The capacitated plant location model [1]

TelecomOptic is a manufacturer of telecommunication equipment. The manufacturing plant locations, demand centers, plant capacities, variable production and transportation costs per thousand units shipped, and fixed costs per month are given in Table **??**

	Demand city Production & transportation cost/thousand units (000 $)						Monthly capacity	Monthly fixed cost
Supply city	Atlanta (**A**)	Boston (**B**)	Chicago (**C**)	Denver (**D**)	Omaha (**O**)	Portland (**P**)	(000 units) K_i	(000 $) f_i
Baltimore (**L**)	1675	400	685	1630	1160	280	18	7650
Cheyenne (**H**)	1460	1940	970	100	495	1200	24	3500
Salt lake city (**S**)	1925	2400	1425	500	950	800	27	5000
Memphis (**M**)	380	1355	543	1045	665	2321	22	4100
Wichita (**W**)	922	1646	700	508	311	1797	31	2200
Monthly demand (000 units) D_j	10	8	12	6	7	11		

Table 1: Capacity, demand, and cost data for TelecomOptic

The management is debating whether all five factories are needed to serve the six markets.

Exercise 1 *As a supply-chain consultant we wish to model this an an IP and make recommendations.*

1. *Which factories must be kept open?*
2. *What if the management decided to have single-sourcing. How would our model change?*

Knights, Knaves, and Werewolves [2]

Part A: Suppose you are visiting a forest in which inhabitants are either knights or knaves. Knights always tell the truth and knaves always lie. In addition, some of the inhabitants have this annoying habit of turning into wolves at night and devouring people. A werewolf can either be knight or a knave. After you enter the forest you interview 3 inhabitants. They make the following statements:

A: I am a werewolf

[1] Adapted from: Chopra Sunil and Peter Meindl, *Supply Chain Management: Strategy, Planning, and Operation*, Pearson Education (Singapore) Pte. Ltd., Indian Branch, 482 FIE, Delhi, India, 2004

[2] Source: Chlond, M. and Cath Toase, *IP Modeling and the Logical Puzzles of Raymond Smullyan*, INFORMS Transaction on Education, **3**(3), 1-12.

B: I am a werewolf

C: At most one of us is a knight

It is known that exactly one of them is a werewolf. You want a complete classification of these three – so that you can choose a good friend.

Exercise 2 *How are you going to classify them?*

Part B: Your companion, who also entered the forest with you, had a similar encounter with three other inhabitants, D, E, and F. Here are their statements:

D: At least one of the three of us is a knave

E: F is a knight

Exercise 3 *Given that there is exactly one werewolf and that he is a knight, who is the werewolf?*