets, parameters, and decision variables.