

§9.2 (PART 1): FORMULATING INTEGER PROGRAMMING PROBLEMS

- 1.] SET COVERING: There are six cities in Kilroy County. The county must determine where to build fire stations. The county wants to build the minimum number of fire stations needed to ensure that at least one fire station is within 15 minutes (driving time) of each city. The times (in minutes) required to drive between the cities in Kilroy County are given in the table below. Formulate an IP that will tell Kilroy how many fire stations should be built and where they should be located.

Time Required to Travel between Cities in Kilroy County

	City 1	City 2	City 3	City 4	City 5	City 6
City 1	0	10	20	30	30	20
City 2	10	0	25	35	20	10
City 3	20	25	0	15	30	20
City 4	30	35	15	0	15	25
City 5	30	20	30	15	0	14
City 6	20	10	20	25	14	0

- 2.] **FIXED-CHARGE PROBLEM:** I have been approached by three telephone companies to subscribe to their long-distance service in the United States. MaBell will charge a flat \$16 per month plus \$0.25 a minute. PaBell will charge \$25 per month but will reduce the per-minute cost to \$0.21. As for BabyBell, the flat monthly charge is \$18, and the cost per minute is \$0.22. I usually make an average of 200 minutes of long-distance calls a month. Assuming that I do not pay the flat monthly fee unless I make calls and that I can apportion my calls among all three companies, how should I use the three companies to minimize my monthly telephone bill?