Lesson 6. Blending Models

Problem 1. You and your partner have decided to enter the candy business. You can produce two types of candies: Primal Pralines and Dual Doves, using somewhat flexible mixtures of sugar, nuts, and chocolate. You currently have 100 ounces sugar, 20 ounces nuts, and 30 ounces chocolate in inventory. The mixture used to make Primal Pralines must contain at least 20% nuts. The mixture used to make Dual Doves must contain at least 10% nuts, but at most 40% chocolate. Each ounce of Primal Pralines can be sold for 25 cents, and each ounce of Dual Doves can be sold for 20 cents. Since your candy is so delicious, you can always sell all the candy you produce. Write a linear program that determines a production plan that maximizes your revenue.

Problem 2. You are a portfolio manager in charge of a bank portfolio with $10 million to invest. There are 5 different securities available:

Bond name	Bond type	Years to maturity	Yield to maturity
1	Municipal	9	4.3%
2	Agency	15	2.7
3	Gov't	4	2.5
4	Gov't	3	2.2
5	Municipal	2	4.5

The bank has some policies that limit how you can construct your portfolio:

1. Government and agency bonds must total at least $4 million
2. The average years to maturity of the portfolio must not exceed 5 years
3. Bonds cannot be "shorted" (cannot buy negative amounts of bonds)

Write a linear program that determines a portfolio of the above securities that maximizes earnings.