

NEW OFFICES AT ATLANTIC MANAGEMENT SYSTEMS

Atlantic Management Systems is a consulting firm that specializes in developing computerized decision support systems for computer manufacturing companies. The firm currently has offices in Chicago, Charlotte, Pittsburgh, and Houston. It is considering opening new offices in one or more cities—including Atlanta, Boston, Washington, DC, St. Louis, Miami, Denver, and Detroit—and it has \$14 million available for this purpose. Because of the highly specialized nature of its high-tech consulting work, the firm must necessarily staff any new offices with a minimum number of its employees from its existing offices. However, it has a limited number of employees available to transfer to any new offices. In addition, the cost of transferring employees depends on the city they are leaving and the city to which they might move.

Following are the costs for opening a new office in each of the prospective cities and the start-up staffing needs at each office:

Prospective Office	Setup Cost (\$1,000,000s)	Staffing Needs (employees)
1. Atlanta	\$1.7	9
2. Boston	3.6	14
3. Denver	2.1	8
4. Detroit	2.5	12
5. Miami	3.1	11
6. St. Louis	2.7	7
7. Washington, DC	4.1	18

The numbers of employees available for transfer from each of the current offices are as follows:

Existing Office	Available Employees
Chicago	24
Charlotte	19
Pittsburgh	16
Houston	21

The costs (in thousands of dollars) of transferring an employee from an existing office to a new office differ according to housing costs and moving expenses plus cost of living adjustments. They are as follows:

Current Office	Prospective New Offices (costs, \$1,000s)						
	1. Atlanta	2. Boston	3. Denver	4. Detroit	5. Miami	6. St. Louis	7. Washington, DC
1. Chicago	\$19	\$32	\$27	\$14	\$23	\$14	\$41
2. Charlotte	14	47	31	28	35	18	53
3. Pittsburgh	16	39	26	23	31	19	48
4. Houston	22	26	21	18	28	24	43

The firm has ranked the possible new offices according to their profit potential, with Washington, DC, being the best (i.e., greatest potential), as follows:

New Office	Rank
Washington, DC	1
Miami	2
Atlanta	3
Boston	4
Denver	5
St. Louis	6
Detroit	7

In addition, the firm wants at least one new office in the Midwest (i.e., Detroit and/or St. Louis) and one new office in the Southeast (i.e., Atlanta or Miami).

Formulate and solve an integer programming model to help Atlantic Systems determine how many new offices it should open, where they should be located, and how to transfer employees.